

USDA-ARS
U.S. Wheat and Barley Scab Initiative
FY19 Performance Report
Due date: September 30, 2020

Cover Page

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Fiscal Year:	2019
USDA-ARS Agreement ID:	58-2090-9-028
USDA-ARS Agreement Title:	Developing FHB Resistant Wheat Cultivars for Idaho and the Western US
FY19 USDA-ARS Award Amount:	\$ 39,163
Recipient Organization:	University of Idaho Moscow, ID 83844-3020
DUNS Number:	075746271
EIN:	82-6000945
Recipient Identifying Number or Account Number:	AP3872
Agency PI:	Deven See
Project/Grant Reporting Period:	8/1/19 - 7/31/20
Reporting Period End Date:	7/31/2020

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
VDHR-SPR	Developing FHB Resistant Wheat Cultivars for Idaho and the Western US	\$ 39,163
	FY19 Total ARS Award Amount	\$ 39,163



Principal Investigator

09/22/2020

Date

* MGMT – FHB Management
 FST – Food Safety & Toxicology
 GDER – Gene Discovery & Engineering Resistance
 PBG – Pathogen Biology & Genetics
 EC-HQ – Executive Committee-Headquarters
 BAR-CP – Barley Coordinated Project
 DUR-CP – Durum Coordinated Project
 HWW-CP – Hard Winter Wheat Coordinated Project
 VDHR – Variety Development & Uniform Nurseries – Sub categories are below:
 SPR – Spring Wheat Region
 NWW – Northern Soft Winter Wheat Region
 SWW – Southern Soft Red Winter Wheat Region

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Project 1: *Developing FHB Resistant Wheat Cultivars for Idaho and the Western US*

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

The overall goal of this project is to develop FHB resistant spring cultivars that have high grain yield and good end-use quality and resistance to predominant diseases and insects. The specific objectives are: 1. Develop and release new spring wheat cultivars pyramided *Fhb1* (3BS) and *Fhb3* (5AS) with other FHB QTL and resistance genes to stripe rust, stem rust, cereal cyst nematodes, Hessian fly, and end-use quality; 2. Expand one FHB nursery in WA in addition to the Aberdeen nursery to evaluate cultivars and breeding lines from University of Idaho (UI) and Washington State University (WSU) as well as from the Uniform Regional Scab Nursery; 3. Train one post doc and one graduate student.

2. What was accomplished under these goals or objectives? (*For each major goal/objective, address items a-b) below.*)

a) What were the major activities?

A virtue field day was conducted, and a video was made that included FHB resistant lines.

A total of 75 lines with known FHB resistance sources (45 soft white in trial 101, 20 hard red spring in trial 103, 10 hard white spring in trial 102 and trial 203) were evaluated in yield trials in four locations in ID and breeder seeds from five lines will be produced in summer 2021.

A total of 1040 headrows (212 elite lines, 112 advanced lines, 112 F2 MAS selected lines, and 88 EMS mutation lines) were inoculated and assessed in a FHB nursery in Aberdeen ID and 500 DON sample will be sent for DON tests. Among them, 49 lines were also assessed in two FHB nurseries in ND under collaboration with Dr. Steve Xu.

Over 50 F1 crosses were made that included ND2710 (*Fhb2*) and FHB resistant synthetic germplasm

b) What were the significant results?

We released a FHB tolerant cultivar UI Cookie with unknown FHB resistance gene in the early spring of 2020.

Elite lines with good level of FHB resistance were advanced to the cultivar development stage and will produce breeder seeds in 2021.

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c) List key outcomes or other achievements.

Four hard white spring wheat lines and one soft white cultivar (UI Stone) showed good FHB resistance in ND nurseries (high disease pressure)

Marker-assisted screening for *Fhb1* and *Fhb3* have been successfully used in the FHB-resistant cultivar development.

Postdoc left for the program and now works in a private company

3. Was this research impacted by the COVID-19 pandemic (i.e. university shutdowns, reduced or lack of support personnel, etc.)? If yes, please explain how this research was impacted or is continuing to be impacted.

