USDA-ARS
U.S. Wheat and Barley Scab Initiative
FY18 Performance Report
Due date: July 12, 2019

Cover Page

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Fiscal Year:	2018
USDA-ARS Agreement ID:	59-0206-6-010
USDA-ARS Agreement Title:	Integrated management of FHB and DON contamination in SRWW in Virginia.
FY18 USDA-ARS Award Amount:	$ 17,281
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:	6/6/18 - 6/5/19
Reporting Period End Date:	06/05/19

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
MGMT	Integrated Management of FHB and DON contamination in SRWW in Virginia.	$ 17,281
	FY18 Total ARS Award Amount	$ 17,281

Hillary L. Mehl

Principal Investigator

July 11, 2019
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 the project is to identify the most effective and economical integrated 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: Two field trials were conducted in southeast Virginia in 2018 utilizing the protocols outlined in the FHB Management Coordinated Project. One trial included three wheat varieties varying in FHB/DON resistance (Shirley, Hilliard, and VA13W-38) and the second trial focused on application rates and timings of the new fungicide Miravis Ace for control of FHB/DON in susceptible variety Shirely. Inoculation and fungicide treatments were applied at flowering in early May, and foliar disease and FHB severity were evaluated in late May. Conditions were favorable for FHB infection during flowering and the weeks following. The trials were harvested on June 18, and yield, test weight, and Fusarium damaged kernels (FDK) were assessed. Grain samples were submitted to the Virginia Tech DON testing lab, and DON concentrations were determined for samples from both trials. Trials for 2019 were planted in fall 2018, and the treatments evaluated in 2018 were applied to the crop in spring 2019.

2) Specific objectives: The specific objectives of this project correspond to those of the FHB Management Coordinated Project which are to 1) evaluate the integrated effects of fungicide treatment and genetic resistance on FHB and DON, with emphasis on a new fungicide, Miravis Ace; and 2) compare the efficacy of Miravis Ace when applied at heading or at anthesis to that of standard anthesis application of Prosaro or Caramba.

3) Significant results: Wheat varieties varied in susceptibility to FHB and DON, and as expected Shirley was more susceptible than the newer varieties with moderate FHB resistance. Treatments with a moderately susceptible variety and Miravis Ace applied at early flowering had the lowest incidence and severity of FHB and lowest FDK ratings. However, DON concentrations only varied among varieties with (Shirely = 4.9 ppm, Hilliard = 1.2 ppm, and VA13W-38 = 1.1 ppm). Flowering (anthesis) applications of Miravis Ace provided the greatest reductions in FHB, by DON reductions were comparable to those provided by flowering applications of Prosaro or Caramba. Heading and late applications of Miravis Ace had less efficacy than early flowering applications, but among early and late timings, late applications provided greater reductions in FDK and DON.

4) Key outcomes or other achievements: The key outcome of this project was that efficacy data for the new fungicide Miravis Ace was generated. The Miravis Ace label indicates flexibility in timing of applications for FHB and DON control, but results of this project indicate the early flowering application timing is still the most effective. In addition,

despite claims of its superior efficacy, results of our project indicate Miravis Ace to Carmaba and Prosaro for control of FHB and DON. This is an important results for making recommendations to wheat producers for economical and effective management of FHB and DON.

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

A PhD 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 FHB Forum in 2018.

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

Results were presented at crop production meetings and crop consultant in-service trainings, and recommendations are being used by producers. Results were also presented at the FHB Forum, and recommendations based on the results of the project were disseminated 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 FY18 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 FY18 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 FY18 award period?**

   If yes, how many? No

3. **Have any post docs who worked for you during the FY18 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 FY18 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 FY18 award period. All columns must be completed for each listed germplasm/cultivar. Use the key below the table for Grain Class abbreviations.

NOTE: 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 FY18-FPR_Instructions for detailed instructions for listing publications/presentations about your work that resulted from all of the projects included in the FY18 grant. Only include citations for publications submitted or presentations given during your award period (6/6/18 - 6/5/19). 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 presentation with an abstract:

> Conley, E.J., and J.A. Anderson. 2018. 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.

None to report.

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

None to report.

Other publications, conference papers and presentations.

Kaur, N., Byrd-Masters, L., and Mehl, H. L. 2018. Integrated management of Fusarium head blight (FHB) and DON contamination in soft red winter wheat in Virginia. Proc. National Fusarium Head Blight Forum 2018:28.
Status: Abstract Published and Poster Presented
Acknowledgement of Federal Support: YES (poster), YES (abstract)