

**USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY09 Final Performance Report
July 15, 2010**

Cover Page

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Fiscal Year:	2009
USDA-ARS Agreement ID:	59-0790-6-059
USDA-ARS Agreement Title:	Responding to Montana's Head Scab Epidemic.
FY09- USDA-ARS Award Amount:	\$ 9,688

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Adjusted Award Amount
VDHR-SPR	Responding to Fusarium Head Blight for the Northern Intermountain Region and the Northwestern Great Plains.	\$ 9,688
	Total Award Amount	\$ 9,688

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 Winter Wheat Region
 SWW – Southern Sinter Wheat Region

Project 1: *Responding to Fusarium Head Blight for the Northern Intermountain Region and the Northwestern Great Plains.*

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

Fusarium head blight has become a perennial problem for the irrigated acreage throughout Montana, northern intermountain region and the western Great Plains as documented by field trials with FHB tolerant varieties in 2006 and 2007. To address this problem, initial trials set in 2007, 2008 and 2009 to evaluate commercial varieties and breeding lines from MSU, University Idaho, AgriPro and WestBred for their performance within a producers' field. In those trials, Fusarium head blight developed reliably under naturally occurring inoculums and sprinkler irrigation. Commercial varieties with FHB tolerance when coupled with a foliar fungicide reduced the impact of FHB on grain production and DON mycotoxin levels. However, most of these varieties lodged, had low yield potential and/or were susceptible to other diseases common to high yield situations where FHB occurs. To provide a more acceptable solution, we used molecular markers to backcross Sumai 3 QTL FHB tolerance using two recurrent parents that have performed well in high yield production and are locally adapted to the pest problems in the area. 'Choteau', a sawfly tolerant variety, is resistant to lodging. MT0249, a sister line to 'Vida' with long green leaf duration, has shorter stature necessary for irrigated conditions. In 2009, 40 homozygous BC3:F5 individuals were evaluated for FHB and agronomic performance in Montana and by cooperators in North Dakota. In crop season 2010, four BC3:F6 individuals were entered in the single row yield trials as part of the on-going spring wheat performance program at MSU. In 2011, the selected individuals will be further evaluated in the preliminary spring wheat nursery where they will be grown in multiple locations as part of the MSU breeding program for variety yield and cereal quality.

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:

This project was responsible for documenting the impact of FHB on spring wheat in Montana and demonstrating the impact directly to the growers with two years of field trials. Information on the performance of available FHB tolerant lines was provided to growers through publications and workshops. Concurrently, MSU Extension specialist, Dr. Mary Burrows, authored the registration of foliar fungicide for FHB management. The program seeks to release FHB resistant varieties for high yielding, irrigated systems in the near future.

Impact:

Commercially available FHB tolerant varieties from private and public sources were immediately available for distribution following the initial year of field trials conducted by this team. Information was disseminated from the variety trials and adopted by the seed trade and grain growers. Varieties from AgriPro, WestBred and North Dakota State University were available in sufficient quantity in the commercial trade by 2008. This rapid response limited the impact of FHB within Montana.

3. Include below a list all germplasm or cultivars released with full or partial support of the USWBSI. List the release notice or publication. Briefly describe the level of FHB resistance.

MSU Spring Wheat Breeding Program - FHB Nursery, 2009

Identification	FHB % Disease Heads	DON ppm detect limit <0.5
Four individuals BC3:F6		
MSU 39-4-26	3%	<0.5
MSU 39-4-31	9%	<0.5
MSU 39-4-63	10%	<0.5
MSU 52-1-19	19%	1.85
64 entry nursery mean	12%	1.06
Reference Varieties		
'Hank' Susceptible	30%	4.20
'Freyr' Resistant	5%	<0.5
'Jenna' Resistant	8%	0.90
'Brennan' Resistant	15%	0.50
Sumai 3 Resistant	3%	<0.5

4. 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.

Burrows, M., W.E. Grey and A. Dyer. 2008. Fusarium head blight (scab) of wheat and barley. MontGuide MT200806AG.

Grey, W., A. Dyer and L. Talbert. 2008. Responding to Fusarium Head Blight and Grain Deoxynivalenol in Montana. Midwest Section Meeting, Association of Analytical Communities, International.