Yes. The nursery planting was delayed. Therefore, we only did a late planting in the nursery. However, we got good infection in one planting date. We don't expect this research to be impacted if COVID-19 gets controlled during May of 2021 when we are planting the nursery.

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

This project provided travel support to a MS student attended a regional meeting. This student is working on the FHB project after graduated in May 2020.

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

We did a virtual field day and made a video for elite FHB-resistant lines.

Training of Next Generation Scientists

Instructions: Please answer the following questions as it pertains to the FY19 award period (8/1/19 - 7/31/20). The term “support” below includes any level of benefit to the student, ranging from full stipend plus tuition to the situation where the student’s stipend was paid from other funds, but who learned how to rate scab in a misted nursery paid for by the USWBSI, and anything in between.

- 1. Did any graduate students in your research program supported by funding from your USWBSI grant earn their MS degree during the FY19 award period?**

No

If yes, how many?

- 2. Did any graduate students in your research program supported by funding from your USWBSI grant earn their Ph.D. degree during the FY19 award period?**

No

If yes, how many?

- 3. Have any post docs who worked for you during the FY19 award period and were supported by funding from your USWBSI grant taken faculty positions with universities?**

No

If yes, how many?

- 4. Have any post docs who worked for you during the FY19 award period and were supported by funding from your USWBSI grant gone on to take positions with private ag-related companies or federal agencies?**

Yes

If yes, how many? 1. The postdoc supported partially went to an ag-related private company.

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Release of Germplasm/Cultivars

Instructions: In the table below, list all germplasm and/or cultivars released with full or partial support through the USWBSI during the FY19 award period. All columns must be completed for each listed germplasm/cultivar. Use the key below the table for Grain Class abbreviations.

NOTE: Leave blank if you have nothing to report or if your grant did NOT include any VDHR-related projects.

Name of Germplasm/Cultivar	Grain Class	FHB Resistance (S, MS, MR, R, where R represents your most resistant check)	FHB Rating (0-9)	Year Released
UI Cookie	SWS	MR-MS	3-4	2020

Add rows if needed.

NOTE: List the associated release notice or publication under the appropriate sub-section in the ‘Publications’ section of the FPR.

Abbreviations for Grain Classes

- Barley - BAR
- Durum - DUR
- Hard Red Winter - HRW
- Hard White Winter - HWW
- Hard Red Spring - HRS
- Soft Red Winter - SRW
- Soft White Winter - SWW

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Publications, Conference Papers, and Presentations

Instructions: Refer to the FY19-FPR_Instructions for detailed more instructions for listing publications/presentations about your work that resulted from all of the projects included in the FY19 grant award. Only citations for publications published (submitted or accepted) or presentations presented during the **award period (8/1/19 - 7/31/20)** should be included. If you did not publish/submit or present anything, state ‘Nothing to Report’ directly above the Journal publications section.

NOTE: Directly below each citation, you **must** indicate the Status (i.e. published, submitted, etc.) and whether acknowledgement of Federal support was indicated in the publication/presentation. See example below for a poster presentation with an abstract:

De Wolf, E., D. Shah, P. Paul, L. Madden, S. Crawford, D. Hane, S. Canty, R. Dill-Macky, D. Van Sanford, K. Imhoff and D. Miller. 2019. “Impact of Prediction Tools for Fusarium Head Blight in the US, 2009-2019.” In: S. Canty, A. Hoffstetter, H. Campbell and R. Dill-Macky (Eds.), *Proceedings of the 2019 National Fusarium Head Blight Forum* (p. 12), Milwaukee, WI; December 8-10. University of Kentucky, Lexington, KY.

Status: Abstract Published and Poster Presented

Acknowledgement of Federal Support: YES (Abstract and Poster)

Journal publications.

Nothing to report.

Books or other non-periodical, one-time publications.

Nothing to report.

Other publications, conference papers and presentations.

Nothing to report.