USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY16 Final Performance Report
Due date: July 28, 2017

Cover Page

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Fiscal Year:	2016
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.
FY16 USDA-ARS Award Amount:	$ 14,885
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:	6/6/16 - 6/5/17
Reporting Period End Date:	06/05/17

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
MGMT	Integrated Management of FHB and DON contamination in SRWW in Virginia.	$ 14,885
	FY16 Total ARS Award Amount	**$ 14,885**

Hillary L. Mehl July 28, 2017

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

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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 is 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 2016, the effectiveness of one and two application fungicide programs for FHB and DON management was evaluated on four wheat varieties (Shirley, Jamestown, Hilliard, and Agrimaxx 426) 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 Agrimaxx 426 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 20, 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 August.

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 Agrimaxx 426 had the lowest levels of FHB among the four varieties. Yields of Shirley and Hilliard were comparably high, and Agrimaxx 426 had the lowest yield. All fungicide treatments lowered disease severity in Shirley and Jamestown but there was less of an effect for the moderately resistant varieties Hilliard and Agrimaxx 426. Fungicides increased yield and decreased DON contamination, but there was not a consistent benefit to two versus a single fungicide application. Results demonstrate the importance of variety selection and a single, well-timed fungicide application for management of FHB and DON.

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, but results need to be supported by additional years of data. 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?

Nothing to report.

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, in-service trainings, and a field day during winter/spring 2017. In addition, a summary of the results was published in the 2017 Virginia Wheat Newsletter.

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?** 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 FY16 award period?** No

   If yes, how many?

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?** No

   If yes, how many?

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?** No

   If yes, how many?

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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 (6/6/16 - 6/5/17). If you did not have any publications or presentations, state 'Nothing to Report' directly above the Journal publications section.

Journal publications. None

Books or other non-periodical, one-time publications. None

Other publications, conference papers and presentations.

Griffey, C., W. Thomason, J. Seago, R. Pitman, K. Brasier, N. Meier, N. Carpenter, B. Ward, S. Malla, L. Liu, E. Rucker, D. Schmale, III, N. McMaster, J. Fitzgerald, M. Balota, J. Oakes, and H. Mehl. 2017. Virginia Wheat Newsletter 2017.
Status: Submitted
Acknowledgement of Federal Support: YES

Mehl, H. L. 2016. Integrated Disease and Nematode Management in Soybean and Small Grains. Oral presentation at Growmaster In-service Training, December 6, 2016, Richmond, VA.
Status: Presented
Acknowledgement of Federal Support: YES

Mehl, H. L. 2017. Nematode and Disease Management in Field Crops. Extension presentation at Four Rivers Ag Conference, January 10, 2017, Charles City, VA.
Status: Presented
Acknowledgement of Federal Support: YES

Mehl, H. L. 2017. Disease Management in Wheat. Field tour presentation at Virginia Small Grains Field Day, May 18, 2017, Amelia, VA.
Status: Presented
Acknowledgement of Federal Support: YES