

FY21 Performance Progress Report

Due date: July 26, 2022

Cover Page

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Fiscal Year:	2021
USDA-ARS Agreement ID:	59-0206-0-140
USDA-ARS Agreement Title:	Integrated Management of Fusarium Head Blight in Wheat in Pennsylvania
FY20 USDA-ARS Award Amount:	\$27,101
Recipient Organization:	Pennsylvania State University Department of Plant Pathology and Microbiology 219 Buckhout Lab, University Park, PA 16802
DUNS Number:	00-340-3953
EIN:	24-6000376
Recipient Identifying Number or Account Number, if any:	138890
Project/Grant Period:	6/1/21 - 5/31/23
Reporting Period End Date:	5/31/2022

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 an: Annual Report 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.



Principal Investigator Signature

July 20, 2022

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 part of the uniform fungicide program, and the additional two trials 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 2021-2022 growing season.

FHB was relatively low in our trials, outside of the inoculated plots. As such, our outreach efforts focused on providing timely information about the risk of FHB during the growing season. Three articles for Penn State Extension's Field Crop News were written during the growing season, and Dr. Alyssa Collins continued to provide local commentary for the Fusarium Head Blight Prediction Center.

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 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, valuable information used to validate current models.

c) List key outcomes or other achievements.

Establishment of four research trials at two locations in Pennsylvania, combined with our ability to attend inoculate trials after the 2020 restrictions due to COVID-19.

Trained one graduate student and two postdoctoral fellows on wheat disease identification and quantification.

Published two journal manuscripts from research supported by the USWBSI.

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

One member of our team, Olanrewaju Shittu, was trained on disease assessments and the importance of FHB. This opportunity will provide the base for his PhD project. Furthermore, he had the opportunity to attend a workshop on developing mechanistic models, an area that will also contribute to his dissertation research.

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.

We also published two journal articles in journals that target plant pathologists.

Lastly, we continue to provide local commentary for the Fusarium Head Blight Prediction Center web tool.

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?

- Yes, I've included the citation reference in listing(s) below.
 No, I have nothing to report.

Journal publications as a result of FY21 grant 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).

Duffeck, M.R., A.Y. Bandara, D.K. Weersooriya, A. Collins, P.J. Jensen, G.A. Kuldau, E. Del Ponte, and **P.D. Esker**. 2022. Fusarium head blight of small grains in Pennsylvania: Unravelling species diversity, toxin types, growth and triazole sensitivity. *Phytopathology*.
<https://doi.org/10.1094/PHYTO-02-21-0070-R>. (Support acknowledge, yes).

Duffeck, M., E.M. Del Ponte, and **P. Esker**. 2021. Multifaceted insights of Fusarium head blight in small grains in Pennsylvania. *Plant Health Progress*, <https://10.1094/PHP-03-21-0067-SYN>. (Support acknowledge, yes).

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

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

Esker, P., A. Collins, A. Murillo-Williams, H. Reed, and B. Clark. 2021. The home stretch: Evaluating your small grain crop. *Field Crop News – Penn State Extension*.
<https://extension.psu.edu/the-home-stretch-evaluating-your-small-grain-crops>.

Esker, P., and A. Collins. 2021. Low risk for Fusarium head blight in wheat. *Field Crop News – Penn State Extension*. <https://extension.psu.edu/low-risk-for-fusarium-head-blight-in-wheat>.

Esker, P., A. Collins, and A. Murillo-Williams. 2021. 2021 Wheat fungicide ratings available. *Field Crop News – Penn State Extension*. <https://extension.psu.edu/2021-wheat-fungicide-ratings-available>.