

**USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY18 Performance Report
Due date: July 12, 2019**

Cover Page

Principle Investigator (PI):	Gongshe Hu
Institution:	USDA-ARS
E-mail:	Gongshe.Hu@ARS.USDA.GOV
Phone:	208-397-4162 ext.241
Fiscal Year:	2018
USDA-ARS Agreement ID:	N/A
USDA-ARS Agreement Title:	Evaluation of Barley Breeding Lines for FHB Resistance in Controlled Field Nursery in Idaho.
FY18 USDA-ARS Award Amount:	\$ 23,800

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
BAR-CP	Development of 2-rowed FHB Resistance Germplasm and Cultivars.	\$ 23,800
	FY18 Total ARS Award Amount	\$ 23,800

GONGSHE HU Digitally signed by GONGSHE HU
Date: 2019.06.19 15:13:20 -06'00'

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

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. 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 presented at the FHB Forum:

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)

Journal publications.

G. Hu,* C. P. Evans, K. Satterfield, S. Ellberg, J. M. Marshall, K. Schroeder, and D. E. Obert. 2019. Registration of ‘Goldenhart’, a Two-Rowed Spring Food Barley. *Journal of Plant Registrations* 13:119–122.

Status: Peer-reviewed journal published

Acknowledgement of Federal Support: Yes.

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

Other publications, conference papers and presentations.

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

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

This project aims to conduct multiple-year/location evaluation of barley breeding lines from Idaho and introduced lines for FHB resistance. We hope to obtain enough data to conclude which lines are FHB resistant or produce low DON from our breeding program. The FHB resistant and low DON lines will be used as parents in future crosses.

2. What was accomplished under these goals? *Address items 1-4) below for each goal or objective.*

1) major activities

We have continuously used multiple FHB screening nurseries to obtain more reliable FHB resistance data for the testing barley lines. In addition to the two NDSU nurseries and the Aberdeen nursery, we added Minnesota FHB screening nursery for our barley lines. We had totally 640 lines evaluated in all the nurseries in 2018. Analysis of the FHB resistance and DON data are complete with seven trial results.

2) specific objectives

to optimize the Aberdeen nursery conditions for reliable infection by working with the Co-Investigators, Dr. Juliet Marshall and Dr. Jianli Chen, of University of Idaho; to assure that useful data are obtained, we use the Scab nurseries in NDSU as an evaluation nursery managed by Dr. Robert Brueggeman and a separate nursery managed by Dr. Rich Horsley. To add an additional FHB screening nursery in Minneapolis, Minnesota managed by Dr. Ruth Dill-Macky.

3) significant results

Results are received from all the nurseries. Lines planted in Minneapolis nursery were well infected. Infection and DON data collected by Dr. Dill-Macky and Dr. Dong helped us to generate more reliable results. After adding the 2018 data, the summarized results confirmed the resistance and low DON levels of the elite malting barley lines of 2Ab04-X1084-27 and 2Ab07-X031098-31. A new elite malting barley line of 2Ab08-X05M010-82 also showed comparable resistance and DON level to the 2-rowed resistance check of Colon. Since 2Ab08-X05M010 is currently being tested by malting industry at plant scale level. It is important to include the FHB resistance character in the variety release if it is eventually accepted by industry.

4) key outcomes or other achievements

Confirmation of resistance and lower DON in 2Ab07-X031098-31 and 2Ab08-X05M010-82 which are in process of malting industry for potential varieties.

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

N/A

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

In FHB Annual Forum and Idaho Barley Commission annual report.

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? N/A**

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? N/A**

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? N/A**

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? N/A**

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
Goldenhart	Food	No enough data for conclusion. Maybe MS		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 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. 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 presented at the FHB Forum:

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)

Journal publications.

G. Hu, C. P. Evans, K. Satterfield, S. Ellberg, J. M. Marshall, K. Schroeder, and D. E. Obert. 2019. Registration of ‘Goldenhart’, a Two-Rowed Spring Food Barley. *Journal of Plant Registrations* 13:119–122.

Status: Peer-reviewed journal published

Acknowledgement of Federal Support: Yes.

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

Other publications, conference papers and presentations.