USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY16 Final Performance Report
Due date: July 28, 2017

Cover Page

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Fiscal Year:	2016
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.
FY16 USDA-ARS Award Amount:	$ 55,559
Recipient Organization:	North Dakota State University Office of Grant & Contract Accouting NDSU Dept 3130, PO Box 6050 Fargo, ND 58108-0650
DUNS Number:	80-388-2299
EIN:	45-6002439
Recipient Identifying Number or Account Number:	FAR0022045
Project/Grant Reporting Period:	5/5/16 - 5/4/17
Reporting Period End Date:	05/04/17

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
MGMT	Developing Integrated Management Strategies for FHB and DON in Small Grains.	$ 55,559
	FY16 Total ARS Award Amount	**$ 55,559**

Principal Investigator — Date: 7-28-17

* MGMT – FHB Management
FST – Food Safety & Toxicology
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
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: *Developing Integrated Management Strategies for FHB and DON in Small Grains.*

1. What are the major goals and objectives of the project?

The goal of this research project is to look at the role host resistance and the use of double/split fungicide applications serve in reducing FHB and DON in multiple small grain market classes. This study will help address grower based questions pertaining to fungicide timing issues when field conditions prevent them from spraying or when scab risk remains high throughout the flowering to grain filling process.

2. What was accomplished under these goals?

1) major activities
Integrated management research experiments were established at six locations in North Dakota; Carrington, Fargo, Finley, Langdon, Prosper and Williston. Four locations housed trials for hard red spring wheat, one for hard red winter wheat, three for spring barley and three for spring durum.

2) specific objectives
Research trials examined the role of host resistance and double/split fungicide application (ie: a triazole fungicide applied at anthesis and a different triazole applied 4-7 days later) on reducing FHB and DON in hard red spring wheat, hard red winter wheat, spring barley and spring durum in North Dakota.

3) significant results
Varying levels of scab pressure developed at each location. This is advantageous as the varieties and fungicide timings were evaluated under varying levels of disease pressure. Field data showed that a double/split fungicide application had lower scab incidence than a single fungicide application. The field data also corresponded with DON level reductions from the double/split fungicide application. On average, the double/split fungicide application provided anywhere from 15-20% more DON suppression than a fungicide applied at the recommended time of early-anthesis in wheat or full-head in spring barley. More information is needed to test the economic validity of double/split fungicide applications.

4) key outcomes or other achievements
Future studies on double/split applications are needed to strengthen in-season management recommendations. This type of data is heavily needed for spring durum growers, as most varieties are susceptible, and the flowering window (infection window) is longer.

3. What opportunities for training and professional development has the project provided?

Research trials were used as an outside classroom for graduate students and research specialists in the NDSU Extension program. Individuals were taught about *Fusarium graminearum* biology, FHB management and principles of field research. Although no formal course was designed, students gained valuable insight and awareness on a very important disease in North Dakota.

4. How have the results been disseminated to communities of interest?

Data will be included in a meta-analysis (submitted to Pierce Paul – Ohio State University). that will provide a robust summary of the collaborative work of the MGMT team and be used in future presentations. The results of the ND trials were communicated and disseminated to growers, Extension agents and other agriculture professionals through Extension meetings, agricultural expo shows, internet, interviews (radio, tv and print), CCA trainings and field days.

Training of Next Generation Scientists

Instructions: Please answer the following questions as it pertains to the FY16 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 FY16 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 FY16 award period?**

   No.

   If yes, how many?

3. **Have any post docs who worked for you during the FY16 award period and were supported by funding from your USWBSI grant taken faculty positions with universities?**

   No.

   If yes, how many?

4. **Have any post docs who worked for you during the FY16 award period and were supported by funding from your USWBSI grant gone on to take positions with private ag-related companies or federal agencies?**

   No.

   If yes, how many?

Release of Germplasm/Cultivars

Instructions: In the table below, list all germplasm and/or cultivars released with full or partial support through the USWBSI during the FY16 award period. All columns must be completed for each listed germplasm/cultivar. Use the key below the table for Grain Class abbreviations. *Leave blank if you have nothing to report or if your grant did NOT include any VDHR-related projects.*

Name of Germplasm/Cultivar	**Grain Class**	**FHB Resistance** (S, MS, MR, R, where R represents your most resistant check)	**FHB Rating** (0-9)	**Year Released**

Add rows if needed.

NOTE: List the associated release notice or publication under the appropriate sub-section in the 'Publications' section of the FPR.

Abbreviations for Grain Classes

Barley - BAR
Durum - DUR
Hard Red Winter - HRW
Hard White Winter - HWW
Hard Red Spring - HRS
Soft Red Winter - SRW
Soft White Winter - SWW

Publications, Conference Papers, and Presentations

Instructions: Refer to the FY16-FPR_Instructions for detailed instructions for listing publications/presentations about your work that resulted from all of the projects included in the FY16 grant. Only include citations for publications submitted or presentations given during your award period (5/6/16 - 5/5/17). If you did not have any publications or presentations, state 'Nothing to Report' directly above the Journal publications section.

Journal publications.

Books or other non-periodical, one-time publications.

Other publications, conference papers and presentations.

