

**USDA-ARS**  
**U.S. Wheat and Barley Scab Initiative**  
**FY17 Preliminary Final Performance Report**  
**Due date: July 31, 2018**

**Cover Page**

<b>Principle Investigator (PI):</b>	Andrew Friskop
<b>Institution:</b>	North Dakota State University
<b>E-mail:</b>	andrew.j.friskop@ndsu.edu
<b>Phone:</b>	701-231-7627
<b>Fiscal Year:</b>	2017
<b>USDA-ARS Agreement ID:</b>	59-0206-4-012
<b>USDA-ARS Agreement Title:</b>	Evaluation of Management Tools for FHB and DON in Multiple Wheat Classes and Barley in ND.
<b>FY17 USDA-ARS Award Amount:</b>	\$ 101,479
<b>Recipient Organization:</b>	North Dakota State University Office of Grant & Contract Accounting NDSU Dept 3130, PO Box 6050 Fargo, ND 58108-0650
<b>DUNS Number:</b>	80-388-2299
<b>EIN:</b>	45-6002439
<b>Recipient Identifying Number or Account Number:</b>	FAR0022045
<b>Project/Grant Reporting Period:</b>	5/5/17 - 5/4/18
<b>Reporting Period End Date:</b>	5/4/2018

**USWBSI Individual Project(s)**

<b>USWBSI Research Category*</b>	<b>Project Title</b>	<b>ARS Award Amount</b>
MGMT	Developing Integrated Management Strategies for FHB and DON in Small Grains.	\$ 55,452
MGMT	Development and Distribution of Educational Material on Scab and Mycotoxins.	\$ 46,027
	<b>FY17 Total ARS Award Amount</b>	<b>\$ 101,479</b>

Principal Investigator 7-31-18  
Date

\* 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 fungicide applications serve in reducing FHB and DON in spring barley, hard red winter wheat, hard red spring wheat and spring durum. 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?** *Address items 1-4) below for each goal or objective.*

1) major activities

Integrated management research experiments were established at five locations in North Dakota; Carrington, Fargo, 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 the research sites. 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 reduced both FHB and DON more 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 10-20% 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.

FY17 Final Performance Report  
PI: Friskop, Andrew  
USDA-ARS Agreement #: 59-0206-4-012  
Reporting Period: 5/5/17 - 5/4/18

**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. The research trials at the Fargo location were used when educating students from Bismarck State College and North Dakota State College of Science of plant pathology.

**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.

**Project 2:** *Development and Distribution of Educational Material on Scab and Mycotoxins.*

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

A recent USWBSI-funded survey indicated areas of disconnect between research and the dissemination of information on FHB and mycotoxins to producers. Areas of greatest concern were the use of inappropriate fungicides, improper timing of fungicides, and confusion on varietal resistance. To help address these concerns, the goal of this project is to develop and deliver to growers and agricultural professionals using multiple communication medias.

**2. What was accomplished under these goals?** *Address items 1-4) below for each goal or objective.*

1) major activities

A platform to develop hard copy Extension materials was identified (Crop Protection Network - CPN). A list of FHB information topics that could serve as stand-alone hard copy publications was generated. Images and videos that reflect field diagnosis, FHB management and other commonly asked questions on FHB were obtained by Extension plant pathologists during the 2018 growing season.

2) specific objectives

The specific objectives of the project are to (1) generate hard copy Extension materials detailing FHB and mycotoxin information (2) take images and videos highlighting topics pertaining to FHB and mycotoxins (3) compile information, images, and videos into an interactive iBook.

3) significant results

One Extension publication has been created titled “Optimizing Fungicide Use for Fusarium Head Blight (Scab) and Associated Mycotoxins”. This publication is now available on the CPN website and can be placed on ScabSmart when available. Several other publications on fungicide efficacy, fungicide timing, fungicide decision making, and host resistance are being drafted.

Thousands of images and over a hundred videos have been taken and close to a hundred videos detailing fungicide timing and FHB symptoms. These files are currently being edited and will be available soon.

4) key outcomes or other achievements

The CPN publication has been handed out at a few summer Extension events this summer and it is expected the publication will be handed out at several winter Extension meetings.

FY17 Final Performance Report  
PI: Friskop, Andrew  
USDA-ARS Agreement #: 59-0206-4-012  
Reporting Period: 5/5/17 - 5/4/18

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

Once the materials and iBook are created, the information can be used by researchers, growers and other agricultural professionals when training interns and students.

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

The CPN publication pertaining to optimizing fungicide use on FHB is available on the website and will be handed out at summer Extension events.

## **Training of Next Generation Scientists**

**Instructions:** Please answer the following questions as it pertains to the FY17 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 FY17 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 FY17 award period?**

No.

**If yes, how many?**

- 3. Have any post docs who worked for you during the FY17 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 FY17 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?**

FY17 Final Performance Report  
 PI: Friskop, Andrew  
 USDA-ARS Agreement #: 59-0206-4-012  
 Reporting Period: 5/5/17 - 5/4/18

### 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 FY17 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

FY17 Final Performance Report  
PI: Friskop, Andrew  
USDA-ARS Agreement #: 59-0206-4-012  
Reporting Period: 5/5/17 - 5/4/18

## **Publications, Conference Papers, and Presentations**

**Instructions:** Refer to the FY17-FPR\_Instructions for detailed instructions for listing publications/presentations about your work that resulted from all of the projects included in the FY17 grant. Only include citations for publications submitted or presentations given during your award period (5/5/17 - 5/4/18). If you did not have any publications or presentations, state 'Nothing to Report' directly above the Journal publications section.

