

**USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY16 Final Performance Report
Due date: July 28, 2017**

Cover Page

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Fiscal Year:	2016
USDA-ARS Agreement ID:	59-0206-4-022
USDA-ARS Agreement Title:	New Sources of Resistance to FHB and DON.
FY16 USDA-ARS Award Amount:	\$ 19,508
Recipient Organization:	Kansas State University 10 Anderson Hall Manhattan, KS 66506
DUNS Number:	929773554
EIN:	48-0771751
Recipient Identifying Number or Account Number:	AR9886 / GAPP603126
Project/Grant Reporting Period:	5/26/16 - 5/25/17
Reporting Period End Date:	05/25/17

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
HW-CP	New Sources of Resistance to FHB and DON in Wheat.	\$ 19,508
	FY16 Total ARS Award Amount	\$ 19,508



June 29, 2017

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
 HW-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: *New Sources of Resistance to FHB and DON in Wheat.*

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

There are only a few sources of resistance to FHB available for wheat improvement. The proposed research is aimed at identifying new sources of FHB resistance in wild relatives of wheat and using directed chromosome engineering to produce agronomically useful compensating wheat-alien translocations, which are then being transferred into adapted winter wheat cultivars. We have previously identified novel sources derived from *Leymus racemosus*, *Fhb3*, and *Elymus tsukushiensis*, *Fhb6*. In addition, we are continuing to evaluate wheat-alien introgression lines for the presence of novel sources of FHB resistance.

2. What was accomplished under these goals?

1) major activities

Identifying novel sources of resistance to FHB in distantly related wild relatives of wheat and using directed chromosome engineering to produce agronomically useful wheat-alien translocations.

2) specific objectives

We are transferring *Fhb6* present on the wheat-*E. tsukushiensis* translocation chromosome T1AL·1AS-1E^{ts}#1S into the moderate resistant hard red winter wheat cultivars Everest, Lyman, and Overland. 430 progenies of the cross (Everest/WGRC61) X Everest, 348 progenies of the cross (Lyman/WGRC61) X Lyman, and 426 progenies of the cross (Overland/WGRC61) X Overland were screened by the marker BE426771 digested with *RsaI* and 331, 130, and 249 plants were positive for this marker indicating that they were heterozygous for *Fhb6*. In 2016-17, the 710 BCF1 plants were grown in the Rocky Ford nursery and were evaluated for their resistance to FHB and DON accumulation.

3) significant results

FHB resistant plants with agronomically desirable phenotypes were selected and will be further evaluated for their resistance to FHB and DON accumulation.

4) key outcomes or other achievements

Development of hard red winter wheat germplasms with improved levels of FHB resistance and DON accumulation will be made available to wheat improvements programs.

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

The project provided part-time support for one graduate student.

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

The results were presented at the National Fusarium Head Blight Forum and were published in peer-reviewed international scientific journals. The germplasms with novel sources of FHB resistance were distributed to public and private wheat breeding programs.

Training of Next Generation Scientists

Instructions: Please answer the following questions as it pertains to the FY16 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 FY16 award period?**

No

- 2. Did any graduate students in your research program supported by funding from your USWBSI grant earn their Ph.D. degree during the FY16 award period?**

No

- 3. Have any post docs who worked for you during the FY16 award period and were supported by funding from your USWBSI grant taken faculty positions with universities?**

No

- 4. Have any post docs who worked for you during the FY16 award period and were supported by funding from your USWBSI grant gone on to take positions with private ag-related companies or federal agencies?**

No

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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 FY16 award period. All columns must be completed for each listed germplasm/cultivar. Use the key below the table for Grain Class abbreviations. *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 FY16-FPR_Instructions for detailed instructions for listing publications/presentations about your work that resulted from all of the projects included in the FY16 grant. Only include citations for publications submitted or presentations given during your award period (5/26/16 - 5/25/17). If you did not have any publications or presentations, state 'Nothing to Report' directly above the Journal publications section.

Nothing to Report