

**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:	NA
USDA-ARS Agreement Title:	Genetic Characterization of Fusarium Head Blight Resistance in Two Elite Spring Wheat Cultivars.
FY10 USDA-ARS Award Amount:	\$ 3,150

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
VDHR-SPR	Genetic Characterization of Fusarium Head Blight Resistance in two Elite Spring Wheat Cultivars.	\$ 3,150
	Total ARS Award Amount	\$ 3,150

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: *Genetic Characterization of Fusarium Head Blight Resistance in two Elite Spring Wheat Cultivars.***1. What major problem or issue is being resolved relevant to Fusarium head blight (scab) and how are you resolving it?**

To date, the FHB resistance present in the spring wheat cultivars released in this region, such as Alsen and Glenn, was mostly derived from the Chinese sources, particularly Sumai 3. Alsen and Glenn are both NDSU releases and have dominated the spring wheat area since 2002. However, further marker haplotyping analysis performed in various labs have confirmed that the resistance present in Glenn may be from the source other than Sumai 3, despite the contrast information as provided based on pedigree. Similarly, Parshall, another NDSU release, was grown on significant acreages in the spring wheat region for many years because of its consistently good tolerance to FHB. The parentage of Parshall didn't trace to any exotic origin such as Chinese germplasm. We postulate that Parshall has an indigenous source of resistance that may be of great interest to wheat breeders. To gain a better understanding the underlying genetic mechanism of FHB resistance present in both Glenn and Parshall, we developed several mapping populations by crossing these two sources of resistance to susceptible parents from MN (MN00261-4), SD (SD3870), and ND (Reeder). Genetic mapping studies will be carried out to detect and locate resistance QTLs using DArT and SSR markers.

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 collaboration with spring wheat breeders, the Fargo genotyping lab will be using the resources allocated to assist the breeders with the genetic mapping process, particularly the later phase of saturating the QTL regions of interest with SSR markers after the regions are determined based on Diversity Array Technology (DArT, Australia) marker data analysis. Preparations of DNA samples from the RILs of all populations, their parents, and checks were achieved for DArT analysis. The data will be used to (1) generate a basic map and identify important QTL regions, (2) augment the identified QTL regions with SSR markers that show polymorphism between parents; and (3) subsequently, generate linkage maps.

Impact:

The potential impact of this research on breeding for FHB resistance would be substantial. Once the genetic mechanism underlying the FHB resistance present in Glenn and Parshall is revealed, wheat breeders will benefit from having additional and much needed novel resistance sources for disease improvement. Closely linked DNA markers when found will be used in the marker-assisted breeding applications to facilitate deployment of the resistance genes. Therefore, we expect the outcome of this research will have a direct impact on wheat production at the state and regional (northern Great Plains), and national levels.

FY10 (approx. May 10 – May 11)

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USDA-ARS Agreement #: NA

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.

None.