

**USDA-ARS/  
U.S. Wheat and Barley Scab Initiative  
FY07 Final Performance Report (approx. May 07 – April 08)  
July 15, 2008**

**Cover Page**

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<b>Fiscal Year:</b>	2007
<b>USDA-ARS Agreement ID:</b>	59-0790-4-097
<b>USDA-ARS Agreement Title:</b>	Field Studies on Chemical and Biological Control of Fusarium Head Blight in South Dakota.
<b>FY07 ARS Award Amount:</b>	\$ 22,699

**USWBSI Individual Project(s)**

<b>USWBSI Research Area*</b>	<b>Project Title</b>	<b>ARS Adjusted Award Amount</b>
CBCC	Collaboration on Uniform Fungicide and Biological Control Trials in South Dakota.	\$12,864
CBCC	Evaluation of Integrated Management Strategies for Fusarium Head Blight in SD.	\$ 9,835
	<b>Total Award Amount</b>	<b>\$ 22,699</b>

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Principal Investigator

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Date

\* CBCC – Chemical, Biological & Cultural Control  
EEDF – Etiology, Epidemiology & Disease Forecasting  
FSTU – Food Safety, Toxicology, & Utilization of Mycotoxin-contaminated Grain  
GET – Genetic Engineering & Transformation  
HGR – Host Genetics Resources  
HGG – Host Genetics & Genomics  
IIR – Integrated/Interdisciplinary Research  
PGG – Pathogen Genetics & Genomics  
VDUN – Variety Development & Uniform Nurseries

**Project 1:** *Collaboration on Uniform Fungicide and Biological Control Trials 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; however, the impact of Fusarium head blight was significantly reduced in 2007 due to statewide drought. The continued availability of tebuconazole (Folicur, Orius, Embrace, and TebuStar) via Section 18 has become widely accepted among growers and has become a common production input in some parts of the state. Full registration of a new product, Bayer's Proline (prothioconazole) was given in early 2007. Availability of the Section 18 fungicides plus having a new Section 3 fungicide gave the producers' additional options for spraying wheat and barley for Fusarium head blight in 2007. More effective fungicides or application methods are needed to provide better disease control and improve 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, and have also 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:** Full registration of a new product, Bayer's Proline (prothioconazole) was given in early 2007. This finally puts the tools in the hands of the producer without the need for special labels. In early 2008, EPA has granted full registrations for the following products: Bayer's Folicur (tebuconazole), Mana's Orius (tebuconazole) and BASF's Caramba (metconazole). These registrations have helped the producers by allowing them to have various options for fungicide use against Fusarium head blight. Having additional pesticides available should reduce shortages as a whole, as several of these chemicals were in short supply in 2008.

**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 2008, the producer has more choices of efficacious products than they have had in previous years and with special labels.

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

**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 occasionally a severe problem in the state (2005); however, damage was significantly reduced in 2007 due to statewide drought. Integrated methods are needed to provide better disease control and improve the profit margin of producers. Awareness of FHB risk has been elevated and is a significant consideration in grower decisions. Plant breeding to introduce increased tolerance and resistance to Fusarium head blight continues to move forward. We are now cooperating with seven other states (Ohio, North Dakota, Kentucky, Missouri, Nebraska, New York and Kansas) to evaluate the effects of multiple strategies including chemical, crop rotation and varietal selections for Fusarium head blight and DON control under different environments.

**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 an integrated management strategy so far has shown that using a moderately resistant variety paired with fungicide control shows the highest percent control of Fusarium head blight. When using different cropping scenarios, the one management scheme to use to get the highest control of Fusarium head blight is to use a non-host crop plus a moderate resistant variety plus a fungicide treatment. This study is helping to show producers that making the right choices in their cropping systems, selecting appropriate varieties plus fungicides can make a difference in FHB suppression.

**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 Fusarium head blight. 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 Fusarium head blight in their wheat or barley.

**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?:**

So far this study has shown that what has been the general idea about different cropping systems paired with varieties that have different resistance levels do have a difference in the levels of Fusarium head blight and that using a moderately resistant variety paired with a non-host crop and a fungicide spray will lessen the severity of Fusarium head blight in the years that are conducive to having Fusarium head blight.

**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.**

Paul, P., L. Madden, M. McMullen, D. Hershman, L. Sweets, S. Wegulo, W. Bockus, S. Halley and K. Ruden. 2007. An integrated approach to managing FHB and DON in Wheat: Uniform Trials 2007. National Head Blight Forum. December 2-4, 2007, Kansas City, MO, Proceedings, pp. 117-122.

Paul, P., L. Madden, M. McMullen, D. Hershman, D. Brown-Rytlewski, L. Sweets, E. Adee, C. Bradley, B. Padgett and K. Ruden. 2007. Fungicide effects on FHB and DON in wheat class across multiple locations and wheat classes: uniform fungicide trials 2007. National Head Blight Forum. December 2-4, 2007, Kansas City, MO, Proceedings, pp. 123-127.

