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

Cover Page

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Fiscal Year:	2017
USDA-ARS Agreement ID:	59-0206-6-010
USDA-ARS Agreement Title:	Integrated Management of FHB and DON in Soft Red Winter Wheat in Virginia.
FY17 USDA-ARS Award Amount:	$ 14,857
Recipient Organization:	Virginia Polytechnic Institute and State University 1880 Pratt Drive, Suite 2006 Blacksburg, VA 24060
DUNS Number:	003137015
EIN:	54-6001805
Recipient Identifying Number or Account Number:	422535
Project/Grant Reporting Period:	6/6/17 - 6/5/18
Reporting Period End Date:	06/05/18

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
MGMT	Integrated Management of FHB and DON contamination in SRWW in Virginia.	$ 14,857
	FY17 Total ARS Award Amount	$ 14,857

Hillary L. Mehl July 31, 2018

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 FHB and DON contamination in SRWW in Virginia.*

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

The major goal/objective of this project was to identify the most effective and economical approaches to FHB and DON management in soft red winter wheat.

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

1) Major Activities: In 2017, the effectiveness of one and two application fungicide programs for FHB and DON management was evaluated on four wheat varieties (Shirley, Jamestown, Hilliard, and VA13W-38) in southeastern Virginia. Shirley is a popular, late-heading variety that is susceptible to FHB. Jamestown is an early-heading variety with moderate resistance to FHB. Hilliard and VA13W-38 are two new releases from the Virginia Tech small grains breeding program with mid-season flowering and moderate resistance to FHB/DON. An untreated check was compared to one or two fungicide applications starting at anthesis. Plots were inoculated 24 hours after anthesis with a spore suspension of *Fusarium graminearum*. Conditions were favorable for FHB infection during flowering and the weeks following. The trial was harvested on June 13, and yield, test weight, and *Fusarium* damaged kernels (FDK) were assessed. Grain samples were submitted to the Virginia Tech DON testing lab, and DON results were received in September.

2) Specific Objectives: The specific objectives of this project correspond to those of the FHB Management Coordinated Project which are to i) evaluate the integrated effects of fungicide and genetic resistance on FHB and DON and ii) generate data to conduct an economic analysis of the integrated effects of fungicide and resistance on FHB/DON as part of a coordinated multi-state project.

3) Significant Results: As expected, Shirley had the highest severity of FHB and DON contamination. Hilliard and VA13W-38 had higher yields compared to Shirley in Jamestown. Two fungicide applications reduced foliar disease, FHB, FDK, and DON more than a single application of Prosaro®, but there were no differences in field among fungicide treatments or the untreated control. The greatest benefit to a two-fungicide application program was observed for Shirley, the FHB susceptible variety. Results demonstrate the importance of variety selection and a single, well-timed fungicide application for management of FHB and DON. Results also suggest there may be a benefit to two fungicide applications for FHB if a susceptible variety is planted, but planting a moderately resistant wheat variety is more likely to be profitable.

4) Key Outcomes or Other Achievements: Effective and economical approaches to FHB and DON management in soft red winter wheat were identified by this project, and results support findings from the first year of the project. One key outcome of the project was the demonstration of the importance of variety selection and a well-timed fungicide application. The specific objective of evaluating the effects of fungicide and genetic resistance on FHB

and DON was directly addressed by this project, and data were generated that will be used along with data from similar trials in other states to conduct an economic analysis of the integrated effects of fungicide and genetic resistance.

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

A graduate student, Navjot Kaur, assisted with this project. She conducted all disease ratings and helped to analyze and summarize data. Ms. Kaur also had the opportunity to present the results of this project at the American Phytopathological Society Potomac Division Meeting in 2018.

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

Results of this study were presented to growers, Extension agents, and consultants at production meetings and in-service trainings during the reporting period. In addition, a summary of the results was published in the Virginia Cooperative Extension Publication "Applied Research on Field Crop Disease and Nematode Management 2017" (https://pubs.ext.vt.edu/SPES/SPES-26/SPES-26.html). This publication was posted online and distributed through the Virginia Ag Pest and Crop Advisory Blog.

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?

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

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 (6/6/17 - 6/5/18). 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.

Journal publications.
Nothing to report.

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

Other publications, conference papers and presentations.
Mehl, H. L. 2017. Disease management in agronomic crops. . Oral presentation at Southern States in-service training, December 7, 2017, Richmond, VA.
Status: Presented
Acknowledgement of Federal Support: YES

Kaur, N., and Mehl, H. L. 2018. Integrated management of Fusarium head blight (FHB) and DON contamination in soft red winter wheat in Virginia. Oral presentation at APS Potomac Division Meeting, March 21-24, 2018, Ocean City, MD.
Status: Presented
Acknowledgement of Federal Support: YES

Mehl, H. L. 2018. Nematode and Disease Management in Field Crops. Extension presentation at Eastern Shore Ag Conference, January 25, 2018, Melfa, VA.
Status: Presented
Acknowledgement of Federal Support: YES

Mehl, H. L. 2018. Applied Research on Field Crop Disease and Nematode Management 2017. Virginia Cooperative Extension Publication SPES-26 (https://pubs.ext.vt.edu/SPES/SPES-26/SPES-26.html).
Status: Published online
Acknowledgement of Federal Support: YES