**NOTE:** Directly below each reference/citation, you must indicate the Status (i.e. published, submitted, etc.) and whether acknowledgement of Federal support was indicated in publication/presentation. See example below for a poster presented at the FHB Forum:

### **Journal publications.**

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

### **Other publications, conference papers and presentations.**

#### Conference Paper

Bauske, E., Halvorson, J., Meyer, S., Chapara, V., Arens, A., Kalil, A., Fonseka, D., and Friskop, A. 2017. Integrated management of Fusarium head blight in durum varieties. 2017 National FHB Forum. Milwaukee, WI. December 3-5, 2017. Proceedings of the 2017 National Fusarium Head Blight Forum, Dec. 3-5, 2017, Milwaukee, WI. US Wheat and Barley Scab Initiative publishers, East Lansing, MI/Lexington, KY.

Status: Poster presentation given by lead author.

Acknowledgement of Federal Support: Yes.

Halvorson, J., Bauske, E., Meyer, S., Chapara, V., Arens, A., Schatz, B., and Friskop, A. 2017. Integrated management of Fusarium head blight in hard red spring wheat varieties. Proceedings of the 2017 National Fusarium Head Blight Forum, Dec. 3-5, 2017, Milwaukee, WI. US Wheat and Barley Scab Initiative publishers, East Lansing, MI/Lexington, KY.

Status: Poster presentation given by lead author.

Acknowledgement of Federal Support: Yes.

Gross, P., Chapara, V., Ransom, J., Brueggeman, R., Schatz, B., Kalil, A., Fonseka, D., Deplazes, C., Arens, A., and Friskop, A. 2017. Integrated Management Strategies to Lower Fusarium Head Blight and Deoxynivalenol in Spring Barley over Multiple Years and Locations. Proceedings of the 2017 National Fusarium Head Blight Forum, Dec. 3-5, 2017, Milwaukee, WI. US Wheat and Barley Scab Initiative publishers, East Lansing, MI/Lexington, KY.

Status: Poster presentation given by lead author.

Acknowledgement of Federal Support: Yes.

(Form – PFPR17)



FY17 Final Performance Report  
PI: Friskop, Andrew  
USDA-ARS Agreement #: 59-0206-4-012  
Reporting Period: 5/5/17 - 5/4/18

Extension Presentations

Friskop, A. Small Grain Disease Update. Hettinger Research Extension Center Field Day – Hettinger, ND. July 2017.

Status: Oral presentation given.

Acknowledgement of Federal Support: Yes.

Friskop, A. Small Grain Disease Update. NDSU Agronomy Seed Farm Field Day – Casselton, ND. July 2017.

Status: Oral presentation given.

Acknowledgement of Federal Support: Yes.

Friskop, A. Pest Clinic. North Central Research and Extension Center Field Day – Minot, ND. July 2017.

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 2017.

Status: Oral and hands-on presentation given.

Acknowledgement of Federal Support: Yes.

Friskop, A. Fusarium Head Blight Diagnosis and Cereal Disease Update. Wheat Quality Council Tour – Extension Talk – Casselton, ND. July 2017.

Status: Oral and hands-on presentation given.

Acknowledgement of Federal Support: No.

Friskop, A. A New Fungicide for Scab and other Wheat Disease Issues Arising in 2017. Best the Best in Wheat and Soybean – Extension Talk – Grand Forks, ND. January 2017.

Status: Oral presentation given.

Acknowledgement of Federal Support: Yes.

Friskop, A. A New Fungicide for Scab and other Wheat Disease Issues Arising in 2017. Best the Best in Wheat and Soybean – Extension Talk – Moorhead, MN. February 2017.

Status: Oral presentation given.

Acknowledgement of Federal Support: Yes.

Friskop, A. A Fungicide Update on Scab and DON. Best of the Best in Wheat – Dickinson, ND – February 2017.

Status: Oral presentation given.

Acknowledgement of Federal Support: Yes.

FY17 Final Performance Report  
PI: Friskop, Andrew  
USDA-ARS Agreement #: 59-0206-4-012  
Reporting Period: 5/5/17 - 5/4/18

Friskop, A. DON Testing and Impacts of High DON Seed on Seedling Establishment. Best of the Best in Wheat – Dickinson, ND – February 2017.

Status: Oral and hands-on presentation given.

Acknowledgement of Federal Support: No.

Friskop, A. A Fungicide Update on Scab and DON. Best of the Best in Wheat – Williston, ND – February 2017.

Status: Oral presentation given.

Acknowledgement of Federal Support: Yes.

Friskop, A. A Fungicide Update on Scab and DON. Best of the Best in Wheat – Minot, ND – February 2017.

Status: Oral presentation given.

Acknowledgement of Federal Support: Yes.

Friskop, A. DON Testing and Impacts of High DON Seed on Seedling Establishment. Best of the Best in Wheat – Minot, ND – February 2017.

Status: Oral and hands-on presentation given.

Acknowledgement of Federal Support: No.

Friskop, A. Wheat Disease Fungicide Update. Advanced Crop Advisers Workshop – Fargo, ND – February 2017.

Status: Oral presentation given.

Acknowledgement of Federal Support: Yes.

Friskop, A and Smith, M. Scab Forecasting Models and a Fungicide Update on Scab. International Crop Expo – Grand Forks, ND. February 2017.

Status: Oral presentation given.

Acknowledgement of Federal Support: Yes.

Friskop, A. Barley Fungicide Timing for Scab Update. NCERA-184: Small Grain Disease Working Group – Pensacola, FL. March 2017.

Status: Oral presentation given.

Acknowledgement of Federal Support: Yes.

Friskop, A. Wheat Fungicide Update. CHS Spring Meeting – Hallock, MN. March 2017

Status: Oral presentation given.

Acknowledgement of Federal Support: Yes.