

FY22 Performance Progress Report

Due date: July 26, 2023

Cover Page

USDA-ARS Agreement ID:	59-0206-2-165
USDA-ARS Agreement Title:	Scab Resistant Variety Development and Testing
Principle Investigator (PI):	Jessica Rutkoski
Institution:	University of Illinois
Institution UEI:	Y8CWNJRCNN91
Fiscal Year:	2022
FY22 USDA-ARS Award Amount:	\$131,896
PI Mailing Address:	University of Illinois, Department of Crop Sciences 1102 S. Goodwin Ave., Urbana, IL 60801
PI E-mail:	jrut@illinois.edu
PI Phone:	217-300-6970
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
VDHR-NWW	Development of Scab Resistant SRW Wheat Varieties and Cooperative Phenotyping	\$131,896
FY22 Total ARS Award Amount		\$131,896

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

July 19, 2023

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: Development of Scab Resistant SRW Wheat Varieties and Cooperative Phenotyping

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

These goals of this project are to 1) Increase and document the number of varieties with improved FHB resistance and high grain yield and grain quality that are tested in statewide variety trials and available to farmers, to reduce DON in the US grain supply and 2) Increase efficiency of the development and release of FHB resistant varieties and germplasm.

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?

Between May 2022 and April 2023 we carried out field experiments, planted new field experiments, made crosses to generate new lines, advanced segregating populations derived from new crosses in the greenhouse, established a spring-transplanted single plant nursery to derive new lines, and established an inoculated and misted scab resistance evaluation nursery.

b) What were the significant results?

During the 2021-2022 field season we obtained excellent expression of scab symptoms in our scab nursery. On all 486 breeding lines and 93 varieties in the state variety trial, we accurately rated FDK and received Deoxynivalenol from the University of Minnesota. For cooperative testing we obtained Incidence, Severity, and FDK on approximately 400 lines and received Deoxynivalenol from the University of Minnesota. As of August 2022, 32 out of 39 of our most advanced breeding lines were found to have higher levels of scab resistance than our moderately resistant check IL07-19334.

c) List key outcomes or other achievements.

In Fall of 2022 we licensed 4 breeding lines to a new seed company in Missouri, and licensed one breeding line to an established seed company. These lines are being evaluated for potential commercialization.

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

This project has given graduate students and undergraduates the opportunity to gain experience evaluating and identifying symptoms of FHB resistance. Undergraduate students have learned about the technical processes of plant breeding and have gained exposure to agricultural research. Several of our undergraduate students have used their work experience with our research group to help them get jobs or admission to graduate school.

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

Results of the breeding program, in the form of germplasm, has been shared with private seed companies for licensing.

Results of FHB resistance evaluation on varieties in the Illinois State Variety trial have been published on the variety testing website: <http://vt.cropsci.illinois.edu/wheat.html> and on scab smart <https://scabsmart.org/>

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.

Advancements in Wheat Variety Development. American Seed Trade Association (ASTA) CSS and Seed Expo, Chicago, IL. December 5-8, 2022.