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	Evaluating and Validating FHB Host Resistance Genes Pyramided	
Title:	in Spring Wheat.	
FY10 USDA-ARS Award	\$ 0.756	
Amount:	ϕ γ ,/JU	

USWBSI Individual Project(s)

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

SPR – Spring Wheat Region

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:

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.