

**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>    | 59-0790-4-133  |
| <b>USDA-ARS Agreement Title:</b> | Uniform Fungicide Trial for Scab on Wheat in Illinois.   |
| <b>FY07 ARS Award Amount:</b>    | \$ 4,878   |

**USWBSI Individual Project(s)**

| <b>USWBSI Research Area*</b> | <b>Project Title</b>                                   | <b>ARS Adjusted Award Amount</b> |
|------------------------------|--|----------------------------------|
| CBCC                         | Uniform Fungicide Trial for Scab on Wheat in Illinois. | \$4,878                          |
|                              | <b>Total Award Amount</b>                              | <b>\$ 4,878</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:** *Uniform Fungicide Trial for Scab on Wheat in Illinois.*

**1. What major problem or issue is being resolved and how are you resolving it?**

Head scab on wheat has caused severe losses in yield and grain quality in Illinois. Fungicides have the potential to be one of the best options for control of scab (*Fusarium head blight*, FHB), but many fungicides are not effective or are not labeled for application time necessary for control of scab. The goal of this study is to test the efficacy of new or recently labeled fungicides and biological control agents in controlling head scab on wheat and their resulting effect on yield and quality of wheat. A small reduction in the toxin level (DON) produced by the fungus means a great deal to the millers who process the grain. Conducting uniform fungicide trials will give farmers valuable information for management of scab as well as contributing to data applicable across all the Midwestern wheat growing regions. Wheat for these trials were planted at Brownstown, DeKalb, Dixon Springs and Monmouth, IL.

**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:**

Weather conditions were not favorable for FHB development to adequately test the effectiveness of the products. The study at Brownstown had no visible symptoms of FHB, however, the level of DON reduced significantly by all but one fungicide (Table 1). The percent incidence of FHB at Monmouth was very low, 4.75, in the check with no fungicides, indicating there was very little disease pressure from FHB. There were no differences between the check and the fungicide treatments for FHB severity, incidence, grain yield, or level of DON at Monmouth (Table 2). There were no leaf disease ratings taken at Monmouth due to the dry conditions experienced after heading resulting in very healthy leaves. These dry conditions may have affected the production of DON, resulting in very low levels the control plot and with all fungicide treatments. The studies at DeKalb and Dixon Springs were lost due stand quality issues associated with winter-kill. These results have been presented through Extension activities and can aid companies in developing products and farmers in selecting fungicides that will be effective in controlling scab.

*Table 1: Uniform FBH Fungicide Trial, Brownstown, IL, 2007*

| <i>Fungicide Treatment<sup>z</sup></i> | <i>Test Weight<br/>(lb/bu)</i> | <i>Yield<br/>(bu/ac)</i> | <i>DON<sup>v</sup><br/>(ppm)</i> |
|--|--------------------------------|--------------------------|----------------------------------|
| <i>Untreated check</i>                 | 58.5                           | 59.8                     | 1.91                             |
| <i>Folicur 432SC 4.0 fl oz</i>         | 58.6                           | 63.2                     | 1.47                             |
| <i>Caramba 8.2 fl oz</i>               | 58.5                           | 59.9                     | 0.91                             |
| <i>Caramba 13.5 fl oz</i>              | 58.6                           | 58.8                     | 0.88                             |
| <i>Topguard 14 fl oz</i>               | 58.7                           | 60.1                     | 1.16                             |
| <i>Prosao 6.5 fl oz</i>                | 59.3                           | 65.5                     | 0.75                             |
| <i>Proline 5 fl oz</i>                 | 58.9                           | 60.4                     | 0.77                             |
| <i>Pr&gt;F</i>                         | 0.42                           | 0.15                     | 0.0001                           |
| <i>LSD (0.05)</i>                      |                                |                          | (0.49)                           |

*Table 2: Uniform FBH Fungicide Trial, Monmouth, IL, 2005*

| <i>Fungicide Treatment<sup>z</sup></i> | <i>FHB<br/>Incidence<br/>(%)<sup>y</sup></i> | <i>FHB Severity<br/>(%)<sup>x</sup></i> | <i>FHB Index<sup>w</sup></i> | <i>Yield<br/>(bu/ac)</i> | <i>Test<br/>Weight<br/>(lb/bu)</i> | <i>DON<sup>v</sup><br/>(ppm)</i> |
|--|--|---|------------------------------|--------------------------|------------------------------------|----------------------------------|
| <i>Untreated check</i>                 | 4.75   | 21.7                                    | 1.2                          | 54.7                     | 57.8                               | 0.40                             |
| <i>Folicur 432SC 4.0 fl oz</i>         | 2.50   | 11.1                                    | 0.35                         | 53.4                     | 58.4                               | 0.43                             |
| <i>Caramba 8.2 fl oz</i>               | 1.75   | 8.7                                     | 0.25                         | 54.5                     | 57.7                               | 0.17                             |
| <i>Caramba 13.5 fl oz</i>              | 2.25   | 5.1                                     | 0.11                         | 54.0                     | 57.8                               | 0.20                             |
| <i>Topguard 14 fl oz</i>               | 3.00   | 13.3                                    | 0.44                         | 51.2                     | 57.7                               | 0.17                             |
| <i>Prosao 6.5 fl oz</i>                | 1.75   | 10.3                                    | 0.37                         | 50.3                     | 58.3                               | 0.72                             |
| <i>Proline 5 fl oz</i>                 | 1.75   | 13.8                                    | 0.30                         | 52.1                     | 57.8                               | 0.39                             |
| <i>Tilt 4 fl oz @ 10.51</i>            |  |   |                              |                          |                                    |                                  |
| <i>Pr&gt;F</i>                         | 0.11   | 0.20                                    | 0.13                         | 0.79                     | 0.60                               | 0.34                             |

<sup>z</sup>Fungicides were applied at the early flowering stage (Feekes 10.51) with 0.125% Induce..

<sup>y</sup>Incidence is the percent of heads with symptoms of FHB.

<sup>x</sup>Severity is percent of florets with FHB in the infected heads.

<sup>w</sup>Disease index is FHB incidence x severity.

<sup>v</sup>Deoxynivalenol

### **Impact:**

Foliar fungicides will have little impact on yield of wheat if the environmental conditions are not favorable for the development of fungal diseases attacking the head and leaves before early grainfill. It does appear that several of these fungicides can lower the production of DON even if there are very few symptoms of FHB visible on the heads.

**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?:**

Data from these studies show that there was relatively little benefit in applying fungicides to wheat in northern Illinois in 2007. Utilizing disease prediction models that include weather data, variety characteristics, cropping history and growth stage can greatly benefit growers when determining if fungicide applications are economically viable.

**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.**