

FY21 Performance Progress Report

Due date: July 26, 2023

Cover Page

USDA-ARS Agreement ID:	59-0206-0-145
USDA-ARS Agreement Title:	Enhancement of Fusarium Head Blight Resistance in the Southeastern U.S. Germplasm
Principle Investigator (PI):	J. Paul Murphy
Institution:	North Carolina State University
Institution UEI:	U3NVH931QJ3
Fiscal Year:	2021
FY21 USDA-ARS Award Amount:	\$127,074
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Period of Performance:	6/16/21 - 6/15/23
Reporting Period End Date:	6/15/2024

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
VDHR-SWW	Enhancement of Fusarium Head Blight Resistance in the Southeastern U.S. Wheat Breeding Programs	\$112,686
VDHR-SWW	Double Haploids to Expedite Development of FHB Resistant Soft Winter Wheat Varieties	\$14,388
FY21 Total ARS Award Amount		\$127,074

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

7/12/2023

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: Enhancement of Fusarium Head Blight Resistance in the Southeastern U.S. Wheat Breeding Programs

With respect to Project 1, the report submitted a year ago covering 6/16/21 – 6/15/22 specifically addressed the objectives, accomplishments, significant results and key outcomes of this work. It is my understanding that this agreement is still active because of Project 2 concerning double haploid research.

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?

The goal of this proposal is to expand the regional Double Haploid (DH) initiative to more quickly develop and release high-yielding varieties that contain an effective FHB resistance pyramid.

2. What was accomplished under these goals or objectives?

a) What were the major activities?

Between 22 and 57 percent of advanced generation lines in field testing are doubled haploids. Three of five of the best advanced lines in state Official Variety Trials are of double haploid origin. They are present in those trials at a far greater rate than is warranted based on the number of crosses involved in their generation.

F1 seed of three crosses were sent to Heartland Plant Innovations in spring 2022 for DH production. Unfortunately, DH seed of those lines has not been received from at this time. I am hopeful they will be here for fall planting. The pedigrees were:

16VDH-SRW03-018 / GA151313-LDH-192-20E48

LANC11558-33 / AR15V25-19-2174N

LANC11558-33 / GA151313-LDH-192-20E48

The request was for 125 DH's per cross, or a total of 375.

I believe this agreement is still active because these DH have not been received or paid for.

b) What were the significant results?

Twenty four of the DHs evaluated in head rows were advanced to first year yield testing in 2023. Of the 468 lines in the F₇ and later generation yield trials in 2023, 20% will be doubled haploids.

c) List key outcomes or other achievements.

Materials are successfully moving through the variety development pipeline with savings of three to four years. The value of this effort is seen by the overrepresentation of DH's in advanced generation yield trials.

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

Three undergraduate students worked in the DH nursery at harvest and on post-harvest processing of materials in preparation for fall planting. They worked with the project leader and PhD graduate student on these activities.

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

The materials are shared with other members of the CP

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.