

USDA-ARS | U.S. Wheat and Barley Scab Initiative
FY21 FINAL Performance Progress Report
Due date: July 26, 2023

Cover Page

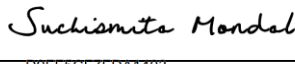
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|-------------------------------------|---|
| USDA-ARS Agreement ID: | 59-0206-0-129 |
| USDA-ARS Agreement Title: | Development of Montana Adapted FHB Resistant Winter Wheat Varieties |
| Principle Investigator (PI): | Suchismita Mondal |
| Institution: | Montana State University |
| Institution UEI: | EJ3UF7TK8RT5 |
| Fiscal Year: | 2021 |
| FY21 USDA-ARS Award Amount: | \$36,880 |
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| PI E-mail: | suchismita.mondal@montana.edu |
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| Period of Performance: | 5/6/21 - 5/5/23 |
| Reporting Period End Date: | 5/5/2023 |

USWBSI Individual Project(s)

| USWBSI Research Category* | Project Title | ARS Award Amount |
|------------------------------------|---|------------------|
| HWW-CP | Development of Montana Adapted FHB Resistant Winter Wheat Varieties | \$36,880 |
| FY21 Total ARS Award Amount | | \$36,880 |

I am submitting this report as a: FINAL Report

I certify to the best of my knowledge and belief that this report is correct and complete for performance of activities for the purposes set forth in the award documents.


Principal Investigator Signature
7/26/2023 | 2:22 PM MDT
Date Report Submitted

† BAR-CP – Barley Coordinated Project
DUR-CP – Durum Coordinated Project
EC-HQ – Executive Committee-Headquarters
FST-R – Food Safety & Toxicology (Research)
FST-S – Food Safety & Toxicology (Service)
GDER – Gene Discovery & Engineering Resistance
HWW-CP – Hard Winter Wheat Coordinated Project

MGMT – FHB Management
MGMT-IM – FHB Management – Integrated Management Coordinated Project
PBG – Pathogen Biology & Genetics
TSCI – Transformational Science
VDHR – Variety Development & Uniform Nurseries
NWW –Northern Soft Winter Wheat Region
SPR – Spring Wheat Region
SWW – Southern Soft Red Winter Wheat Region

Project 1: Development of Montana Adapted FHB Resistant Winter Wheat Varieties

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

Research objectives:

1) Integrate FHB resistance genes from FHB resistant winter and spring wheat germplasm into MSU's winter wheat breeding program using both conventional breeding and marker assisted backcrossing (MAB) to increase FHB resistant allele frequencies in the Montana winter wheat breeding program. Four generations of MAB and two generations of conventional breeding can be achieved in 2022-2023.

2) Phenotype Montana adapted winter wheat experimental lines for FHB resistance during the 2022 and 2023 growing seasons using an inoculated mist irrigated FHB screening nursery. Experimental lines found to have FHB resistance will be considered for public release.

2. What was accomplished under these goals or objectives? *(For each major goal/objective, address these three items below.)*

Objective 1.

a) What were the major activities?

Crosses were conducted in 2022 to integrate FHB resistance from winter and spring germplasm into MSU's winter wheat breeding program. F1's generated from 20 crosses were sown in GH for backcrosses which were completed in early 2023. Marker-assisted backcrosses were conducted for Fhb1 and Fhb5A.

b) What were the significant results?

Initiated the use of markers for backcrosses in greenhouse.

c) List key outcomes or other achievements.

The key outcome is the development of populations with increased FHB resistant alleles.

Objective 2.

d) What were the major activities?

Advanced winter wheat lines developed for FHB resistance screened at Southern Agricultural Research Center (SARC) in Huntley, MT in 2022 field season. Lines were scored for FHB resistance and harvested seed was sent for DON analysis. Lines with moderate FHB resistance were selected and planted in October 2022 for screening in 2023 field season.

e) What were the significant results?

Of the evaluated advanced lines two potential lines with moderate resistance were identified

List key outcomes or other achievements.

Advanced lines with moderate resistance were selected and planted in 2023 field season for FHB and yield evaluations as are part of multilocation yield trials.

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

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

The advanced lines with FHB resistance were included in multilocation trials and off station trials and information on upcoming lines with moderate resistance were shared with producers at field day presentations.

Publications, Conference Papers, and Presentations

Please include a listing of all your publications/presentations about your FHB work that were a result of funding from your FY21 grant award. Only citations for publications published (submitted or accepted) or presentations presented during the **award period** should be included.

Did you publish/submit or present anything during this award period?

- Yes, I've included the citation reference in listing(s) below.
 No, I have nothing to report.

Journal publications as a result of FY21 award

List peer-reviewed articles or papers appearing in scientific, technical, or professional journals. Include any peer-reviewed publication in the periodically published proceedings of a scientific society, a conference, or the like.

Identify for each publication: Author(s); title; journal; volume: year; page numbers; status of publication (published [include DOI#]; accepted, awaiting publication; submitted, under review; other); acknowledgement of federal support (yes/no).

Books or other non-periodical, one-time publications as a result of FY21 award

Report any book, monograph, dissertation, abstract, or the like published as or in a separate publication, rather than a periodical or series. Include any significant publication in the proceedings of a one-time conference or in the report of a one-time study, commission, or the like.

Identify for each one-time publication: Author(s); title; editor; title of collection, if applicable; bibliographic information; year; type of publication (book, thesis, or dissertation, other); status of publication (published; accepted, awaiting publication; submitted, under review; other); acknowledgement of federal support (yes/no).

Other publications, conference papers and presentations as a result of FY21 award

Identify any other publications, conference papers and/or presentations not reported above. Specify the status of the publication.