

**USDA-ARS/  
U.S. Wheat and Barley Scab Initiative  
FY11 Preliminary Final Performance Report  
July 13, 2012**

**Cover Page**

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<b>Fiscal Year:</b>	FY11
<b>USDA-ARS Agreement ID:</b>	59-0206-1-118
<b>USDA-ARS Agreement Title:</b>	Proteomic Dissection of RILs for the Discovery of Scab Responsive Genes in Wheat.
<b>FY11 USDA-ARS Award Amount:</b>	\$ 14,634

**USWBSI Individual Project(s)**

<b>USWBSI Research Category*</b>	<b>Project Title</b>	<b>ARS Award Amount</b>
GDER	Proteomic Dissection of RILs for the Discovery of Scab Responsive Genes in Wheat.	\$ 14,634
	<b>Total ARS Award Amount</b>	<b>\$ 14,634</b>

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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:** *Proteomic Dissection of RILs for the Discovery of Scab Responsive Genes in Wheat.*

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

When FHB/scab attacks the wheat plant successfully, myriad of events take place inside the wheat plant's cell. Our hypothesis is that in resistant lines of wheat plant some key proteins are favorably differentially regulated (up or down regulation) compare to susceptible lines. Presently, in this direction very little is known at molecular level. Through this project our main focus is to discover scab responsive genes by studying a highly resistant near isogenic line and a highly susceptible near isogenic line of wheat (kindly provided by Dr. Gary Muehlbauer, University of Minnesota) and subject them to the proteomic experimental pipeline to discover the proteins (and finally the corresponding genes) differentially regulated before and after the scab infections. Since Fusarium isolates vary in cultural characteristics and ability to cause scab, a mixture of local isolate is being used as inoculum (kindly provided by Dr. Yang Yen, South Dakota State University). Infected young heads were collected at different time intervals along with uninfected control (sprayed with water and broth only). The harvested samples were snap frozen in liquid nitrogen and stored at minus 80°C till the researchers were ready for the proteomic experiments. We isolated total protein from both- near isogenic lines and from prior infection and after infection stages. The total protein from samples were subjected to a cutting-edge proteomic technique 2 dimensional – differential in gel electrophoresis (2D-DIGE) to discover the differential regulation of proteins in resistant and susceptible near isogenic lines.

**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:**

Our 2D-DIGE approach is novel in this field and has resulted in the identification of 20 protein spots differentially expressed between a susceptible and a resistant near isogenic line of wheat. The mass spectrometry identification of the protein spots is underway.

**Impact:**

1. New knowledge generated by the experiment will enhance our understanding of wheat-FHB interaction significantly.
2. The newly discovered genes will be used by wheat breeders to screen the germplasm and apply “Marker assisted selection” approach in their breeding programs.

FY11 (approx. May 11 – May 12)

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**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 at this time.