

**USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY08 Final Performance Report (approx. May 08 – April 09)
July 15, 2009**

Cover Page

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Fiscal Year:	2008
USDA-ARS Agreement ID:	59-0790-4-097
USDA-ARS Agreement Title:	Field Studies on Chemical and Biological Control of Fusarium Head Blight in South Dakota.
FY08 USDA-ARS Award Amount:	\$ 20,452

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Adjusted Award Amount
MGMT	Collaboration on Uniform Fungicide Trials in South Dakota.	\$10,505
MGMT	Evaluation of Integrated Management Services for Fusarium Head Blight in SD.	\$ 9,947
	Total Award Amount	\$ 20,452

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
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

(Form FPR08)

Project 1: *Collaboration on Uniform Fungicide Trials in South Dakota.*

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

Teams of researchers at several major land grant universities have evaluated fungicides for the management of Fusarium head blight in uniform nurseries across locations. The objective is to determine the most effective products or formulations for chemical management of the disease.

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:

The latest additions to the uniform fungicide trials, prothioconazole+tebuconazole and metconazole formulations have performed significantly better than previous generations of products for FHB management. While no fungicides are completely effective at eliminating FHB in most cases, the data from several trials across the U.S. concur that these newest products perform at a level that dramatically reduces DON, disease incidence and/or severity, and perform better than prior state-of-the-art products.

Impact:

Producers have an much larger arsenal of products for managing outbreaks of FHB when management techniques such as host resistance and crop rotation are overwhelmed by a high-risk environment. The impact of the uniform testing program allows for more rapid assessment of the efficacy and utility of new products or product combinations than if the program were not in place.

Project 2: *Evaluation of Integrated Management Services for Fusarium Head Blight in SD.*

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

Over the past ten years or so of major research into the management of Fusarium head blight of wheat and barley, it has become clear that no single management tool is effective at reducing the disease to an acceptable level. Host resistance and cultural practices have been successfully implemented to manage low disease pressure situations, but by themselves are not sufficient to control FHB under high-pressure environments. Foliar fungicides have been successfully integrated into FHB management to further reduce FHB. This research was directed at the evaluation of integrating host resistance and chemical management to optimize FHB control under higher pressure situations.

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 research has demonstrated clearly the value of incorporating an integrated approach to FHB management through the increased levels of control achieved by integrating host resistance to FHB with appropriately timed fungicide applications. Either method alone performed significantly less well than the combined effects of the two major management strategies.

Impact:

Growers will be better able to understand the necessity to use resistant varieties when faced with the risk of FHB, even if fungicide management is to be used. Furthermore, growers who plant resistant varieties will be aware that fungicides may be required if highly FHB-favorable environments are experienced.

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.

Refereed Journal Article:

Stein, J.M., L.E. Osborne, K.D. Bondalapati, K.D. Glover, and C.A. Nelson. 200X. Fusarium Head Blight Severity and Deoxynivalenol Concentration in Wheat in Response to *Gibberella zeae* Inoculum Concentration. *Phytopathology* 99:759-764

Proceeding Articles:

Bradley, C.A., E. Adee, S. Ebelhar, B. Young, M. Burrows, M. McMullen, J. Luckach, L. Osborne, K. Ruden, L. Sweets, and K. Wise. 2008. Multi-state Uniform Fungicide Trials to Control Fusarium Head Blight and Deoxynivalenol. *in: Proc. National Fusarium Head Blight Forum; Dec 2-4, 2008; Indianapolis, IN, USA.*

Jochum, C.C., G.Y. Yuen, K.R. Ruden, B.H. Bleakley, J. Morgan, L. Osborne, L.E. Sweets, S. Halley, and K. Kinzer. 2008. 2008 Results from the Uniform Evaluation of Biological Agents for the Control of Fusarium Head Blight on Wheat and Barley, *in: Proc. National Fusarium Head Blight Forum; Dec 2-4, 2008; Indianapolis, IN, USA.*

Paul, P.A., L. Madden, M. McMullen, D. Hershman, L. Sweets, S. Wegulo, S. Halley, L. Osborne, K. Ruden, and B. Padgett. 2008. Integrated Management of FHB and DON in Small Grains: 2008 Uniform Trials, *in: Proc. National Fusarium Head Blight Forum; Dec 2-4, 2008; Indianapolis, IN, USA.*

Poster Presentations:

Bondalapati, K.D., J.M. Stein, L.E. Osborne, S.M. Neate, and C.R. Hollingsworth. 2008. Modeling Fusarium Head Blight and SON in Barley. *in: Proc. National Fusarium Head Blight Forum; Dec 2-4, 2008; Indianapolis, IN, USA.*

Ruden, K.R., L.E. Osborne, K.D. Glover, and J.L. Kleinjan. 2008. 2008 Uniform Fungicide Performance Trials for the Suppression of Fusarium Head Blight in South Dakota, *in: Proc. National Fusarium Head Blight Forum; Dec 2-4, 2008; Indianapolis, IN, USA.*

Ruden, K.R., L.E. Osborne, B.H. Bleakley, J. Morgan. 2008. 2008 Uniform Trials for the Performance of Biological Control Agents in the Suppression of Fusarium Head Blight in South Dakota, *in: Proc. National Fusarium Head Blight Forum; Dec 2-4, 2008; Indianapolis, IN, USA*

Websites:

Osborne, L. 2008 Wheat and Barley Scab Risk Advisory. (11 updates). Disease forecast and commentary URL: http://plantsci.sdstate.edu/planthealth/scab_advisory/index.html
Osborne, L. 2008. The Fusarium Head Blight Prediction Center. (11 commentaries). Site-specific weather and disease forecast information. URL: <http://wheatcab.psu.edu>

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If your FY08 USDA-ARS Grant contained a VDHR-related project, 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. If this is not applicable (i.e. no VDHR-related project) to your FY08 grant, please insert ‘Not Applicable’ below.

NOT APPLICABLE