

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

Cover Page

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Fiscal Year:	2020
USDA-ARS Agreement ID:	59-0206-0-127
USDA-ARS Agreement Title:	Fusarium Head Blight Resistance for Montana Barley
FY20 USDA-ARS Award Amount:	\$ 45,879
Recipient Organization:	Montana State University Office of Sponsored Programs Montana State University PO Box 172470 Bozeman, MT 59717-2470
DUNS Number:	625447982
EIN:	81-6010045
Recipient Identifying Number or Account Number:	4W8485
Project/Grant Reporting Period:	5/6/20 - 5/5/21
Reporting Period End Date:	5/5/2021

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
BAR-CP	Fusarium Head Blight Resistance for Montana Barley	\$ 45,879
FY20 Total ARS Award Amount		\$ 45,879



7/29/2021

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: *Fusarium Head Blight Resistance for Montana Barley*

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

Objective 1: Continue crossing resistant material into Montana lines; field screen resulting progeny in three different environments.

Objective 2: Continue to pyramid resistant lines and screen for resistance in the field for future genotype mapping.

Objective 3: Collect and identify *Fusarium* isolates from FHB infected barley.

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?

Objective 1: We field screened progeny that has performed well the last three years in Sidney, North Dakota, and Minnesota. In total, we have included 35 lines in the off-station screening. We have also added commonly grown varieties of barley in Montana to the nursery screening this year. Additionally, we are growing lines that have shown promise in the Bozeman Post Farm to test for agronomic and malting characteristics. These have not been harvested yet but we should have results this fall.

Objective 2: Currently, early generation lines from the pyramiding are being rescreened as hill plots at Sidney. In total we are screening 1008 lines including controls as hill plots this year. Last year, the screening was destroyed by birds so it had to be repeated in 2021. However – our anti-bird equipment that we added this year appears to be working well.

Objective 3: Because of the severe drought in our state this year, no FHB was identified. However, we have completed the morphological and most of the molecular identification of isolates from 2016. We intend to start screening *F. gram* isolates for chemotype before the end of the year.

b) What were the significant results?

Objective 1: We were able to obtain disease in a field season with the most severe drought in over 100 years.

Objective 2: We have been able to achieve disease pressure and prevent bird damage.

Objective 3: We are making good progress on isolate identification.

c) List key outcomes or other achievements.

Objective 1: We will identify lines that could be used in future breeding efforts.

Objective 2: In the future, we will use this data to identify lines for genotype by sequencing and eventual marker development.

Objective 3: Identify the members of the Fusarium head blight complex will help us determine the risk of non-Fusarium graminearum species to the malt barley industry and identify species for future malt quality testing.

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.

Our research was minimally impacted. Like other universities we are under specific hiring restrictions that have decreased the number of our support personnel but this had a minimal impact on the program this year.

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

This project is training one graduate student on Fusarium head blight management and understanding pathogen communities and mycotoxins.

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

Our work on Fusarium head blight has been presented at three field days and plot tours to Montana stakeholders this year. This includes the Eastern Ag Research Center field day, the Southern Ag Research Center field day, and the Swank plot tour.

Training of Next Generation Scientists

Instructions: Please answer the following questions as it pertains to the FY20 award period (5/6/20 - 5/5/21). 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 (5/6/20 - 5/5/21). 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
N/A	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
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Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
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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 (5/6/20 - 5/5/21)** 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.

Nothing to report.

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

Nothing to report.

Other publications, conference papers and presentations.

Nothing to report.