

USDA-ARS | U.S. Wheat and Barley Scab Initiative
FY21 FINAL Performance Progress Report

Due date: July 26, 2023

Cover Page

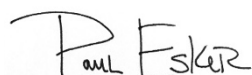
USDA-ARS Agreement ID:	59-0206-0-140
USDA-ARS Agreement Title:	Integrated Management of Fusarium Head Blight in Wheat in Pennsylvania
Principle Investigator (PI):	Paul Esker
Institution:	Pennsylvania State University
Institution UEI:	NPM2J7MSCF61
Fiscal Year:	2021
FY21 USDA-ARS Award Amount:	\$27,101
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Period of Performance:	6/1/22 - 9/30/23
Reporting Period End Date:	9/30/2023

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
MGMT-IM	Integrated Management of Fusarium Head Blight in Wheat in Pennsylvania	\$27,101
FY21 Total ARS Award Amount		\$27,101

I am submitting this report as a: FINAL Report

I certify to the best of my knowledge and belief that this report is correct and complete for performance of activities for the purposes set forth in the award documents.



November 21, 2023

Principal Investigator Signature

Date Report Submitted

† BAR-CP – Barley Coordinated Project
 DUR-CP – Durum Coordinated Project
 EC-HQ – Executive Committee-Headquarters
 FST-R – Food Safety & Toxicology (Research)
 FST-S – Food Safety & Toxicology (Service)
 GDER – Gene Discovery & Engineering Resistance
 HWW-CP – Hard Winter Wheat Coordinated Project

MGMT – FHB Management
 MGMT-IM – FHB Management – Integrated Management Coordinated Project
 PBG – Pathogen Biology & Genetics
 TSCI – Transformational Science
 VDHR – Variety Development & Uniform Nurseries
 NWW –Northern Soft Winter Wheat Region
 SPR – Spring Wheat Region
 SWW – Southern Soft Red Winter Wheat Region

Project 1: 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:

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 flexibility of fungicide application timing within the context of the integrated management strategies.
4. Continue to update and enhance the content of the ScabSmart website.
5. Make 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.)

a) What were the major activities?

For FY21, we conducted four wheat trials at two locations. Two of the trials were uniform fungicide trials. The other two trials were part of the integrated management coordinated project. Trials that were also established for the 2021-2022 growing season were completed accordingly. Data were compiled and shared with the Coordinated Project lead at Ohio State, which formed part of two USWBSI Forum Proceedings. One poster paper was also presented at the Annual Meeting of the American Phytopathological Society. Two extension articles were also published.

b) What were the significant results?

By continuing to conduct a standard set of trials across multiple locations, we have monitored the risk and impact of FHB in Pennsylvania more closely. While FHB has been variable the past few years in Pennsylvania, conducting standardized trials provides timely information to farmers and other stakeholders. Our field data also contributes to the larger coordinated project, which provides local data for FHB prediction and validation.

c) List key outcomes or other achievements.

We have an established field trial system that provides space to conduct four trials annually (two locations, two trials at each location). We also have a laboratory pipeline to produce inoculation and inoculate the field trials at the proper time of the growing season. One graduate student continues to be trained on FHB, with these field trials providing data that is integrated into their Ph.D. dissertation. Two postdoctoral fellows contributed to the project, and we trained several undergraduate researchers on disease assessment and quantification in small grains.

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

One member of our team, Olanrewaju Shittu, has taken a lead role on this project as part of his Ph.D. research. He is an FFAR Fellow and has developed a network with other students and industry partners.

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 11,000 subscribers. Results from data shared as part of the coordinated project were presented at the U.S. Wheat & Barley Scab Initiative Forum, and a poster was shared at an annual phytopathology conference.

Publications, Conference Papers, and Presentations

Please include a listing of all your publications/presentations about your **FHB work** that were a result of funding from your FY21 grant award. Only citations for publications **published** (submitted or accepted) or presentations **presented** during the **award period** should be included.

Did you publish/submit or present anything during this award period 6/1/22 - 9/30/23)?

Yes, I've included the citation reference in listing(s) below.

No, I have nothing to report.

Journal publications as a result of FY21 award

List peer-reviewed articles or papers appearing in scientific, technical, or professional journals. Include any peer-reviewed publication in the periodically published proceedings of a scientific society, a conference, or the like.

Identify for each publication: Author(s); title; journal; volume; year; page numbers; status of publication (published [include DOI#]; accepted, awaiting publication; submitted, under review; other); acknowledgement of federal support (yes/no).

Books or other non-periodical, one-time publications as a result of FY21 award

Report any book, monograph, dissertation, abstract, or the like published as or in a separate publication, rather than a periodical or series. Include any significant publication in the proceedings of a one-time conference or in the report of a one-time study, commission, or the like.

Identify for each one-time publication: Author(s); title; editor; title of collection, if applicable; bibliographic information; year; type of publication (book, thesis, or dissertation, other); status of publication (published; accepted, awaiting publication; submitted, under review; other); acknowledgement of federal support (yes/no).

Other publications, conference papers and presentations as a result of FY21 award

Identify any other publications, conference papers and/or presentations not reported above. Specify the status of the publication.

Collins, A. A., and P. Esker. 2023. Helpful resources for wheat and barley scab prevention. Field Crop News - Penn State Extension. <https://extension.psu.edu/helpful-resources-for-wheat-and-barley-scab-prevention>.

Esker, P., A. Collins, A. Murillo-Williams, and H. Reed. 2022. Home stretch: Evaluating your small grain crops. Field Crop News – Penn State Extension. <https://extension.psu.edu/home-stretch-evaluating-your-small-grain-crops>.

Moraes, W.B., G. Bergstrom, et. al. (27 total authors). 2022. Fusarium head blight management coordinate project: Uniform fungicide trials in 2022. P. 22-23. In: USWBSI Networking & Facilitation Office (ed.), Proceedings of the 2022 National Fusarium Head Blight Forum. St. Paul, NA: U.S. Wheat & Barley Scab Initiative.

Moraes, W.B., G. Bergstrom, et. al. (27 total authors). 2022. Fusarium head blight management coordinate project: Integrated management trials in 2022. P. 20-21. In: USWBSI Networking & Facilitation Office (ed.), Proceedings of the 2022 National Fusarium Head Blight Forum. St. Paul, NA: U.S. Wheat & Barley Scab Initiative.

Shittu, O., F. Dalla Lana, W. Moraes, P. Paul, D. Shah, E. De Wolf, and **P. Esker**. 2022. Validation of the Fusarium head blight risk tool and its application in Pennsylvania. Plant Health 2022 (American Phytopathology Society.)