

**USDA-ARS**  
**U.S. Wheat and Barley Scab Initiative**  
**FY19 Performance Report**  
**Due date: July 24, 2020**

**Cover Page**

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<b>Fiscal Year:</b>	2019
<b>USDA-ARS Agreement ID:</b>	N/A
<b>USDA-ARS Agreement Title:</b>	Evaluation of Barley Breeding Lines for FHB Resistance in Controlled Field Nursery in Idaho
<b>FY19 USDA-ARS Award Amount:</b>	\$ 23,800

**USWBSI Individual Project(s)**

<b>USWBSI Research Category*</b>	<b>Project Title</b>	<b>ARS Award Amount</b>
BAR-CP	Development of 2-rowed FHB Resistance Germplasm and Cultivars	\$ 23,800
	<b>FY19 Total ARS Award Amount</b>	<b>\$ 23,800</b>

**GONGSHE HU** Digitally signed by GONGSHE HU  
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Principal Investigator

Date

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\* 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

**Project 1:** *Development of 2-rowed FHB Resistance Germplasm and Cultivars*

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

The long term goal of the ARS barley breeding program at Aberdeen, Idaho is to develop FHB resistance barley cultivars.

The objectives of this proposal are: 1) to screen 300-400 F5 and advanced breeding materials for FHB resistance and DON content to identify the best for use in barley cultivar development; and 2) to introgress FHB resistance and lower DON into locally adapted lines by making at least 50 crosses that include at least one parent with FHB resistance..

**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?

The major activities include conducting barley germplasm FHB screening via collaborations with other FHB nursery evaluation groups such as University of Minnesota and North Dakota State University, as well as DON testing laboratories in the two universities. Totally there were 500 lines evaluated for FHB resistance; making pollination crosses (more than 50) by selecting at least one FHB resistance parent; speeding up the breeding process by using New Zealand winter nursery.

b) What were the significant results?

The significant results: useful FHB resistance data are obtained in 2019 for all the barley lines evaluated in all the FHB screening nurseries. All the breeding lines are advanced more generation.

c) List key outcomes or other achievements.

Key outcome include that enough data point obtained for our released barley varieties to conclude the FHB resistance. Those include food barley varieties of Transit, Julie, Goldenhart, and Kardia. Transit, Julie, and Kardia are concluded as Moderate Resistance (MR), Goldenhart is concluded as Moderate susceptible (MS). The malting barley variety of GemCraft is concluded as MR in FHB resistance. All the new results are communicated with the stake holders.

**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 in university of Minnesota was not able to plant the nursery in 2020, we will loss the opportunity to obtain the data. That will delay the germplasm and variety FHB resistance conclusion. We are not clear whether it is a continuous problem.

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

N/A

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

We updated the stakeholders for the variety FHB resistance conclusion by email notification.

## **Training of Next Generation Scientists**

**Instructions:** Please answer the following questions as it pertains to the FY19 award period (N/A). 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? 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 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
Transit	Food	MR		2011
Julie	Food	MR		2012
Kardia	Food	MR		2016
Goldenhart	Food	MS		2019
Gemcraft	Malting	MR		2018

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 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 (N/A)** 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*, Milwaukee, WI; December 8-10. University of Kentucky, Lexington, KY. p. 12.

Status: Abstract Published and Poster Presented

Acknowledgement of Federal Support: YES (Abstract and Poster)

### **Journal publications.**

**Hu, G.**, Evans, C., Satterfield, K., Ellberg, S., Marshall, J., Schroeder, K., Obert, D. 2019. Registration of ‘Goldenhart’, a two-rowed spring food barley. *Journal of Plant Registration* 13: 119-122.

Status: manuscript published in peer-reviewed journal.

Acknowledgement of Federal Support: YES (the paper published)

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

### **Other publications, conference papers and presentations.**