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

Cover Page

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Fiscal Year:	2019
USDA-ARS Agreement ID:	59-0206-9-123
USDA-ARS Agreement Title:	Efficacy of a New Fungicide for FHB and DON Management in Indiana
FY19 USDA-ARS Award Amount:	$ 10,148
Recipient Organization:	Purdue University AG Spnsored Program Services 615 W. State Street West Lafauette, IN 47907
DUNS Number:	07-205-1394
EIN:	35-6002041
Recipient Identifying Number or Account Number:	17000615
Project/Grant Reporting Period:	5/1/19-4/30/20
Reporting Period End Date:	4/30/2020

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
MGMT	Efficacy of a New Fungicide for FHB and DON Management in Indiana	$ 10,148
	FY19 Total ARS Award Amount	**$ 10,148**

07/01/2020

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: *Efficacy of a New Fungicide for FHB and DON Management in Indiana*

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

This project addressed the following **goal in the USWBSI Action Plan**: Goal *# **2)** Help develop and validate the next generation of management tools for FHB/DON control*". **The research needs in the USWBSI Action plan** addressed by the proposed research are: to *1) Evaluate the flexibility of fungicide application timing within the context of integrated management strategies and 2**)** Develop economic analyses of effective management strategies used alone or in combination.*

This research served as a location in a cooperative multi-state study comparing the effects of fungicide treatment for FHB and DON control across different environments and wheat types and participated in Objective 2 to **Compare the efficacy of Miravis Ace when applied at heading or at anthesis to that of standard anthesis application of Prosaro or Caramba** in uniform fungicide trials (UFT).
The proposed research was conducted at two sites in Indiana. 1) Purdue Agronomy Center for Research and Education (ACRE) in West Lafayette, Indiana and 2) Southwest Purdue Agriculture Center (SWPAC), Vincennes, Indiana.

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?
Research trials were established in the fall of 2018 at both locations indicated above in Indiana, and fungicide treatments were applied in the spring of 2019. In all trials, FHB, DON, FDK, foliar diseases severity, yield, and test weight data were collected.

b) What were the significant results?
In 2019, weather conditions were favorable for Fusarium head blight (FHB) at ACRE. Fusarium head blight (FHB) was the most prominent disease in the trial showing a significantly higher FHB index in untreated plots and a significantly lower FHB index under treatment with Miravis Ace® fb Caramba® (13.7 and 13.5 fl oz/A at 10.5.1 Anthesis). All fungicide treatments significantly reduced severity of Fusarium head blight, leaf blotch and, leaf rust over the untreated control. All fungicide treatments significantly increased yield over the untreated control except for treatments with Miravis Ace (13.7 fl oz/A at 10.3 Feekes). The highest yield were reached under treatment with Miravis Ace fb Caramba (13.7 and 13.5 fl oz/A at 10.5.1 Anthesis). The concentration of the Mycotoxin Deoxynivalenol (DON) were significantly reduced under treatments with Caramba (13.5 fl oz/A at 10.5.1 Anthesis), Miravis Ace (13.7 fl oz/A at 10.5.1 Anthesis), Miravis Ace fb Prosaro (13.7 and 6.5 fl oz/A at 10.5.1 Anthesis) and, Miravis Ace fb Caramba (13.7 and 13.5 fl oz/A at 10.5.1 Anthesis) over the untreated control.

In 2019, weather conditions were favorable for Fusarium head blight (FHB) at SWPAC. Fusarium head blight (FHB) was the most prominent disease in the trial. All fungicide programs significantly reduced FHB incidence on 3 Jul. Miravis Ace applied at 10.5.4, Miravis Ace followed by Prosaro, and Miravis Ace followed by Caramba significantly reduced FHB severity. All fungicide programs reduced FHB Index over nontreated control, except Caramba. Deoxynivalenol (DON) was reduced by all fungicide programs over nontreated control (2.34 ppm), except Prosaro and Miravis Ace followed by Caramba. All fungicide treatments significantly increased moisture and test weight over the nontreated control. All fungicide programs increased yield over nontreated, except Caramba. The percentage of Fusarium damaged kernels (FDK) was significantly reduced with Miravis Ace followed by Prosaro, Miravis Ace followed by Caramba, and Miravis Ace applied at 10.5.4 and 10.5.1 as compared to the nontreated control.

c) List key outcomes or other achievements.

Miravis Ace was evaluated in the uniform fungicide (UFT) coordinated project for the first time in 2018 and repeated in 2019. The results were extremely promising, but highly variable. It would take more than two growing seasons with a relatively small number of trials to effectively evaluate the performance of a new fungicide and change application guidelines.

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.

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

This project provided an opportunity to train plant pathology graduate students and undergraduates on plant disease identification and quantification, along with general field research trial establishment and data analysis.

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

The results were shared and combined with the multi-state data to summarize and publish in the Proceedings of the National Fusarium Head Blight Forum. They were also shared with Indiana wheat stakeholders via the annual Applied Research in Field Crop Pathology for Indiana Extension publication. In addition, Dr. Telenko presented results to Indiana growers during winter Extension meetings.

Training of Next Generation Scientists

Instructions: Please answer the following questions as it pertains to the FY19 award period (5/1/19-4/30/20). 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?**

   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 FY19 award period?**

   If yes, how many? No

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?**

   If yes, how many? None

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?**

   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 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 (5/1/19-4/30/20**) 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. See example below for a poster presentation with an abstract:

De Wolf, E., D. Shah, P. Paul, L. Madden, S. Crawford, D. Hane, S. Canty, R. Dill-Macky, D. Van Sanford, K. Imhoff and D. Miller. 2019. "Impact of Prediction Tools for Fusarium Head Blight in the US, 2009-2019." In: S. Canty, A. Hoffstetter, H. Campbell and R. Dill-Macky (Eds.), *Proceedings of the 2019 National Fusarium Head Blight Forum*, Milwaukee, WI; December 8-10. University of Kentucky, Lexington, KY. p. 12.
Status: Abstract Published and Poster Presented
Acknowledgement of Federal Support: YES (Abstract and Poster)

Journal publications.

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

Other publications, conference papers and presentations.

Extension publication.

Telenko, D. E. P. 2020. Applied Research in Field Crop Pathology for Indiana 2019. BP-205-W. Purdue Extension. https://mdc.itap.purdue.edu/item.asp?Item_Number=BP-205-W
Status: Published and available online
Acknowledgement of Federal Support: YES (in credits)