USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY14 Final Performance Report
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Cover Page

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Fiscal Year:	FY14
USDA-ARS Agreement ID:	59-0206-4-012
USDA-ARS Agreement Title:	Evaluation of Management Tools for FHB and DON in Multiple Wheat Classes and Barley in ND.
FY14 USDA-ARS Award Amount:	$ 42,100

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
MGMT	Integrated Management Coordinated Project, ND.	$ 30,071
MGMT	Uniform Fungicide Trials in ND.	$ 12,029
	FY14 Total ARS Award Amount	**$ 42,100**

Principal Investigator 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: *Integrated Management Coordinated Project, ND.*

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

   No single management tool is fully effective in reducing FHB and DON. Using an integrated strategy that employs host resistance and a timely fungicide application is the best way to manage FHB. As a way to increase the amount of research data, North Dakota State University research and Extension specialists conducted several trials across the state. Variety by fungicide trials were conducted on hard red spring wheat, hard red winter wheat, spring barley, and durum at several locations across ND. There were varying levels of scab pressure at each location, which demonstrated the efficacy of integrated strategies under multiple scab environments. Final data was sent to Pierce Paul (Ohio State University) for inclusion in the national report. The results of the trials were presented at several Extension winter meetings.

   The trials produced information that growers can readily use when making scab management decisions in small grains. Also, several field days were conducted at the NDSU Research and Extension Centers showcasing the importance of host resistance and fungicides in managing scab and DON levels.

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:
   The data obtained from the integrated management trials has created awareness in new small grain growers and reaffirmed decision making skills in longer tenured small grain growers and crop consultants.

   Impact:
   Growers are using the variety by fungicide information to make management decisions on small grain acres in the state. Growers have the opportunity to select less susceptible varieties and understand the importance of timely fungicide applications. By employing less susceptible varieties with a well-timed fungicide applications, growers have the opportunity to increase both yield and quality in small grains.

Project 2: *Uniform Fungicide Trials in ND.*

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

   Fungicide choice and timing are important when managing scab and DON in small grain crops. Providing growers and consultants with updated information on fungicides is important in small grain production systems. In 2014, fungicide uniform trials were conducted on hard red spring wheat, spring barley and durum across multiple locations (Fargo, Carrington and Langdon) in ND. Conducive conditions for *Fusarium* infection occurred when the wheat was flowering and when barley was heading at most research locations. Statistical differences in fungicide choice and timing were apparent in most of the uniform trials. The data was included in the 2014 Uniform Fungicide report and was used extensively in FHB presentations this past winter.

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:
   These trial data continued to demonstrate that triazole-based fungicides are the only effective chemistry class in suppressing FHB and mycotoxin accumulation. Applying a fungicide at early-flowering in wheat and at heading in barley was effective in reducing both scab severity and DON when compared to the non-treated control. Also, a post-flowering fungicide application with a triazole still offered some scab and DON suppression.

   Impact:
   The updated fungicide information reaffirms that triazole-based products are best in managing FHB and DON. Differences among the triazole chemistries are still apparent and growers will analyze the risk and reward of economics and fungicide efficacy when selecting to apply a triazole product. Growers continue to use the FHB forecasting model to aid in the decision of applying a fungicide at the appropriate time.

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.

Presentations

Friskop, A. Using Fungicides to Manage Small Grain Diseases. Minn-Kota Ag Grower Meeting. Wahpeton, ND.

Friskop, A. Management of Fusarium Head Blight (Scab). Western Crop and Pest Management School. Mandan, ND.

Friskop, A. Management of Fusarium Head Blight in Wheat to Reduce DON Levels. Stanley Crop Improvement Meeting. Stanley, ND.

Friskop, A. 2014 Cereal Disease Review. West Central Spring Agronomy Update. Fargo, ND.

Friskop, A. Best Management Practices for Fusarium Head Blight (Scab) in Small Grains. Best of the Best in Wheat. Bismarck, ND.

Friskop, A. Best Management Practices for Fusarium Head Blight (Scab) in Small Grains. Best of the Best in Wheat. Minot, ND.

Friskop, A. Management of Fusarium Head Blight in Wheat to Reduce DON Levels. 2015 Divide County Ag Day. Crosby, ND.

Friskop, A. Vomitoxin: What is it, and how do we manage it? Mercer County Ag Day. Beulah, ND.

Friskop, A. Current Disease Problems in Durum in North Dakota. Crop Outlook and International Durum Forum. Minot, ND.

Publications

Friskop, A., Brueggeman, R., McMullen, M, Gross, P., Ransom, J., Halley, S., Gautam, P., Dill-Macky, R., Osborne, L., Byamukama, E., Ruden, K., and Paul, P.A. 2014. The effectiveness of an integrated strategy to manage Fusarium head blight in barley production using a meta-analysis approach. Proceedings of the 2014 National Fusarium Head Blight Forum, Dec. 7-9, 2014, St. Louis, MO. US Wheat and Barley Scab Initiative publishers, East Lansing, MI/Lexington, KY.

Gross, P., Friskop, A., Ransom, J., and Brueggeman, R. 2014. The use of integrated management strategies to lower FHB DON in barley. Proceedings of the 2014 National Fusarium Head Blight Forum, Dec. 7-9, 2014, St. Louis, MO. US Wheat and Barley Scab Initiative publishers, East Lansing, MI/Lexington, KY.

Salgado, J.D., Ames, K., Bergstrom, G., Bradley, C., Byamukama, E., Cummings, J., Dill-Macky, R., Friskop, A., Gautam, P., Kleczewski, N., Madden, L, Milus, E., Nagelkirk, M., Ransom, J., Ruden, K., Wegulo, S., Wise, K., Paul, P.A. 2014. Best FHB management practices: A 2014 multi-state project update. Proceedings of the 2014 National Fusarium Head Blight Forum, Dec. 7-9, 2014, St. Louis, MO. US Wheat and Barley Scab Initiative publishers, East Lansing, MI/Lexington, KY.

Smith, M.J., Wiersma, J., Friskop, A., Schatz, B., Gautam, P., G.C. Bergstrom, Cummings, J.A., Byamukama, E., Ruden, K., Bleakley, B., Murthy, N., Bradley, C.A., Ames, K., Pike, J., Bellm, R., and Milus, E. 2014. Uniform fungicide trial results for management of FHB and DON, 2014. Proceedings of the 2014 National Fusarium Head Blight Forum, Dec. 7-9, 2014, St. Louis, MO. US Wheat and Barley Scab Initiative publishers, East Lansing, MI/Lexington, KY.