

**USDA-ARS/  
U.S. Wheat and Barley Scab Initiative  
FY13 Final Performance Report  
July 15, 2014**

**Cover Page**

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<b>Fiscal Year:</b>	FY13
<b>USDA-ARS Agreement ID:</b>	59-0206-2-088
<b>USDA-ARS Agreement Title:</b>	Alien Chromosome Engineering and the Deployment of a Novel Source of Fusarium Head Blight Resistance in Wheat.
<b>FY13 USDA-ARS Award Amount:</b>	\$ 24,457

**USWBSI Individual Project(s)**

<b>USWBSI Research Category*</b>	<b>Project Title</b>	<b>ARS Award Amount</b>
HWW-CP	New Sources of Resistance to FHB and DON.	\$ 24,457
	<b>FY13 Total ARS Award Amount</b>	<b>\$ 24,457</b>

  
Principal Investigator

June 10, 14  
Date

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\* MGMT – FHB Management  
FSTU – Food Safety, Toxicology, & Utilization of Mycotoxin-contaminated Grain  
GDER – Gene Discovery & Engineering Resistance  
PBG – Pathogen Biology & Genetics  
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.*

**1. What major problem or issue is being resolved relevant to Fusarium head blight (scab) and how are you resolving it?**

There are only few effective sources of resistance to FHB available in wheat. The proposed research is aimed at identifying new sources of FHB resistance in wild relatives of wheat and transferring them in the form of agronomically useful compensating translocations to wheat.

**2. List the most important accomplishments and their impact (i.e. how are they being used) to minimize the threat of Fusarium Head Blight or to reduce mycotoxins. Complete both sections; repeat sections for each major accomplishment:**

**Accomplishment:** We have identified a novel source of FHB resistance from *Leymus racemosus*, *Fhb3*, transferred to wheat in the form of the Robertsonian translocation T7AL·7Lr#1S and the recombinant chromosomes rec124 T7AL·7Lr#1S-7AS and rec989 T7AL·7AS-7Lr#1S. We recently have identified a second novel source of FHB resistance derived from *Elymus tsukushiensis* and transferred it to wheat in the form of a compensating T1AL·1AS-1E<sup>ts</sup>#1S translocation. We have requested a gene symbol for this resistance gene and are in the process of publishing this result. We also developed molecular markers tagging the *Fhb3* and new FHB resistance gene.

**Impact:** *Fhb3* and the new FHB resistance gene derived from *E. tsukushiensis* have been transferred to the adapted winter wheat cultivars Fuller and Everest and this year seeds of these germplasms have been distributed to most wheat breeding programs in the US. We also provided molecular marker information along with the germplasm material that will facilitate the transfer of these resistance genes in breeding programs.

**Include below a list of the publications, presentations, peer-reviewed articles, and non-peer reviewed articles written about your work that resulted from all of the projects included in the FY13 grant. Please reference each item using an accepted journal format. If you need more space, continue the list on the next page.**

Qi LL, M. O. 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.

Bockus WW, Friebe B, Gill BS. 2010. Reaction of winter wheat accessions containing *Fhb3* and selected cultivars to Fusarium headblight, 2009. *Plant Disease Management Reports*. Report 4:CF012. DOI:10.1094/PDMR04. The American Phytopathological Society, St. Paul, MN.