USDA-ARS
U.S. Wheat and Barley Scab Initiative
FY18 - Final Performance Report
Due date: September 23, 2019

Cover Page

Cooperating Principle Investigator (CPI):	Mike Pumphrey
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Fiscal Year:	2018
USDA-ARS Agreement ID:	58-2090-8-070
USDA-ARS Agreement Title:	Developing FHB Resistant Wheat Cultivars for Idaho and the Western US.
FY18 USDA-ARS Award Amount:	$ 18,260
Recipient Organization:	Washington State Univ. Office of Research Support and Operations Lighty Student Services Building, Room 280 PO Box 641060 Pullman, WA 99164-1060
DUNS Number:	04-148-5301
EIN:	91-6001108
Recipient Identifying Number or Account Number:	11D-3019-3123
Agency PI:	Deven See
Project/Grant Reporting Period:	8/1/18 - 7/31/19
Reporting Period End Date:	07/31/19

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.	$ 18,260
	FY18 Total ARS Award Amount	$ 18,260

8/9/19

Principal Investigator 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 project?** The major goal of this project is to introgress FHB resistance into elite variety candidates suitable for production in irrigated areas of the Pacific Northwest that are at risk for and currently experience damage due to FHB. WSU spring wheat varieties have significant market share in these irrigated areas, but have not been screened for FHB resistance. Our annual objective is to develop 20 single backcross populations per year enriched for *Fhb1* in laboratory and greenhouse efforts, and the resulting BC1F2 populations advanced through normal field selection practices under irrigated conditions. We also support the management of an inoculated and misted FHB nursery that we have helped establish in Pullman, WA.

2. **What was accomplished under these goals?**

   1) major activities: We continued advancement and selection of BC1-derived *Fhb1* populations generated in 2018 through irrigated field nurseries with stripe rust and FHB pressure in 2019.

   2) specific objectives: Develop 20 single backcross populations per year enriches for *Fhb1* and resulting BC1F2 populations.

   3) significant results: Approximately 1600 headrows were evaluated as BC1F4's. Selections in the field in 2019 were completed in July 2019, and will be harvested in August 2019. These selections will undergo routine early generation end-use quality evaluation this winter, and best-performing lines advanced for evaluation in our collaborative misted/inoculated FHB nursery in 2020. A new round of BC1F1 populations for introgressing *Fhb1* were initiated in 2019. These will be advanced to routine F3 selection populations in the field in 2020.

   4) key outcomes or other achievements: Our field screening nursery managed in collaboration with Dr. Deven See was much improved in 2019, with reasonable FHB pressure that was sufficiently uniform across the nursery. We increased pressure by using both grain-spawn inoculum and macrocondia preparations. The irrigation system was also improved and a new farm location chosen with more functional irrigation systems.

3. **What opportunities for training and professional development has the project provided?** To date, we have focused on establishing germplasm to work with and reliable screening nurseries. Graduate and undergraduate students in the spring wheat breeding program have assisted with greenhouse management, DNA isolation and marker genotyping, field selections, management, and harvest of these materials, but none are supported by USWBSI funding. Technical staff have become proficient on both marker-assisted selection for FHB resistance, and management of a misted screening nursery.

4. **How have the results been disseminated to communities of interest?** We have discussed this project during field days at irrigated locations, as well as with our key industry stakeholders, especially the Washington Grain Commission.

Training of Next Generation Scientists

Instructions: Please answer the following questions as it pertains to the FY18 award period. 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 FY18 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 FY18 award period?** NO

   If yes, how many?

3. **Have any post docs who worked for you during the FY18 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 FY18 award period and were supported by funding from your USWBSI grant gone on to take positions with private ag-related companies or federal agencies?** NO

   If yes, how many?

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 FY18 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**

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

Publications, Conference Papers, and Presentations

Instructions: Refer to the FY18-FPR_Instructions for detailed instructions for listing publications/presentations about your work that resulted from all of the projects included in the FY18 grant. Only include citations for publications submitted or presentations given during your award period (8/1/18 - 7/31/19). If you did not have any publications or presentations, state 'Nothing to Report' directly above the Journal publications section.

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

> Conley, E.J., and J.A. Anderson. 2018. Accuracy of Genome-Wide Prediction for Fusarium Head Blight Associated Traits in a Spring Wheat Breeding Program. In: Proceedings of the XXIV International Plant & Animal Genome Conference, San Diego, CA.
> Status: Abstract Published and Poster Presented
> Acknowledgement of Federal Support: YES (poster), NO (abstract)

Nothing to report

Journal publications.

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

Other publications, conference papers and presentations.