USDA-ARS
U.S. Wheat and Barley Scab Initiative
FY19 Final Performance Report
Due date: July 24, 2020

Cover Page

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Fiscal Year:	2019
USDA-ARS Agreement ID:	59-0206-6-010
USDA-ARS Agreement Title:	Integrated management of FHB and DON contamination in SRWW in Virginia
FY19 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:	6/6/19 - 6/5/20
Reporting Period End Date:	6/5/2020

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
	FY19 Total ARS Award Amount	**$ 17,281**

Hillary L. Mehl — July 29, 2020

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 research project?

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

2. What was accomplished under these goals or objectives? *(For each major goal/objective, address items a-b) below.)*

a) What were the major activities?

Two field trials were conducted in southeast Virginia in 2019 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 timings of the new fungicide Miravis Ace for control of FHB/DON in susceptible variety Shirley. Inoculation and fungicide treatments were applied between heading and flowering in late April/early May, and foliar disease and FHB severity were evaluated in late May. Conditions were relatively dry and did not favor FHB infection and DON development. The trials were harvested on June 25, 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 2020 were planted in fall 2019, and fungicide treatments were applied to the crop in spring 2020.

b) What were the significant results?

Wheat varieties varied in susceptibility to FHB and DON, but due to dry conditions, FHB incidence and severity, FDK, and DON were low for all varieties and fungicide treatments. In the fungicide variety trial, Prosaro and Miravis Ace applied at anthesis (Feekes 10.5.1) reduced DON compared to the untreated control. Miravis Ace applied at flowering did not reduce DON. In the fungicide timing trial, FHB incidence was reduced by heading applications of Miravis Ace and anthesis applications of Prosaro or Miravis Ace. Applications of Miravis Ace at anthesis followed by a second fungicide application four days later also had reduced FHB incidence, but reductions were similar to those achieved with a single application at anthesis. Even though heading applications of Miravis Ace reduced FHB, this application timing did not reduce DON in the harvested grain. Anthesis applications of Prosaro and Miravis Ace reduced DON, but the greatest reductions were achieved with fungicide treatments that included two applications (i.e. Miravis Ace at anthesis followed by Caramba or Folicur four days later). Late applications of Miravis Ace (four or six days after anthesis) provided greater DON control than early heading applications.

c) List 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 and Prosaro have similar efficacy for control of FHB and DON. This is an important result for making recommendations to wheat producers for economical and effective management of FHB and DON.

3. Was this research impacted by the COVID-19 pandemic (i.e. university shutdowns, reduced or lack of support personnel, etc.)? If yes, please explain how this research was impacted or is continuing to be impacted.

No, the work for FY19 was completed prior to shutdowns due to COVID-19.

4. 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.

5. 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 FY19 award period (6/6/19 - 6/5/20). 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 FY19 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 FY19 award period?**
   No

   If yes, how many?

3. **Have any post docs who worked for you during the FY19 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 FY19 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 FY19 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 FY19-FPR_Instructions for detailed more instructions for listing publications/presentations about your work that resulted from all of the projects included in the FY19 grant award. Only citations for publications published (submitted or accepted) or presentations presented during the **award period (6/6/19 - 6/5/20**) should be included. If you did not publish/submit or present anything, state 'Nothing to Report' directly above the Journal publications section.

NOTE: Directly below each citation, you **must** indicate the Status (i.e. published, submitted, etc.) and whether acknowledgement of Federal support was indicated in the publication/ presentation.

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. 2019. Comparison of flag leaf, heading, and flowering fungicide applications for control of scab and foliar diseases of wheat in Virginia, 2018. *Plant Disease Management Reports* 13:CF169.
Status: Published online
Acknowledgement of Federal Support: NO (no place for acknowledgements in publication)

Kaur, N., Byrd-Masters, L., and Mehl, H. L. 2019 Comparison of flag leaf and flowering fungicide applications for control of scab and foliar diseases of wheat in Virginia, 2018. *Plant Disease Management Reports* 13:CF170.
Status: Published online
Acknowledgement of Federal Support: NO (no place for acknowledgements in publication)

Paul, P.A., S. J. Ng, G. Bergstrom, K. Bissonnette, K. Bowen, C. Bradley, E. Byamukama, M. Chilvers, A. Collins, C. Cowger, H. Darby, E. DeWolf, R. Dill-Macky, P. Esker, A. Friskop, N. Kleczewski, A. Koehler, L. Madden, J. Marshall, H. Mehl, W. Moraes, M. Nagelkirk, N. Rawat, D. Smith, D. Telenko, S. Wegulo, and H. Young-Kelly. 2019. "Fusarium head blight management coordinated project: integrated management trials 2018-2019." In: S. Canty, A. Hoffstetter, H. Campbell and R. Dill-Macky (Eds.), *Proceedings of the 2019 National Fusarium Head Blight Forum* (p. 19), Milwaukee, WI; December 8-10. University of Kentucky, Lexington, KY.

Status: Poster presented and paper published.
Acknowledgement of Federal Support: YES on both.

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