

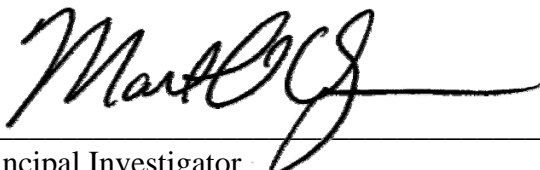
**USDA-ARS/  
U.S. Wheat and Barley Scab Initiative  
FY05 Final Performance Report (approx. May 05 – April 06)  
July 14, 2006**

**Cover Page**

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<b>Fiscal Year:</b>	<b>2005</b>
<b>FY05 ARS Agreement ID:</b>	<b>59-0790-4-097</b>
<b>Agreement Title:</b>	<b>Field Studies on Chemical and Biological Control of Fusarium Head Blight in South Dakota.</b>
<b>FY05 ARS Award Amount:</b>	<b>\$ 20,075</b>

**USWBSI Individual Project(s)**

<b>USWBSI Research Area*</b>	<b>Project Title</b>	<b>ARS Adjusted Award Amount</b>
CBC	Field Studies on Chemical and Biological Control of Fusarium Head Blight in South Dakota.	\$ 13,161
CBC	Aerial Fungicide Application Studies for the Control of Fusarium Head Blight.	\$ 6,914
	<b>Total Award Amount</b>	<b>\$ 20,075</b>

  
 Principal Investigator \_\_\_\_\_ Date July 6, 2006

\* BIO – Biotechnology  
 CBC – Chemical & Biological Control  
 EDM – Epidemiology & Disease Management  
 FSTU – Food Safety, Toxicology, & Utilization  
 GIE – Germplasm Introduction & Enhancement  
 VDUN – Variety Development & Uniform Nurseries  
 (Form – FPR05)

**Project 1:** *Field Studies on Chemical and Biological Control of Fusarium Head Blight in South Dakota.*

**1. What major problem or issue is being resolved 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 to compromise on cultural approaches at disease management and become reliant on chemical control. Fusarium head blight is an erratic problem in SD, but was severe over a wide area of the state in 2005. The availability of tebuconazole (Folicur, Orius, and TebuStar) via Section 18, has become widely accepted among growers and has become a common production input in some parts of the state. More effective fungicides or application methods are needed to provide better disease control and improving the profit margin of producers. Awareness of FHB risk has been elevated and is a significant consideration in grower decisions.

We have continued to screen products through the uniform fungicide trial, participated in the “mini”-uniform biological trial, screened SDSU biological products in the field for Dr. Bruce Bleakley.

**2. List the most important accomplishment and its impact (how is it being used?).**

**Complete all three sections (repeat sections for each major accomplishment):**

**Accomplishment:**

Success in using the uniform trials to show producers that fungicides can make a difference in FHB suppression. The identified products tebuconazole, metconazole, and prothioconazole continue to be the most efficacious fungicide chemistries.

**Impact:**

It is expected that the first products will be fully labeled by EPA in July of 2006. This finally puts the tools in the hands of the producer without the need for special labels. More so, The first “next generation” fungicide will be acted on by EPA in 2006, providing the potential for better suppression than producers have had with tebuconazole alone.

**As a result of that accomplishment, what does your particular clientele, the scientific community, and agriculture as a whole have now that they didn't have before?:**

In 2007 the producer will have a more efficacious product than they have had in previous years and with special labels.

**Project 2:** *Aerial Fungicide Application Studies for the Control of Fusarium Head Blight.*

**1. What major problem or issue is being resolved 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 to compromise on cultural approaches at disease management and become reliant on chemical control. Fusarium head blight is an erratic problem in SD, but was severe over a wide area of the state in 2005. The availability of tebuconazole (Folicur, Orius, and TebuStar) via Section 18, has become widely accepted among growers and has become a common production input in some parts of the state. More effective fungicides or application methods are needed to provide better disease control and improving the profit margin of producers. Awareness of FHB risk has been elevated and is a significant consideration in grower decisions.

