USDA-ARS | U.S. Wheat and Barley Scab Initiative

FY22 Performance Progress Report

Due date: July 26, 2023

Cover Page

USDA-ARS Agreement ID:	59-0206-2-099
USDA-ARS Agreement Title:	Approaches to Improving Barley Health in Pennsylvania
Principle Investigator (PI):	Alyssa Collins
Institution:	Penn State Southeast Agricultural Research & Extension Center
Institution UEI:	NPM2J7MSCF61
Fiscal Year:	2022
FY22 USDA-ARS Award Amount:	$20,000
PI Mailing Address:	Pennsylvania State University, PSU Southeast Ag Research & Extension Center 1446 Auction Rd Manheim, PA 17545
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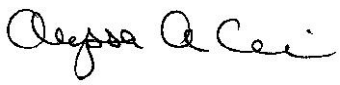
Period of Performance:	May 1, 2022 – April 30, 2026
Reporting Period End Date:	April 30, 2023

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
MGMT IM-CP	Integrated Management of Fusarium Head Blight of Barley in Pennsylvania	$20,000
	FY22 Total ARS Award Amount	$20,000

I am submitting this report as an: ☒ Annual 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

7/26/23

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 of Barley in Pennsylvania

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

1) Evaluate the integrated effects of fungicide treatment and genetic resistance on FHB and DON in all major grain classes, 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) Generate data to further quantify the economic benefit of FHB and DON management programs.
4) Generate data to validate and advance the development of FHB risk prediction models.

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?

Integrated Management (IM) and Uniform Fungicide Trials (UFT) were planted at two locations (the Penn State Southeast Agricultural Research and Extension Center (SEAREC) in Lancaster County and the Russell E. Larson Agricultural Research & Education Center (Rock Springs) in Centre County) in fall of 2022. The IM were designed with three different barley varieties of differing FHB resistance levels such that Prosaro Pro, Sphaerex, Prosaro, and Miravis Ace could be applied and efficacy compared when paired with crop resistance and application timing (for Spharex only). A Uniform Fungicide Trial (UFT) was also established to evaluate these chemistries and multipass fungicide programs on a single variety of barley. The fungicide applications had not yet been made at the conclusion of this reporting period.

b) What were the significant results?

Data analysis is now underway.

c) List key outcomes or other achievements.

During this reporting period, we successfully planted and applied all treatments for the IM and UFT projects. The spring and early summer were unusually dry with no rain falling for over two months starting the beginning of April. This will likely result in low FHB and DON levels which may affect our ability to discern the efficacy of our treatments. However, rain did return and delay our harvest, which may provide us the opportunity to observe the effects of our treatments on other quality issues such as sooty mold. Knowing the effects of our treatments on non-FHB diseases and disorders can help farmers weigh the economics and potential benefits of using our fungicide programs in the event FHB does not manifest in a given season.

In January, an intensive workshop/group discussion was conducted with high-intensity wheat and barley producers representing the majority of managed small grains in south central PA, northern MD, and West Virginia. These growers have taken very deliberate actions to carefully manage their crops to reduce FHB and DON contamination and maximize quality and yield. They continually engage the PIs to help tweak their approaches to production utilizing the most current research generated by this project and the projects of other USWBSI-sponsored researchers.

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

While students are not being directly funded by this award, three undergraduate research assistants and one postdoctoral scholar are participating in the establishment, maintenance, evaluation, and analysis of the field trials. This is providing exposure to experimental design and execution to these students (enrolled at Penn State and Susquehanna Universities), increasing their scientific literacy and likelihood of choosing a related career path.

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

During the spring of 2023, PIs provided commentary to the FHB Risk Tool and published newsletter articles bringing attention to FHB Risk Tool and fungicide options, including:
Heads Up, Barley Heads Are Out! Avoiding
Viruses in Small Grain Crops Updated 2023
Fungicide Efficacy Tables
While a planned activity for fall 2022 was to conduct a disease and insect management in small grains workshop, this event was cancelled due to low enrollment.

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 FY22 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 May 1, 2022 – April 30, 2023?

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

☒ No, I have nothing to report.

Journal publications as a result of FY22 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 FY22 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 FY22 award

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