USDA-ARS | U.S. Wheat and Barley Scab Initiative

FY22 Performance Progress Report

Due date: July 26, 2023

Cover Page

USDA-ARS Agreement ID:	59-0206-2-109
USDA-ARS Agreement Title:	Production of Doubled Haploids for Fusarium Head Blight (FHB) Resistance
Principle Investigator (PI):	Patrick Hayes
Institution:	Oregon State University
Institution UEI:	MZ4DYXE1SL98
Fiscal Year:	2022
FY22 USDA-ARS Award Amount:	$78,637
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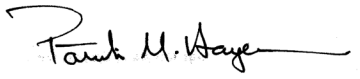
Period of Performance:	May 1, 2022 – April 30, 2024
Reporting Period End Date:	April 30, 2023

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
BAR-CP	Collaborative Barley Doubled Haploid Production	$78,637
	FY22 Total ARS Award Amount	$78,637

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.



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Principal Investigator Signature Date Report Submitted

ǂ 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: Collaborative Barley Doubled Haploid Production

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

Our major goal was to continue to assist researchers in increasing the efficiency with which they identify and deploy genes and QTLs that contribute to reduction in the losses caused by Fusarium head blight (FHB). We sought to achieve this goal by developing doubled haploid (DH) germplasm from the F1s of cross combinations identified by collaborating breeders. DH's are complete homozygotes that provide unequivocal genotyping and phenotyping data.

Our project objectives were to:

1. Produce ~ 2,000 green plantlets (GP) from the F1 donor plants with the expectation of producing ~ 1,000 fertile doubled haploid (DH) plants.
2. Produce seed from the DH and ship seed to cooperators.

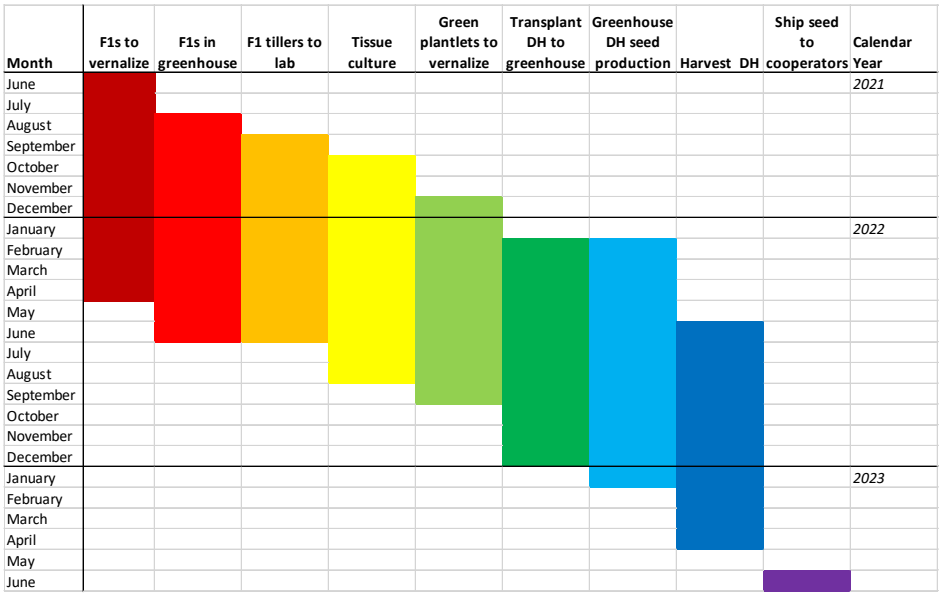
Our plan to accomplish goals was:

1. Receive F1 seed no later than June 1 from the collaborating research group(s) identified by the CP Steering Committee (CPSC) as having the greatest potential to have economic impact and to contribute to the fundamental body of knowledge.
2. Grow F1 donor plants.
3. Produce ~ 2,000 GPs from the F1 donor plants.
4. Produce ~ 1,000 DHs from the GPs.

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?

Our doubled haploid production cycle is not synchronous with the report timeframe. Therefore, we report numbers of DHs from the 2021-2022 production year and numbers of GPs for the 2022-2023 production year. The following graph shows the chronology of the 2021-2022 production year – doubled haploids were shipped to cooperators in 2023.



b) What were the significant results?

2021-22 PRODUCTION YEAR:

Project completed in 2023. Number of doubled haploids produced per cross.

ID	Program	Pedigree	Doubled Haploids
D1	Nebraska-Lincoln	NB17411/2ND38517	137
D2	Nebraska-Lincoln	NB15415/2ND38517	164
D3	Virginia Tech	Avalon (VA16M-81)/ARS15B12	117
D4	Virginia Tech	ARS15B12//VA16M-84/Calypso	253
D5	Ohio State	DH02FL-028/2WI15-8688	245
Total			***916***

2022-23 PRODUCTION YEAR:

Crosses received. Lab and greenhouse work continued. The DH production is ongoing in 2023. Number of green plantlets per cross produced to date during funding period.

ID	Program	Pedigree	Green Plantlets
E1	Cornell	Lightning/Buck	178
E2	Cornell	DH131055/Purple Prince	204
E3	Ohio State	MOB2112-Alexis-028/DH0214-056	523
E4	U. of Minnesota	2ND32529/S2M187	301
E5	UC Davis	OSU 5 (DH160733)/UC Tahoe	296
Total			***1,502***

c) List key outcomes or other achievements.

We were challenged with recalcitrance by the 2021-2022 "D" series of crosses and therefore missed our production goal by 84 doubled haploids. We are optimistic to make up total numbers of DH produced in the 2022-2023 production year.

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

Professional expertise enhanced.

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

DH seed was delivered to cooperators.

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).

We rely on cooperators to acknowledge our doubled haploid production of their germplasm in publications that they author.

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).

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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.

We rely on cooperators to acknowledge our doubled haploid production of their germplasm in publications that they author.