

FY22 Performance Progress Report

Due date: July 26, 2023

Cover Page

USDA-ARS Agreement ID:	59-0206-2-141
USDA-ARS Agreement Title:	Breed Fusarium Head Blight (FHB) resistant HWW via Doubled Haploid
Principle Investigator (PI):	Shuyu Liu
Institution:	Texas A&M AgriLife Research
Institution UEI:	KU3DCFJJTVN3
Fiscal Year:	2022
FY22 USDA-ARS Award Amount:	\$47,965
PI Mailing Address:	6500 Amarillo Blvd West, Amarillo, TX 79106
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Period of Performance:	May 1, 2022 – April 30, 2023
Reporting Period End Date:	April 30, 2023

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
HWW-CP	Breed FHB Resistant Hard Winter Wheat Cultivars and Germplasm Via Doubled Haploid	\$47,965
FY22 Total ARS Award Amount		\$47,965

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

7/26/2023

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: Breed FHB Resistant Hard Winter Wheat Cultivars and Germplasm Via Doubled Haploid

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

The major goal is to develop FHB resistance germplasm and cultivars by pyramided genes. The objective is to pyramid Fhb1, Fhb6, Fhb7 and other major QTL into hard red winter wheat for breeders and geneticists.

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?

1) Wheat heads were pollinated using the corn pollens to develop seeds; 2) Seeds were dissected 18 days after pollination to rescue haploid embryos, cultured them on the growth media, and vernalized the seedlings for 6-8 weeks; 3) Vernalized seedling were transplanted into soil pots and grown to 2-3 tillers and treat the crown and roots with colchicine; 4) Transplanted and grow the colchicine treated seedlings in the greenhouse till maturity.

b) What were the significant results?

The 1st cycle of DH development was conducted in 2022. In the current cycle of 2023, more than 2200 embryos were dissected from more than 25 crosses from the seven breeding programs in the hard winter wheat region.

c) List key outcomes or other achievements.

A total of 51 DHLs were developed in 2022. During the current cycle of 2023, seedlings from the 2200 embryos are either in the vernalization stage or already colchicine treated and growing in pots for maturity. So far 548 seedlings treated with colchicine have been transplanted into pots for growing in the greenhouse.

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

Two postdocs, two PhD and three undergraduate students were trained from this project to develop DHLs.

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

The results were shared with the breeders in the regional Zoom meeting and in the 2022 National FHB Forum.

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.

Liu, S., Y. Rauf, Z. Wang, K. Parker. 2023. Annual report for USWBSI sponsored HWW-CP projects on pyramiding multiple FHB resistance genes using doubled haploid lines.