Ruden, K.R. and B.E. Ruden. 2008. 2007 Field Plot Summaries: Plant Disease and Fungicide Trials. SDSU Extension Service. 54 p. online at <http://plantsci.sdstate.edu/planthealth/Pubs/2007DataBook.pdf>

Ruden, K.R., B.E. Ruden, K.D. Glover, and J.L. Kleinjan. 2007. 2007 uniform fungicide performance trials for the suppression of Fusarium head blight in South Dakota. National Head Blight Forum. December 2-4, 2007, Kansas City, MO, Proceedings, p. 135.

Ruden, K.R., B.H. Bleakley, and B.E. Ruden. 2007. 2007 uniform trials for the performance of biological control agents in the suppression of Fusarium head blight in South Dakota. National Head Blight Forum. December 2-4, 2007, Kansas City, MO, Proceedings, p. 136.

Yuen, G.Y., C.C. Jochum, K.R. Ruden, J. Morgan, B.H. Bleakley, and L.E. Sweets. 2007. Results from the 2007 standardized evaluation of biological agents for the control of Fusarium head blight on wheat and barley. National Head Blight Forum. December 2-4, 2007, Kansas City, MO, Proceedings, pp. 153-157.

#### Presentations

Ruden, B.E. 2008. What Happened to my Wheat? Disease Management for 2008. Crops Clinic. January 4, 2008. Aberdeen, SD.

Ruden, B.E. 2008. What Happened to my Wheat? Disease Management for 2008. Crops Clinic. January 8, 2008. Faulkton and Selby, SD.

Ruden, B.E. 2008. What Happened to my Wheat? Disease Management for 2008. Crops Clinic. January 9, 2008. Timber Lake and Bison, SD.

Ruden, B.E. 2008. What Happened to my Wheat? Disease Management for 2008. Crops Clinic. January 10, 2008. Wall, SD.

Ruden, B.E. 2008. Fungicide Management in Small Grains 2007. What Happened to my Wheat? Crops Clinic. January 11, 2008. Martin, SD.

Ruden, B.E. 2008. What Happened to my Wheat? Disease Management for 2008. Winter Wheat Meeting. January 15, 2008. Tripp County, SD.

Ruden, B.E. 2008. Disease Management for 2008. Season long disease protection... Seed Treatment to Fungicide Timing. Ag Expo, SD Commercial Pesticide Applicators Training. January 17, 2008. Sioux Falls, SD.

Ruden, B.E. 2008. Disease Management for 2008. Season long disease protection... Seed Treatment to Fungicide Timing. SD Commercial Pesticide Applicators Training. January 22 – January 30, 2008. Rapid City, Pierre, Mitchell, Watertown, Sioux Falls, Yankton and Aberdeen, SD.

Ruden, B.E. 2008. What Happened to my Wheat? Disease Management for 2008. Crops Clinic. February 5, 2008. Bristol and Britton, SD.

Ruden, B.E. 2008. What Happened to my Wheat? Disease Management for 2008. Crops Clinic. February 5, 2008. Bristol and Britton, SD.

Ruden, B.E. 2008. What Happened to my Wheat? Disease Management for 2008. SD Private Applicators Training. February 6, 2008. Murdo, SD.

Ruden, B.E. 2008. What Happened to my Wheat? Disease Management for 2008. SD Private Applicators Training. February 6, 2008. Winner, SD.

Ruden, B.E. 2008. Disease Management for 2008. Season long disease protection... Seed Treatment to Fungicide Timing. IPM Conference. February 8, 2008. Brookings, SD.

Ruden, B.E. 2008. Disease Management for 2008. Season long disease protection... Seed Treatment to Fungicide Timing. SD Commercial Pesticide Applicators Training. February 11, 2008. Brookings, SD.

Ruden, B.E. 2008. What Happened to my Wheat? Disease Management 2008. Industry Day/Winfield Solutions Meeting. February 13, 2008. Brookings, SD.

Ruden, B.E. 2008. What Happened to my Wheat and Corn? Disease Management for 2008. Crops Clinic. February 14, 2008. Roscoe and Mellette, SD.

Ruden, B.E. 2008. Disease Management 2008. Timing, What's New, What's Changed. Crops Clinic. February 19, 2008. Pierre, SD.

Ruden, B.E. 2008. What Happened to my Wheat and Corn? Disease Management for 2008. Crops Clinic. February 26, 2008. Huron, SD.

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Ruden, B.E. 2008. Hitting the Fungicide Target in 2008. Precision Placement through Application. Potter County Implement Crops Clinic. March 4, 2008. Gettysburg, SD.

Ruden, B.E. 2008. Disease Management 2008. Timing, What's New, What's Changed. Canby's Ag Crops Clinic. March 6, 2008. Ipswich, SD.

Ruden, B.E. 2008. Wheat Management 2008. SD Cooperative Agronomy Educator's Meeting. March 18, 2008. Philip and Pierre, SD.

Ruden, B.E. 2008. Disease Management 2008. Timing, What's New, What's Changed. Crop Consultant's Meeting. March 24, 2008. Brookings, SD.