USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY15 Final Performance Report
Due date: November 1, 2016

Cover Page

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Fiscal Year:	2015
USDA-ARS Agreement ID:	59-0206-5-007
USDA-ARS Agreement Title:	Applied Management of Fusarium Head Blight in Kentucky.
FY15 USDA-ARS Award Amount:	$ 29,379
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:	09/08/15-09/07/16
Reporting Period End Date:	09/07/16

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
MGMT	Integrated Management Strategies for Scab in Kentucky.	$ 19,661
MGMT	Uniform Fungicide Tests for Control of Fusarium Head Blight in Kentucky.	$ 9,718
	FY15 Total ARS Award Amount	**$ 29,379**

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 Scab in Kentucky.*

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

There 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 FHB/DON.
2. To increase grower adoption of integrated strategies to control FHB.

2. What was accomplished under these goals? Address each item below.

1) Major activities. The major activities undertaken included conducting field research trials at Princeton, KY and Dixon Springs, IL. In addition, results from these trials were presented at Extension meetings and field days.

2) Specific objectives. The specific objectives were to investigate management of Fusarium head blight (FHB) and deoxynivalenol (DON) contamination in wheat grain. Specifically, moderately-resistant varieties and fungicide applications (solo and sequential) fungicide applications were evaluated.

3) Significant results. Overall, FHB index values and DON levels were relatively low at both locations in 2016 except for the non-treated susceptible variety. FHB index and DON values were lowest in moderately-resistant varieties applied with a fungicide at the Feekes 10.5.1 growth stage. A sequential fungicide application did not appear to provide any additional significant control of FHB index or DON over a solo application at Feekes 10.5.1.

4) Key outcomes or other achievements. The key outcome of this research continues to be that integrated management practices (applying an effective fungicide at the right timing to a moderately-resistant variety) are necessary to achieve the greatest level of control of FHB and DON. From these results it also appears that sequential applications of a fungicide may not provide any added benefit to management of FHB and DON; however, FHB and DON values were relatively low, and continued evaluation of sequential applications is important to be able to determine if this holds true in high FHB and DON environments.

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

This project has allowed a graduate student and the PI to attend the National Fusarium Head Blight Forum, which has allowed them to interact with and learn from other scientists working on this disease. This project also has allowed a graduate student to learn research techniques in plant pathology.

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

Results of this research have been disseminated to the scientific community thru posters presented at the National Fusarium Head Blight Forum and the American Phytopathological Society Annual Meeting. Results 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 Extension newsletters and blogs.

Project 2: *Uniform Fungicide Tests for Control of Fusarium Head Blight in Kentucky.*

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

The goal of this project is to test the efficacy of fungicides for their effects on Fusarium head blight (FHB) control and their ability to reduce deoxynivalenol (DON) levels in harvest soft red winter wheat grain.

2. What was accomplished under these goals? Address each item below.

1) **Major activities.** A field trial was conducted in Princeton, KY to evaluate the effect of foliar fungicides in controlling FHB and DON.

2) **Specific objectives.** The specific objective was to evaluate the effect of any new fungicides in controlling FHB and DON under a mist-irrigated FHB nursery.

3) **Significant results.** A new experimental coded fungicide from Syngenta provided significant control of FHB and DON. Although not statistically significant than Prosaro, application of the new coded fungicide resulted into a numerically lower FHB index and DON value than Prosaro.

4) **Key outcomes or other achievements.** This research helped evaluate a new experimental fungicide that may eventually provide a new tool wheat growers can use to combat FHB and DON. This new fungicide is in a different chemistry class than the current standard fungicides, Prosaro and Caramba, which also would help in managing fungicide resistance. Additional research on this new fungicide is needed to better understand its effects on FHB and DON across multiple years and locations.

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

This project has allowed a graduate student and the PI to attend the National Fusarium Head Blight Forum, which has allowed them to interact with and learn from other scientists working on this disease. This project also has allowed a graduate student to learn research techniques in plant pathology.

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

Results of this research have been disseminated to the scientific community thru posters presented at the National Fusarium Head Blight Forum. Results 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 Extension newsletters and blogs.

