

**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:	59-0206-9-050
USDA-ARS Agreement Title:	Integrated FHB Management Research - South Dakota.
FY10 USDA-ARS Award Amount:	\$ 24,390

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
MGMT	Uniform Fungicide and Biocontrol Agent Test for Control of FHB and DON on Winter Wheat in South Dakota.	\$ 7,805
MGMT	Integrated Management of FHB and DON in Spring Wheat, Winter Wheat and Barley in South Dakota.	\$ 16,585
	Total ARS Award Amount	\$ 24,390


Principal Investigator

13 July 2011

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: *Uniform Fungicide and Biocontrol Agent Test for Control of FHB and DON on Winter Wheat in South Dakota.*

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

Fusarium head blight can only be managed by a combination of cultural and chemical means. In many cases, producers have had to compromise on cultural approaches for disease management and become reliant on chemical control. We have been investigating different fungicides and different application timings to see what are the most effective products out in the industry and how the different application timings affect Fusarium head blight and DON levels. We have also been testing various biological control agents by themselves and along with a chemical fungicide to see how these combined programs perform against Fusarium head blight.

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: Success in using the uniform trials has been seen in demonstrating to producers, crop consultants, etc. that there is a difference in fungicide efficacy and more importantly that in general, fungicides can be very successful tools for FHB suppression. We have also shown in some areas of the region that if a fungicide is applied a little later in the flowering period but within the limits of the chemical label that the fungicides still can be effective against FHB and DON.

Impact: By testing different timings of spraying fungicides, we have become confident in a later application, if necessary and have helped the producers understand that a fungicide application later than early flowering but within the requirements of the chemical labels may still provide protection against FHB. This has made an impact because of the unique weather situations (namely rainy weather and associated wet field conditions) that we have had last year. Producers have had significant problems being able to get into the fields to spray their wheat at flowering and additional issues of improper timing due to long waiting lists for pesticide applications through local commercial applicators or aerial application businesses.

Project 2: *Integrated Management of FHB and DON in Spring Wheat, Winter Wheat and Barley in South Dakota.*

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

To investigate when and how to incorporate different management strategies including fungicide, crop rotation and varietal selections for Fusarium head blight (FHB) and DON suppression under different environmental conditions. We hope to identify a combination of these strategies that will help the producer gain an edge against FHB and DON when he/she is thinking about planting small grains and to help assure that the producer is maximizing potential profit margins on the wheat acres grown.

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: Success in using an integrated management strategy has shown that using at least a moderately resistant variety planted on a non- host crop (i.e. soybeans) field all paired with a timely fungicide application shows the highest percent of control for FHB and DON. This study has shown producers that by making the right choices in their cropping systems, significant improvement of FHB suppression can be seen. This integrated management strategy is very important in South Dakota as most of the producers are no-tilling which leaves residue on the top of the fields, providing a ready source of FHB inoculum.

Impact: Increasing producer knowledge of the effects of cropping systems, understanding the disease cycle and what tools they can use to develop an integrated management program to prevent/suppress FHB, ultimately leading to improved profit per acre grown. This approach may ultimately reduce the use of fungicides by incorporating a moderately resistant variety paired with a non-host rotational crop to reduce inoculum load for FHB in their small grains.

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.

- Bradley, C.A., E.A. Adee, S.A. Ebelhar, R. Dill-Macky, J.J. Wiersma, A.P. Grybauskas, W. W. Kirk, M.P. McMullen, S. Halley, E.A. Milus, L.E. Osborne, K. R. Ruden and B.G. Young. 2010. “Multi-State Uniform Fungicide Evaluations for Control of Fusarium Head Blight and Associated Mycotoxins.” In: S.Canty, A. Clark, A. Anderson-Scully, D. Ellis and D. Van Sanford (Eds.), Proceedings of the National Fusarium Head Blight Forum; 2010 Dec 7-9; Milwaukee, WI. Lexington, KY: University of Kentucky. p. 74
- Ruden, K.R., L.E. Osborne, N. Srinivasa Murthy and B. H. Bleakley. 2010. “2010 Trial for the Performance of Biological Control Agents for the Suppression of Fusarium Head Blight in South Dakota.” In: S.Canty, A. Clark, A. Anderson-Scully, D. Ellis and D. Van Sanford (Eds.), Proceedings of the National Fusarium Head Blight Forum; 2010 Dec 7-9; Milwaukee, WI. Lexington, KY: University of Kentucky. p. 94
- Willyerd, K. T., C. Bradley, A. Grybauskas, D. Hershman, L. Madden, M. McMullen, L. Osborne, L. Sweets and P. Paul. 2010. “Multi-state evaluation of integrated management strategies for Fusarium head blight and deoxynivalenol in small grain. Abstr. *Phytopathology* 100:S137.
- Willyerd, K., L. Madden, M. McMullen, S. Wegulo, B. Bockus, L. Sweets, C. Bradley, K. Wise, D. Hershman, G. Bergstrom, A. Grybauskas, L. Osborne, P. Esker and P. Paul. 2010. “Inoculated Field Trials for Evaluating FHB/DON Integrated Management Strategies”. In: S.Canty, A. Clark, A. Anderson-Scully, D. Ellis and D. Van Sanford (Eds.), Proceedings of the National Fusarium Head Blight Forum; 2010 Dec 7-9; Milwaukee, WI. Lexington, KY: University of Kentucky. p. 109