

FY21 Performance Progress Report

Due date: July 26, 2023

Cover Page

USDA-ARS Agreement ID:	59-0206-0-167
USDA-ARS Agreement Title:	Development of FHB-Resistant Wheat Cultivars for the Midsouth
Principle Investigator (PI):	Ehsan Shakiba
Institution:	University of Arkansas
Institution UEI:	WJNTJ7LBL823
Fiscal Year:	2021
FY21 USDA-ARS Award Amount:	\$127,075
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Period of Performance:	6/1/21-05/31/23
Reporting Period End Date:	5/31/2024

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
VDHR-SWW	Development of FHB Resistant Wheat Cultivars for the Midsouth	\$120,155
VDHR-SWW	Double Haploids to Expedite Development of FHB Resistant Soft Winter Wheat Varieties	\$13,802
FY21 Total ARS Award Amount		\$133,957

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.

Ehsan Shakiba
Principal Investigator Signature



6/14/2023
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 FHB Resistant Wheat Cultivars for the Midsouth

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

- 1) Develop and release high-yielding FHB-resistant cultivars adapted to Arkansas and the mid-south.
- 2) Screen and report the reactions of breeding lines and currently grown commercial cultivars to FHB using misted inoculated nurseries.

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?

The focus for FY21 was producing inoculum for FHB 2023 study. The process began in January 2023. Corn seeds were infected by FHB and kept in control conditions for developing inoculums. The inoculums were distributed in the field by hand on March 29 on the Fayetteville FHB trail and May 2 in Newport, AR. On the same date, we set up the misting system.

b) What were the significant results?

Despite successful inoculation and misting system, the disease pressure in Fayetteville was less than in Newport. That can be contributed to the weather differences between these two locations.

c) List key outcomes or other achievements.

No immunity or full resistance to FHB. We identified several lines that showed high tolerance to FHB. This information can be added to the package release of potentially released cultivars, or the lines can be used as parental lines for developing new high-yield lines.

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

We introduced the project to our new employees and taught them how to set up the misting system, harvesting techniques, etc. We will train them how to evaluate FDK after harvesting and collecting seeds.

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

FHB is an important disease in our state. Presently I plan to submit our results in our local journal that farmers in Arkansas can view. Moreover, the information from this study will be shared with other wheat breeders in the SunGrain consortium.

Project 2: Double Haploids to Expedite Development of FHB Resistant Soft Winter Wheat Varieties

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

This proposal aims to use double haploid technology to combine favorable loci for more rapid improvement of FHB resistance. This is done collaboratively with the exchange of DH lines.

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?

Currently, no 2021 funds is available for developing DL, but we initiated developing several lines during the crossing season. We aimed to send two lines for line development.

b) What were the significant results?

We are planning to send F1 seeds from two selected lines for DH development

c) List key outcomes or other achievements.

Nothing to report

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

We trained new employees on how to make crosses.

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

We described our activities in the Wheat breeding program to people interested in wheat production in Arkansas. Furthermore, I received the first funds for developing DH lines.

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 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.