We have tested droplet patterns from aerial applicators using standard nozzle configurations and also further examined droplet deposition from ground application which we feel will help us better understand the performance of aerial applied fungicides.

**2. List the most important accomplishment and its impact (how is it being used?).  
Complete all three sections (repeat sections for each major accomplishment):**

**Accomplishment:**

Preliminary evidence suggests that deposition of fungicide droplets on the rachis of the head is a partial explanation for why fungicides perform erratically for FHB suppression. Coverage may not be as important as penetration of the droplets into the center of the head. Triazole fungicides only move upward in the plant, so understanding where the droplet is placed is critical to understanding FHB protection.

**Impact:**

A better understanding of the effect of droplet placement and interaction with crop variety head morphology will potentially improve recommendations for optimizing fungicide performance.

**As a result of that accomplishment, what does your particular clientele, the scientific community, and agriculture as a whole have now that they didn't have before?:**

The SD wheat and barley clientele have heard that coverage and FHB disease protection is not a precisely understood science and that this application is very different than other fungicide treatments.

**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.**

Draper, M.A., B. Bleakley, K.R. Ruden, S.M. Thompson, and D.S. Wittmeier. 2005. 2005 uniform trials for the performance of biological control agents in the suppression of Fusarium head blight in South Dakota. National Fusarium Head Blight Forum. December 11-13, 2005, Milwaukee, WI, Proceedings, p.189.

Draper, M.A., K.R. Ruden, K.D. Glover, S.M. Thompson, D.S. Wittmeier, and G. Lammers. 2005. 2005 uniform fungicide performance trials for the suppression of Fusarium head blight in South Dakota. National Fusarium Head Blight Forum. December 11-13, 2005, Milwaukee, WI, Proceedings, p.188.

Paul, P., D Hershman, M. Draper and L Madden. 2005. Effect of fungicides on FHB and DON in wheat – 2005 uniform fungicide trials. National Fusarium Head Blight Forum. December 11-13, 2005, Milwaukee, WI, Proceedings, p.225.

Ruden, B.E., M.A. Draper, K.R. Ruden, D.S. Wittmeier, and S.M. Thompson. 2005. Sprayer nozzle configurations and effects on fungicide spray deposition on wheat heads. National Fusarium Head Blight Forum. December 11-13, 2005, Milwaukee, WI, Proceedings, p.230.

Ruden, B.E., M.A. Draper, K.R. Ruden, D.S. Wittmeier and S.M. Thompson. 2004. Fungicide spray deposition on heads from various nozzle configurations. International Symposium on Fusarium Head Blight. December 11-15, 2004, Orlando, FL., Proceedings p 368.

Ruden, B.E., M.A. Draper, K.R. Ruden, D.S. Wittmeier and S.M. Thompson. 2006. Fungicide Coverage of the Wheat Rachis, Related Fungicide Movement and Effective Control of Fusarium Head Blight. NC-APS Meeting. Fargo, ND June 13-14, 2006

Stein, J.M. and M.A. Draper. 2005. The Fusarium Head Blight epidemics of the winter and spring wheat crops in South Dakota for 2005. National Fusarium Head Blight Forum. December 11-13, 2005, Milwaukee, WI, Proceedings, p.152.

### Presentations

Draper, M.A. 2005. Managing plant diseases with fungicides. SD Commercial Pesticide Applicators Training. January 21 - February 2, 2006, Aberdeen, Watertown, Brookings, Pierre, Mitchell, Yankton and Sioux Falls, SD.

Draper, M.A. 2005. Wheat disease management in South Dakota, 2005. AgHorizons Conference, December 6, 2005, Pierre, SD.

Ruden, B.E. and Draper, M.A. 2006. Nozzle performance for disease control. Precision Farming Conference. Aberdeen, SD. February 2006