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?**

   If yes, how many? Yes, one M.S. student graduated in May 2015 (University of Illinois).

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?**

   If yes, how many? Yes, 2 Ph.D. students graduated in May 2015 (University of Illinois).

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?**

   If yes, how many? No.

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?**

   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 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

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.

Nothing to Report.

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

Bissonnette, K. M. 2016. *Fusarium* in winter wheat: mycotoxin accumulation in straw and a survey of roots. Ph.D. Dissertation, University of Illinois, Urbana, IL.
Status: Published
Acknowledgement of Federal Support: Yes

Other publications, conference papers and presentations.

Bissonnette, K. M., Ames, K. A., Dong, Y., Kolb, F. L., and Bradley, C. A. 2015. *Fusarium graminearum* mycotoxin accumulation in wheat straw after anthesis in wheat cultivars ranging in susceptibility to Fusarium head blight. Phytopathology 105(Suppl. 4):S4.16 (Abstract).
Status: Published
Acknowledgement of Federal Support: Yes

Bissonnette, K. M., Kolb, F. L., Dong, Y., Ames, K. A., and Bradley, C. A. 2015. Effectiveness of FHB indices in estimating straw DON accumulation in winter wheat cultivars. Pp. 3-4, Proc. National Fusarium Head Blight Forum, December 2015.
Status: Published
Acknowledgement of Federal Support: Yes

Salgado, J. D., Ames, K., Bergstrom, G., Bradley, C., Byamukama, E., Cummings, J., Chapara, V., Chilvers, M., Dill-Macky, R., Friskop, A., Gautam, P., Kleczewski, N., Madden, L. V., Milus, E., Nagelkirk, M., Ransom, J., Ruden, K., Stevens, J., Wegulo, S., Wise, K., Yabwalo, D. and Paul, P. A. 2015. Robust management programs to minimize losses due to FHB and DON: a multi-state coordinated project. Pp. 24-26, Proc. National Fusarium Head Blight Forum, December 2015.
Status: Published
Acknowledgement of Federal Support: Yes

Smith, M. J., Friskop, A., Arends, A., Chapara, V., Meyer, S., Schatz, B., Bergstrom, G. C., Cummings, J. A., Byamukama, E., Yabwalo, D., Bleakley, B., Murthy, N., Ruden, K., Bradley, C. A., Ames, K., Pike, J., and Bellm, R. 2015. Uniform fungicide trial results for management of FHB and DON, 2015. Pp. 33, Proc. National Fusarium Head Blight Forum, December 2015.
Status: Published
Acknowledgement of Federal Support: Yes

Bradley, C. A. 2016. Considerations for fungicide management of Fusarium head blight (scab) of wheat. Kentucky Pest News, April 19, 2016 (online at: https://kentuckypestnews.wordpress.com/2016/04/19/considerations-for-fungicide-management-of-fusarium-head-blight-scab-of-wheat/).
Status: Published
Acknowledgement of Federal Support: No

Bradley, C. A. 2016. Fusarium head blight: risk and management. Presentation at the 2016 University of Kentucky Winter Wheat Meeting, Hopkinsville, KY, January 5, 2016.
Status: Presented
Acknowledgement of Federal Support: Yes

Bradley, C. A. 2016. Management of Fusarium head blight of wheat. Presentation at the 2016 University of Kentucky Wheat Disease Management Workshop, Princeton, KY, February 5, 2016.
Status: Presented
Acknowledgement of Federal Support: Yes
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Bradley, C. A. 2016. Hitting the mark: fungicide application timing. Presentation at the 2016 Illinois Wheat Association Wheat Forum, Mt. Vernon, IL, February 16, 2016.
Status: Presented
Acknowledgement of Federal Support: Yes

Bradley, C. A. 2016. 309 trials can't be wrong: a summary of the national Fusarium head blight uniform fungicide testing program. Presentation at the 2016 University of Kentucky Wheat Field Day, Princeton, KY, May 10, 2016.
Status: Presented
Acknowledgement of Federal Support: Yes