

**USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY15 Final Performance Report
Due date: July 15, 2016**

Cover Page

Principle Investigator (PI):	Kiersten Wise
Institution:	Purdue University
E-mail:	kawise@purdue.edu
Phone:	765-496-2170
Fiscal Year:	2015
USDA-ARS Agreement ID:	59-0206-4-017
USDA-ARS Agreement Title:	Integrated Management of Fusarium Head Blight in Indiana.
FY15 USDA-ARS Award Amount:	\$ 9,718
Recipient Organization:	Purdue University AG Sponsored Program Services 615 W. State Street West Lafayette, IN 47907
DUNS Number:	07-205-1394
EIN:	35-6002041
Recipient Identifying Number or Account Number:	107129
Project/Grant Reporting Period:	05/08/15-05/07/16
Reporting Period End Date:	05/07/16

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
MGMT	Integrated Management Strategies for Fusarium Head Blight of Wheat in Indiana.	\$ 9,718
	FY15 Total ARS Award Amount	\$ 9,718



7/11/16

Principal Investigator

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: *Integrated Management Strategies for Fusarium Head Blight of Wheat in Indiana.*

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

Fusarium Head Blight (FHB) levels on wheat vary each year in Indiana but the disease is consistently present and of concern to growers. The goal of this project is to research effective FHB and deoxynivalenol (DON) management programs. Application timing of fungicides has been a recent concern, since weather conditions often prohibit applications at the optimum timing of early anthesis. Therefore the objective of this research is to determine the window of effective fungicide timing for FHB and DON in Indiana in conjunction with varietal resistance and provide updated management recommendations to farmers.

2. What was accomplished under these goals?

1) major activities

A research trial was conducted in West Lafayette, IN to evaluate the effect of genetic resistance and fungicide application timing to achieve optimal management of FHB and DON. The fungicide Prosaro® was applied to experimental plots of six varieties of varying susceptibility to FHB at Feekes 10.5.1 and 2, 4, and 6 days after anthesis. Non-treated plots of each of the varieties were included in the experiment to test the effects of a foliar fungicide application at Feekes 10.5.1, and variety susceptibility for improved FHB management. Treatments were replicated across plots that were inoculated with *Fusarium graminearum*, and non-inoculated plots were also included for each treatment.

2) specific objectives

The objective of this research is to determine the window of effective fungicide timing for FHB and DON in Indiana in conjunction with varietal resistance.

3) significant results

FHB levels were high in 2015, and DON levels exceeded 1.0 ppm in all treatments, with a high of 7 ppm in the susceptible, inoculated control. FHB and DON levels were reduced in all varieties with moderate to high levels of FHB resistance, even without a fungicide. Plots receiving fungicide applications did yield higher across all varieties, and resulted in reduced levels of DON. The most resistant varieties had lower FHB and DON at all fungicide timings compared to the untreated, including applications made up to 6 days after anthesis. The most susceptible varieties had lower FHB and DON with applications made after anthesis compared to no application or applications made at anthesis.

4) key outcomes or other achievements

This research indicates that fungicide applications of Prosaro can reduce FHB and DON and increase yield when conditions are favorable for FHB development. It also indicates that for some varieties, applications made shortly after anthesis may provide similar levels of FHB and DON control as applications made at anthesis. These findings indicate that farmers may have more flexibility in application timing, should weather prevent applications at anthesis. Management recommendations distributed to Indiana wheat farmers will indicate that a combination of variety resistance and fungicide application are most efficacious at minimizing the impact of FHB and DON. Additional research is

needed to more thoroughly investigate the interaction between fungicide and variety susceptibility under Indiana conditions under conditions more favorable for FHB.

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

Undergraduate students (3) learned laboratory techniques and assisted in inoculum preparation and application.

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

This information is of primary importance to growers and is presented in various programs and field days, and also contributes data to help refine the national FHB forecasting model. Research results are summarized in Extension articles to aid growers in managing FHB and DON in wheat.

Training of Next Generation Scientists

Instructions: Please answer the following questions as it pertains to the FY15 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 FY15 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 FY15 award period?**
No
If yes, how many?

- 3. Have any post docs who worked for you during the FY15 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 FY15 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 FY15 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

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Publications, Conference Papers, and Presentations

Refer to the FY15-FPR_Instructions for listing publications/presentations about your work that resulted from all of the projects included in the FY15 grant. If you did not have any publications or presentations, state 'Nothing to Report' directly above the Journal publications section.

Journal publications.

Freije, A.J., and Wise, K.A. 2015. Impact of *Fusarium graminearum* inoculum availability and fungicide application timing on Fusarium head blight in wheat. *Crop Protection*.

doi:10.1016/j.cropro.2015.07.016.

Status: Published

Acknowledgement of Federal Support: YES

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

Nothing to Report

Other publications, conference papers and presentations.

Freije, A. and Wise, K. 2015. Variability of wheat tiller growth stages within soft red winter wheat and their impact on fungicide timing decisions. In: S. Canty, Clark, S. Vukasovich and D. Van Sanford (Eds.), *Proceedings of the 2015 National Fusarium Head Blight Forum*. East Lansing, MI/Lexington, KY: U.S. Wheat & Barley Scab Initiative. p. 14.

Status: Abstract published and poster presented

Acknowledgement of Federal Support: YES

Freije, A., and Wise, K. 2015. Diseases of Wheat: Revised Fungicide Recommendations for Fusarium Head Blight. *Purdue Extension Bulletin BP-145-W*.

Status: Published

Acknowledgement of Federal Support: YES

Salgado, J.D., K. Ames, G. Bergstrom, C. Bradley, E. Byamukama, J. Cummings, V. Chapara, M. Chilvers, R. Dill-Macky, A. Friskop, P. Gautam, N. Kleczewski, L.V. Madden, E. Milus, M. Nagelkirk, J. Ransom, K. Ruden, J. Stevens, S. Wegulo, K. Wise, D. Yabwalo and P.A. Paul. 2015. Robust Management Programs to Minimize Losses due to FHB and DON: A Multi-state Coordinated Project. In: S. Canty, Clark, S. Vukasovich and D. Van Sanford (Eds.), *Proceedings of the 2015 National Fusarium Head Blight Forum*. East Lansing, MI/Lexington, KY: U.S. Wheat & Barley Scab Initiative. pp. 24-29.

Status: Paper Published and Poster Presented

Acknowledgement of Federal Support: Yes, but not for this agreement.