USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY15 Final Performance Report
Due date: July 15, 2016

Cover Page

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Fiscal Year:	2015
USDA-ARS Agreement ID:	59-0206-4-022
USDA-ARS Agreement Title:	New Sources of Resistance to FHB and DON.
FY15 USDA-ARS Award Amount:	$ 19,527
Recipient Organization:	Kansas State University 10 Andrerson Hall Manhattan, KS 66506
DUNS Number:	929773554
EIN:	48-0771751
Recipient Identifying Number or Account Number:	AR9886 / GAPP603126
Project/Grant Reporting Period:	05/26/15-05/25/16
Reporting Period End Date:	05/25/16

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
HWW-CP	New sources of Resistance to FHB and DON in Wheat.	$ 19,527
	FY15 Total ARS Award Amount	**$ 19,527**

06/08/2016

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: *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 wheat cultivars. We have previously identified novel sources of FHB resistance derived from *Leymus racemosus*, *Fhb3*, and *Elymus tsukushiensis*. 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?

We are presently 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. The germplasm release KS14WGRC61 with *Fhb6* was crossed twice with Everest, Lyman, and Overland. We are presently using molecular marker analysis to identify plants that are heterozygous for T1AL·1AS-1E^{ts}#1S and are using Genotyping-By Sequencing to recover plants with the recurrent wheat background. These plants will be selfed and plants homozygous for Fhb6 will be selected and evaluated for their FHB resistance and DON accumulation under greenhouse and field conditions.

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

Nothing to Report

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 FY15 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 FY15 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 FY15 award period?**

   No

3. **Have any post docs who worked for you during the FY15 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 FY15 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

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 FY15 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

Publications, Conference Papers, and Presentations

Refer to the FY15-FPR_Instructions for listing publications/presentations about your work that resulted from all of the projects included in the FY15 grant. If you did not have any publications or presentations, state 'Nothing to Report' directly above the Journal publications section.

Journal publications.

Qi LL, Pumphrey MO, Friebe B, Chen PD, Gill BS. 2008. Molecular cytogenetic characterization of alien introgressions with gene *Fhb3* for resistance to Fusarium head blight disease of wheat. Theor Appl Genet 117: 1155-1166.
Status: published
Acknowledgement of Federal Support: yes

Bockus WW, Friebe B, Gill BS. 2010. Reaction of winter wheat accessions containing *Fhb3* and selected cultivars to Fusarium head blight, 2009. Plant Disease Management Reports. Report 4:CF012. DOI: 10.1094/PDMR04. The American Phytopathology Society, St. Paul, MN.
Status: published
Acknowledgement of Federal Support: yes

Cainong JC, Bockus WW, Feng Y, Chen PD, Qi LL, Sehgal SK, Danilova TV, Koo D-H, Friebe B, Gill BS, 2015. Chromosome engineering, mapping, and transferring of resistance to Fusarium head blight disease from *Elymus tsukushiensis* into wheat. Theor Appl Genet 128:1019-1027.
Status: published
Acknowledgement of Federal Support: yes

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

none

Other publications, conference papers and presentations.

none