

USDA-ARS
U.S. Wheat and Barley Scab Initiative
FY18 Performance Report
Due date: September 23, 2019

Cover Page

Principle Investigator (PI):	Xuehui Li
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Fiscal Year:	2018
USDA-ARS Agreement ID:	59-0206-7-157
USDA-ARS Agreement Title:	Genetic Characterization and Selection for Fusarium Head Blight Resistance in Durum Wheat.
FY18 USDA-ARS Award Amount:	\$ 35,620
Recipient Organization:	North Dakota State University Office of Grant & Contract Accounting NDSU Dept 3130, PO Box 6050 Fargo, ND 58108-0650
DUNS Number:	80-388-2299
EIN:	45-6002439
Recipient Identifying Number or Account Number:	FAR0028453
Project/Grant Reporting Period:	8/1/18 - 7/31/19
Reporting Period End Date:	07/31/19

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
DUR-CP	Genomics-Assisted Recurrent Selection to Enhance FHB resistance in Durum Wheat.	\$ 35,620
FY18 Total ARS Award Amount		\$ 35,620

Xuehui Li

9/26/2019

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

Project 1: *Genomics-Assisted Recurrent Selection to Enhance FHB resistance in Durum Wheat.*

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

The major goal of this project is to develop durum wheat germplasm/lines with improved Fhb resistance adapted to Northern Great Plain in US. The specific objectives are to

- 1) improve Fhb resistance of a durum wheat population through recurrent selection
- 2) utilize genomics-assisted selection to enhance efficiency of recurrent selection
- 3) develop new durum wheat inbred lines with improved Fhb resistance

2. What was accomplished under these goals?

Objective 1

1) major activities

200 S1 families were evaluated for FHB resistance with hill plots at two locations Fargo and Prosper in 2019. Top 20 families were selected and are being crossed to generate C1 population, which will be evaluated in next year.

2) specific objectives

NA

3) significant results

NA

4) key outcomes or other achievements

One cycle of phenotypic selection is done.

Objective 2

1) major activities

The 200 parents of the C0 were genotyped by using GBS. Genomic selection model will be developed and validated using the marker data and phenotypic data collected in 2019.

2) specific objectives

NA

3) significant results

NA

4) key outcomes or other achievements

Total 200 parents of the cycle 0 were genotyped

Objective 3

1) major activities

Phenotypic selection of FHB resistance was performed on a bi-parental population. First, 200 F2 individuals were evaluated for type II resistance in greenhouse in 2018 Fall and top 20 F2 plants were selected; 160 F3 plants were evaluated for type II resistance in greenhouse in

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2019 Spring and top 40 F3 plants were selected; the selected 40 F3 families were evaluated at field FHB nursery in 2019 Summer and top five families were selected.

2) specific objectives

NA

3) significant results

NA

4) key outcomes or other achievements

Total 200 parents of the cycle 0 were genotyped

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

NA

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

NA

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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?**
None
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?**
None
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?**
None
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?**
None
If yes, how many?

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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 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

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

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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 (8/1/18 - 7/31/19). 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 presentation with an abstract:

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)

Nothing to report.

Journal publications.

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

Other publications, conference papers and presentations.