Conference Paper

Gross, P., Chapara, V., Ransom, J., Brueggeman, R., Schatz, B., Kalil, A., Fonseka, D., Deplazes, C., Arens, A., and **Friskop, A.** 2016. The use of integrated management strategies to lower Fusarium head blight and DON in spring barley. Proceedings of the 2016 National Fusarium Head Blight Forum, Dec. 4-6, 2016, St. Louis, MO. US Wheat and Barley Scab Initiative publishers, East Lansing, MI/Lexington, KY
Status: Poster presentation given by lead author.
Acknowledgement of Federal Support: Yes.

Extension Presentations

Friskop, A. 2016 Review of Cereal Crop Diseases. Extension Agent Training - Dickinson, ND. July 2016.
Status: Oral presentation given.
Acknowledgement of Federal Support: No.

Friskop, A. Barley Disease Identification and Management. Barley Field Day – Belfield, ND. July 2016.
Status: Oral presentation given.
Acknowledgement of Federal Support: Yes.

Friskop, A. Small Grain Disease Update. Hettinger Research Extension Center Field Day – Hettinger, ND. July 2016.
Status: Oral presentation given.
Acknowledgement of Federal Support: Yes.

Friskop, A. Small Grain Disease Update. Dickinson Research Extension Center Field Day – Dickinson, ND. July 2016.
Status: Oral presentation given.
Acknowledgement of Federal Support: Yes.

Friskop, A. Small Grain Disease Update. NDSU Agronomy Seed Farm Field Day – Casselton, ND. July 2016.
Status: Oral presentation given.
Acknowledgement of Federal Support: Yes.

Friskop, A. Small Grain Disease Update. North Central Research and Extension Center Field Day – Minot, ND. July 2016.
Status: Oral presentation given.
Acknowledgement of Federal Support: No.

Friskop, A. Pest Clinic. North Central Research and Extension Center Field Day – Minot, ND. July 2016.
Status: Oral and hands-on presentation given.
Acknowledgement of Federal Support: No.

Friskop, A. 2016 Wheat Disease Review. Wheat Quality Council Tour – Extension Talk – Casselton, ND. July 2016.
Status: Oral and hands-on presentation given.
Acknowledgement of Federal Support: No.

Friskop, A. Barley Disease Management. NDSU Barley Field School – Extension Talk. Fargo, ND. July 2016.
Status: Oral and hands-on presentation given.
Acknowledgement of Federal Support: No.

Friskop, A. Small Grain Diseases of North Dakota. ND Trade Office International Visitor Program – Extension Talk. Fargo, ND. September 2016.
Status: Oral and hands-on presentation given.
Acknowledgement of Federal Support: Yes.

Friskop, A. Fusarium Head Blight Management Update. NDSU Extension and REC Fall Conference – Extension Training. Fargo, ND. October 2016.
Status: Oral and hands-on presentation given.
Acknowledgement of Federal Support: Yes.

Friskop, A. What We Learned in 2016: Fusarium Head Blight. Crop Outlook and International Durum Forum – Extension Talk. Minot, ND. November 2016.
Status: Oral and hands-on presentation given.
Acknowledgement of Federal Support: Yes.

Friskop, A. Optimizing Foliar Fungicide use in Small Grains and Corn. NDSU/UM Commercial Pesticide Applicator Training – Extension Talk. Fargo, ND. December 2016.
Status: Oral and hands-on presentation given.
Acknowledgement of Federal Support: Yes.

Friskop, A. Scab, Scab, Scab. Williston REC Irrigation Workshop – Extension Talk. Williston, ND. December 2016.
Status: Oral and hands-on presentation given.
Acknowledgement of Federal Support: Yes.

Friskop, A. Fusarium infected seed. Best of the Best – East – Extension Talk. Moorhead, MN. February 2017.
Status: Hands-on presentation given.
Acknowledgement of Federal Support: No.

Friskop, A. Fusarium infected seed. Best of the Best – East – Extension Talk. Grand Forks, ND. February 2017.
Status: Hands-on presentation given.
Acknowledgement of Federal Support: No.

Friskop, A. FAQs on FHB. Hard Red Wheat Show – Extension Talk. Williston, ND. February 2017.
Status: Oral presentation given.
Acknowledgement of Federal Support: Yes.

Friskop, A. FHB and DON. Mohall Ag Day – Extension Talk. Mohall, ND. February 2017.
Status: Oral presentation given.
Acknowledgement of Federal Support: Yes.

Friskop, A. Fusarium infected seed. Best of the Best – West – Extension Talk. Minot, ND. February 2017.
Status: Hands-on presentation given.
Acknowledgement of Federal Support: No.

Friskop, A. Fusarium infected seed. Best of the Best – West – Extension Talk. Dickinson, ND. February 2017.
Status: Hands-on presentation given.
Acknowledgement of Federal Support: No.

Friskop, A. Best Management Practices for Scab and DON. Best of the Best – Extension Talk. Minot, ND. February 2017.
Status: Oral presentation given.
Acknowledgement of Federal Support: Yes.

Friskop, A. Best Management Practices for Scab and DON. Best of the Best – Extension Talk. Dickinson, ND. February 2017.
Status: Oral presentation given.
Acknowledgement of Federal Support: Yes.

Friskop, A. Cereal Disease Update. West Central Agronomy Meeting – Extension Talk. Fargo, ND. March 2017.
Status: Oral presentation given.
Acknowledgement of Federal Support: Yes.

Friskop, A. Cereal Disease Update. CHS Agronomy Meeting – Extension Talk. Fargo, ND. March 2017.
Status: Oral presentation given.
Acknowledgement of Federal Support: Yes.