

FY22 Performance Progress Report

Due date: July 26, 2023

[Cover Page](#)

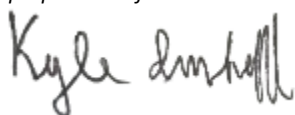
USDA-ARS Agreement ID:	59-0206-2-119
USDA-ARS Agreement Title:	Fusarium Head Blight of Wheat & Barley Prediction Models
Principle Investigator (PI):	Kyle Imhoff
Institution:	Penn State
Institution UEI:	NPM2J7MSCF61
Fiscal Year:	2022
FY22 USDA-ARS Award Amount:	\$43,827
PI Mailing Address:	Pennsylvania State University, Dept. of Meteorology 606 Walker Bldg., University Park, PA 16802-4507
PI E-mail:	kai5024@psu.edu
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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	Continued Deployment of Prediction Models for Fusarium Head Blight of Wheat & Barley	\$43,827
FY22 Total ARS Award Amount		\$43,827

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

7/17/23

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: Continued Deployment of Prediction Models for Fusarium Head Blight of Wheat & Barley

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

We are addressing the risk of scab development during the critical flowering stage when the growers can ameliorate the risk with treatment. This project leverages various atmospheric data networks, including the finest scale and most accurate gridded observational data set (URMA and RTMA), gridded weather model data and a host of regression based epidemiological models on a user-friendly graphic interface to assist growers in decision making in protecting their fields from scab. Using hourly reports of temperature and moisture from finely gridded data, each day the risk is assessed anew with the most recent observations and is available by mid-morning.

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?

A successful daily prediction using various scab risk models have been run throughout the wheat growing season during the period of performance (May 2022-Aug 2022;Feb 2023-Current) from winter wheat in the southern Plains to late spring wheat in the Dakotas. Additional expert commentary is included from plant pathologists in most states to augment the utility of the interface. The tools are accessible on mobile devices due to upgraded mobile-friendly interface and risk in non-growing regions is being masked to prevent misinterpretation of the risk tool.

In late 2022, work began on developing new epidemiological models to establish a foundation of data for use in ensembling techniques to be implemented in the 2023 growing seasons and beyond. Preliminary maps of risk values from individual epidemiological models and relevant meteorological data were created in late 2022 and early 2023 to investigate model performance and to begin the planning process for ensemble method implementation. Work will continue into 2023 and 2024 for appropriate means of disseminating and displaying ensembles for technical users.

b) What were the significant results?

Growers utilized the interface and modeling technique to assist crucial decisions about the risk of disease growth in their particularly locality or region. When any breaks in data stream or interface occurred, we received immediate response.

c) List key outcomes or other achievements.

Work continued related to graphing/plotting functionality at grid points. New epidemiological models are in development as of late 2022 for preliminary use as an expert tool in future growing seasons using a variety of meteorological data inputs. Additional updates to the tool include an upgrade to the expert commentary system that will automate the submission/database ingest process compared to an older manual submission process. This work continues into the 2023 growing season with plans to implement in 2024.

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

Nothing to report.

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

The target audience of growers and extension personnel that advise grower consortiums receive information through the web interface. Experts provide commentary within the interface that report status of the wheat/barley crops as well as an assessment of disease risk. The interface is located at: <http://www.wheatcab.psu.edu/>.

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).

Nothing to report.

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).

Nothing to report.

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.

Nothing to report.