USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY16 Final Performance Report
Due date: November 10, 2017

Cover Page

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Fiscal Year:	2016
USDA-ARS Agreement ID:	59-0206-5-007
USDA-ARS Agreement Title:	Applied Management of Fusarium Head Blight in Kentucky.
FY16 USDA-ARS Award Amount:	$ 20,328
Recipient Organization:	University of Kentucky Research Foundation University Station Lexington, KY 40506-0057
DUNS Number:	939017877
EIN:	61-6033693
Recipient Identifying Number or Account Number:	3200000233
Project/Grant Reporting Period:	9/08/16 - 9/7/17
Reporting Period End Date:	09/07/17

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
MGMT	Integrated Management of Fusarium Head Blight in Kentucky.	$ 20,328
	FY16 Total ARS Award Amount	**$ 20,328**

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 of Fusarium Head Blight in Kentucky.*

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

The major goals and objectives of this project are:

1. To demonstrate that integrated management is the most effective and economical means of reducing losses to Fusarium head blight (FHB) and deoxynivalenol (DON).
2. To increase grower adoption of integrated strategies to control FHB

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

1) major activities

The major activities undertaken included conducting field research trials at Princeton, KY and Marion, IL. Results of these trials were presented at extension meetings and field days.

2) specific objectives

The specific objectives were to investigate management of FHB and DON contamination in wheat grain. Specifically, the effects of fungicide application timing, multiple fungicide applications, and wheat cultivars (cultivars ranged in their susceptibility to FHB) were evaluated for their effects on FHB and DON levels in harvested grain.

3) significant results

Overall, the FHB index values and DON levels were low at both locations in 2017. The only statistically significant ($P \leq 0.05$) reductions in FHB index values occurred at the Princeton, KY location, in which FHB index was reduced when the susceptible cultivar was sprayed with any of the fungicides evaluated, relative to the non-treated control. When evaluating the non-treated controls for each cultivar, moderately-resistant varieties had significantly lower FHB index values than the susceptible cultivar.

4) key outcomes or other achievements

Although FHB and DON levels were low, the key outcome is that an application of an effective fungicide at the correct timing and planting of a moderately-resistant cultivar will result in the lowest level of FHB and DON. In addition, the results of these trials did not show a significant benefit in sequential fungicide applications compared to a solo fungicide application at the proper timing.

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

Conducting this research allowed two undergraduate students from Murray State University, a graduate student from University of Kentucky, a post doc from the University of Kentucky, and a research specialist from the University of Kentucky to gain hands-on learning about the Fusarium head blight disease cycle, impacts of this disease, and management options. In addition, the project has allowed the PI to attend the National Fusarium Head Blight Forum, which has promoted interaction with other scientists working on this disease. Results from

this project are presented to farmers, crop consultants, and others, which presents opportunities for their professional development and learning.

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

Results of the Integrated Management Project throughout the years have been disseminated to the scientific community thru journal articles and thru posters presented at the National Fusarium Head Blight Forum and the American Phytopathological Society Annual Meeting. Results also have been disseminated to stakeholders (i.e. farmers, Extension personnel, crop consultants, industry representatives, and commodity representatives) through presentations at Extension meetings, field days, and articles written in on-line Extension newsletters and blogs.

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?**

   If yes, how many? No

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?**

   If yes, how many? Yes, 1 Ph.D. student graduated in December 2016 (University of Illinois)

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?**

   If yes, how many? No

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?**

   If yes, how many? No

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 (9/08/16 - 9/7/17). 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:

> Conley, E.J., and J.A. Anderson. 2016. Accuracy of Genome-Wide Prediction for Fusarium Head Blight Associated Traits in a Spring Wheat Breeding Program. In: Proceedings of the XXIV International Plant & Animal Genome Conference, San Diego, CA.
> Status: Abstract Published and Poster Presented
> Acknowledgement of Federal Support: YES (poster), NO (abstract)

Journal publications.
Bissonnette, K. M., Kolb, F. L., Ames, K. A., and Bradley, C. A. 2017. Effect of Fusarium head blight management practices on mycotoxin contamination of wheat straw. Plant Disease (Accepted with revisions).
Status: Accepted pending revisions
Acknowledgement of federal support: Yes

Books or other non-periodical, one-time publications.
Nothing to report

Other publications, conference papers and presentations.

Salgado, J. D., Paul, P. A., Ames, K. A., Bergstrom, G. C., Bradley, C. A., Byamukama, E. Z., Cummings, J. A., Chapara, V., Chilvers, M., Dill-Macky, R., Friskop, A. J., Gautam, P., Kleczewski, N. M., Madden, L. V., Milus, E. A., Nagelkirk, M., Ransom, J., Ruden, K. R., Stevens, J., Wegulo, S. N., Wise, K., and Yabwalo, D. 2017. Multi-state coordinated project to evaluate integrated management strategies for Fusarium head blight and deoxynivalenol in wheat. Proceedings of the 2017 American Phytopathological Society, San Antonio, TX, August 5-9, 2017. Available online at: https://apsnet.confex.com/apsnet/2017/meetingapp.cgi/Paper/5478.
Status: Abstract published and poster presented
Acknowledgement of federal support: Yes (poster), No (abstract)

Bradley, C. A. 2017. Fusarium head blight: risk and management. Presentation at the 2016 Kentuckiana Certified Crop Adviser Conference, French Lick, IN, November 30, 2016.
Status: Presented
Acknowledgement of federal support: Yes

Bradley, C. A. 2017. Management of stripe rust and Fusarium head blight of wheat. Presentation at the 2017 University of Kentucky Winter Wheat Meeting, Hopkinsville, KY, January 5, 2017.
Status: Presented
Acknowledgement of federal support: Yes

Bradley, C. A. 2017. Management of stripe rust and Fusarium head blight of wheat. Presentation at the 2017 Illinois Wheat Association Conference, Mt. Vernon, IL, February 8, 2017.
Status: Presented
Acknowledgement of federal support: Yes

Bradley, C. A. 2017. Wheat disease management. Presentation at the 2017 University of Kentucky Wheat Field Day, Princeton, KY, May 9, 2017.
Status: Presented
Acknowledgement of federal support: Yes