

**USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY10 Final Performance Report
July 15, 2011**

Cover Page

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Fiscal Year:	FY10
USDA-ARS Agreement ID:	59-0206-0-057
USDA-ARS Agreement Title:	Evaluating and Validating FHB Host Resistance Genes Pyramided in Spring Wheat.
FY10 USDA-ARS Award Amount:	\$ 9,756

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
VDHR-SPR	Evaluating and Validating FHB Host Resistance Genes Pyramided in Spring Wheat.	\$ 9,756
	Total ARS Award Amount	\$ 9,756

Principal Investigator

Date

* 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: *Evaluating and Validating FHB Host Resistance Genes Pyramided in Spring Wheat.*

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

Fusarium head blight (FHB), caused by *Gibberella zeae* Schwein. (Petch) (anamorph: *Fusarium graminearum* Schwabe), is a devastating disease in small grains (McMullen et al., 1997). Gene pyramiding (combining type I and type II resistance) is considered one of the most effective strategies to develop durable resistance to FHB. Current wheat breeding programs for FHB focus mainly on type II resistance, which limits pathogen spread but may not be sufficiently durable. Despite that, few studies have been conducted to address the effects of type I resistance and combination of both types of resistance to FHB. In our preliminary experiments, several RILs showed higher level of resistance (reduced disease severity and low DON content) than the resistant parents. These enhanced resistant RILs could be useful breeding material to achieve the goal of this research project.

2. List the most important accomplishment and its impact (i.e. how is it being used) to minimize the threat of Fusarium head blight or to reduce mycotoxins. Complete both sections (repeat sections for each major accomplishment):

Accomplishment:

In this project, the resistant line(s) were selected based on preliminary results and tested in series of experiments in the greenhouse and field. These RILs were evaluated for resistance to initial infection, FHB spread, final disease severity, and DON. The results indicated that several RILs were significantly better than the resistant parents (Alsen and Frontana) for all these disease parameters assessed. Importantly, these RILs possess a high of level of type I, II, and V resistance to *F. graminearum*. Thus, these pyramided lines could be valuable sources of resistance to FHB and utilized in wheat breeding programs in the region.

Impact: The information obtained in this research would ultimately speed up the effort in the development of durable resistance to *F. graminearum* and would help for better management of the disease in the field.

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 grant. Please reference each item using an accepted journal format. If you need more space, continue the list on the next page.

One manuscript is underway for submitting to Crop Science.