

USDA-ARS
U.S. Wheat and Barley Scab Initiative
FY20 Annual Performance Progress Report
Due date: July 29, 2021

Cover Page

Principle Investigator (PI):	Gongshe Hu
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Phone:	208-397-4162 ext.241
Fiscal Year:	2020
USDA-ARS Agreement ID:	N/A
USDA-ARS Agreement Title:	Evaluation of Barley Breeding Lines for FHB Resistance in Controlled Field Nursery in Idaho
FY20 USDA-ARS Award Amount:	\$ 23,800
Project/Grant Reporting Period:	5/1/20 - 4/30/21
Reporting Period End Date:	4/30/2021

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
FY20 Total ARS Award Amount		\$ 23,800

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 Principal Investigator

 Date

* MGMT – FHB Management
 FST – Food Safety & Toxicology
 R- Research
 S – Service (DON Testing Labs)
 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?

This project will 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 or released as a variety.

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?

We have continuously used multiple FHB screening nurseries to obtain more reliable FHB resistance data when testing barley lines. In addition to the two NDSU nurseries and the Aberdeen nursery, we added a Minnesota FHB screening nursery for our barley lines. We had a total of 570 lines evaluated in all the nurseries in 2020. Analysis of the FHB resistance and DON data are complete with five trial results. DON data were received for the three nurseries.

b) What were the significant results?

One hundred forty-two lines have three DON data from the 2020 nurseries. Comparing the DON average values of the three replicates, 44 of 142 lines have equal or lower DON values than the partial resistance check of Conlon, indicating that pretty large portion of the new breeding lines could have equal or better FHB resistance than Conlon.

c) List key outcomes or other achievements.

Three lines showed significant lower DON than Conlon. On the averaged 18.1 ppm DON of Conlon, the lines of 6Ab07-X020049-11, 6Ab07-X031057-33, and 15ARS277-7 have averaged below 10ppm DON.

Released three barley germplasm lines with moderate resistance to FHB.

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

Major effect was that some nursery could not planted. Therefore one set of data was totally absent.

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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?

Results have been communicated via exchange information with related researchers, reported in Scab annual report, and presented in stakeholder reports.

Training of Next Generation Scientists

Instructions: Please answer the following questions as it pertains to the FY20 award period (5/1/20 - 4/30/21). 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 FY20 award period?**

Yes No

If yes, how many? [Click to enter number here.](#)

- 2. Did any graduate students in your research program supported by funding from your USWBSI grant earn their Ph.D. degree during the FY20 award period?**

Yes No

If yes, how many? [Click to enter number here.](#)

- 3. Have any post docs who worked for you during the FY20 award period and were supported by funding from your USWBSI grant taken faculty positions with universities?**

Yes No

If yes, how many? [Click to enter number here.](#)

- 4. Have any post docs who worked for you during the FY20 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 No

If yes, how many? [Click to enter number here.](#)

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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 FY20 award period (5/1/20 - 4/30/21). 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	FHB Rating (0-9)	Year Released
ARS10-82	BAR - Barley	MR - Moderately Resistant	Enter as text 0-9 rating	2020
ARS98-31	BAR - Barley	MR - Moderately Resistant	Enter as text 0-9 rating	2020
ARS84-27	BAR - Barley	MR - Moderately Resistant	Enter as text 0-9 rating	2020
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year

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

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Publications, Conference Papers, and Presentations

Instructions: Refer to the PR_Instructions for detailed more instructions for listing publications/presentations about your work that resulted from all of the projects included in the FY20 grant award. Only citations for publications published (submitted or accepted) or presentations presented during the **award period (5/1/20 - 4/30/21)** 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:

Z.J. Winn, R. Acharya, J. Lyerly, G. Brown-Guedira, C. Cowger, C. Griffey, J. Fitzgerald, R.E. Mason and J.P. Murphy. 2020. "Mapping of Fusarium Head Blight Resistance in NC13-20076 Soft Red Winter Wheat." In: S. Canty, A. Hoffstetter, and R. Dill-Macky (Eds.), *Proceedings of the 2020 National Fusarium Head Blight Forum* (p. 12.), Virtual; December 7-11. Online: https://scabusa.org/pdfs/NFHBF20_Proceedings.pdf.
Status: Abstract Published and Poster Presented
Acknowledgement of Federal Support: YES (Abstract and Poster)

Journal publications.

G. Hu, C. Evans, K. Satterfield, S. Ellberg. 2020. Registration of Spring Malting Barley Germplasm of ARS84-27, ARS98-31, and ARS10-82. *Journal of Plant Registrations*. 1-6. <https://doi.org/10.1002/plr2.20114>.

Status: published.

Acknowledgement of Federal Support: Yes (paper)

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

Nothing to report.

Other publications, conference papers and presentations.

Nothing to report.