

**USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY14 Final Performance Report
July 15, 2015**

Cover Page

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Fiscal Year:	FY14
USDA-ARS Agreement ID:	59-0206-4-038
USDA-ARS Agreement Title:	Management of FHB and DON in Small Grains.
FY14 USDA-ARS Award Amount:	\$ 9,728

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
MGMT	Uniform Evaluation of Fungicides for FHB and DON Management in Minnesota.	\$ 9,728
	FY14 Total ARS Award Amount	\$ 9,728



Principal Investigator

07/15/16

Date

* MGMT – FHB Management
 FSTU – Food Safety, Toxicology, & Utilization of Mycotoxin-contaminated Grain
 GDER – Gene Discovery & Engineering Resistance
 PBG – Pathogen Biology & Genetics
 EC-HQ – Executive Committee-Headquarters
 BAR-CP – Barley Coordinated Project
 DUR-CP – Durum Coordinated Project
 HWW-CP – Hard Winter Wheat Coordinated Project
 WES-CP – Western 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 Evaluation of Fungicides for FHB and DON Management in Minnesota.*

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

Fusarium head blight (FHB), caused predominantly by *Fusarium graminearum*, remains a disease of significance, limiting the production capacity and quality of wheat in Minnesota in years when environmental conditions favor initial infection and disease development. Each year mycotoxin levels are monitored at grain elevators in Minnesota and every year some grain lots are rejected because of high mycotoxin levels above those acceptable to the malting and milling industries.

At present, control of FHB in Minnesota relies on a combined management approach of correct crop rotation, selection of varieties which are more FHB tolerant, and the use of fungicides that give the best suppression of FHB. Since the resurgence of FHB in the Upper Midwest in the early 1990's, fungicides have proven to be effective and have subsequently been widely adopted as a tool for the management of FHB. Even when all of these management practices are applied correctly in Minnesota, the best control of FHB in the state remains around 85%. Control of FHB therefore remains a significant challenge to producers of wheat and barley in the state.

This project represents Minnesota's contribution to the multi-state cooperative uniform fungicide trial. This cooperative effort will help determine the efficacy of registered, unregistered and experimental fungicides on multiple classes of wheat and in barley across diverse environments. The data will be used to test the efficacy of generic compounds versus the industry standards, and to determine the most appropriate rates and timing of application of these fungicides to best manage FHB development and reduce mycotoxin accumulation in grain. The data generated by this project may be used to support the registration of new chemistries and to provide recommendations at the state, regional and national levels for best management practices.

2. List the most important accomplishments and their impact (i.e. how are they being used) to minimize the threat of Fusarium Head Blight or to reduce mycotoxins. Complete both sections; repeat sections for each major accomplishment:

Accomplishment:

A range of different fungicides containing different active ingredients were evaluated for their efficacy in suppressing FHB infection and reducing DON levels in harvested grain in an FHB susceptible, hard red spring wheat variety, Samson.

High levels of disease pressure were achieved in the 2014 growing season by inoculating the nursery with corn grain colonized with *Fusarium graminearum*. Disease development was facilitated by the use of mist irrigation to promote disease.

Impact:

Data from this season suggested that amongst the cheaper generic tebuconazole- containing products there was little difference in reduction of FHB index between treatments. However, there were some differences between treatments in DON reduction. These products did perform as well as the current industry standard fungicides containing either metconazole, or prothioconazole plus tebuconazole.

Further elucidation of these observations between generic tebuconazole products will be required in the 2015 growing season. However, these data do suggest that there may be differences between these products in reducing DON levels.

As input cost margins get tighter for small grains production, the decision of the grower to use a cheaper fungicide for FHB control is not uncommon in Minnesota. These products can be as much as a third cheaper than the best chemistries currently in use for FHB suppression, metconazole, or prothioconazole plus tebuconazole. Given that some growers make the decision each year to use a cheaper product, it is important that they are able adequately maximize control of both FHB and also DON levels using these products with their varietal selections. These data show that there may be differences in the performance of these generic tebuconazole products for DON reduction. If this is the case, further testing will result in recommendations for the best tebuconazole products to use to minimize DON levels in harvested grain for growers should they chose to use them.

Training of Next Generation Scientists

Instructions: Please answer the following questions as it pertains to the FY14 award period. The term “support” below includes any level of benefit to the student, ranging from full stipend plus tuition to the situation where the student’s stipend was paid from other funds, but who learned how to rate scab in a misted nursery paid for by the USWBSI, and anything in between.

- 1. Did any graduate students in your research program supported by funding from your USWBSI grant earn their MS degree during the FY14 award period? No**

If yes, how many?

- 2. Did any graduate students in your research program supported by funding from your USWBSI grant earn their Ph.D. degree during the FY14 award period? No**

If yes, how many?

- 3. Have any post docs who worked for you during the FY14 award period and were supported by funding from your USWBSI grant taken faculty positions with universities? None**

If yes, how many?

- 4. Have any post docs who worked for you during the FY14 award period and were supported by funding from your USWBSI grant gone on to take positions with private ag-related companies or federal agencies? None**

If yes, how many?

Include below a list of all germplasm or cultivars released with full or partial support of the USWBSI during the FY14 award period. List the release notice or publication. Briefly describe the level of FHB resistance. *If not applicable because your grant did NOT include any VDHR-related projects, enter N/A below.*

N/A

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 FY14 grant. Please reference each item using an accepted journal format. If you need more space, continue the list on the next page.

Smith, M.J., Wiersma. J.J., Friskop, A., Schatz, B., Gautam. P., Bergstrom, G.C., Cummings, J.A., Byamukama, E., Ruden, K., Bleakley, B., Murthy, N., Bradley, C.A., Ames, K., Pike, J., Bellm, R. and Milus. E. Uniform fungicide trial results for management of FHB and DON 2014. In: *Proceedings of the 2014 National Fusarium Head Blight Forum*, St. Louis, Missouri, December 7-9, 2014, p.