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:	59-0206-8-192
USDA-ARS Agreement Title:	Fungicide Efficacy in FHB/DON Management for Hard Red Winter and Spring Wheat in SD.
FY18 USDA-ARS Award Amount:	$ 31,049
Recipient Organization:	South Dakota State University SAD 133, Box 2201 Brookings, SD 57007
DUNS Number:	929929743
EIN:	46-6000364
Recipient Identifying Number or Account Number:	3F4628
Project/Grant Reporting Period:	4/6/18 - 4/5/19
Reporting Period End Date:	04/05/19

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
MGMT	Fungicide Efficacy in FHB/DON Management for Hard Red Winter and Spring Wheat in SD.	$ 31,049
	FY18 Total ARS Award Amount	$ 31,049

07/10/2019

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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PI: Byamukama, Emmanuel
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Project 1: *Fungicide Efficacy in FHB/DON Management for Hard Red Winter and Spring Wheat in SD.*

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

The major goal of the project was to improve on the FHB management through integration of cultivar resistance and fungicide application.

The objectives of the project were:

i) Determine the efficacy of Miravis Ace applied at heading for FHB and DON management.
ii) Determine the efficacy of Miravis Ace fungicide treatment at flowering for FHB and DON management in wheat; and
iii) Generate data to advance the FHB and DON risk prediction effort.

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

Obj. 1. Determine the efficacy of Miravis Ace applied at heading for FHB and DON management

1) Major activities:
Three hard red spring wheat cultivars, Brick (FHB-resistant), Prevail (FHB-moderately resistant) and Samson (FHB-susceptible) were planted at two locations: SDSU Volga Research Farm near Brookings, and Northeast Research Farm near South shore. Treatments evaluated were: Miravis Ace 11.5 fl oz/ac applied at heading; Miravis Ace 11.5 fl oz/ac applied at flowering, Prosaro 6.5 fl oz/ac applied at flowering and non-treated check. The plots at the Volga location were misted beginning at heading to increase FHB pressure. The plots at this location additionally had infected corn kernels (100g per plot) scattered within each plot to increase the FHB pressure. The experiment was set up as a randomized complete block design with a split-plot arrangement, where the fungicide was the main plot and cultivar the sub-plot. Treatments were replicated four times and plot size was 5 ft x 15 ft. at both locations. A CO2-pressurized backpack sprayer (40 psi) with three nozzles (Twin Jet TJ- ! the fungicide at a spray volume of 18.6 gal/A. Twenty-one days following treatment, plots were evaluated for FHB incidence, FHB head severity, and FHB field severity. Fusarium damaged kernels (FDK), DON content, and grain yield were assessed post-harvest.

2) Specific objective was to evaluate the efficacy of the new fungicide Miravis Ace applied at heading in controlling FHB/DON.

3) Significant results
Miravis Ace applied at heading did not significantly reduce FHB index compared to Prosaro applied at flowering. Similarly, Miravis Ace applied at heading did not significantly reduce DON compared to Prosaro applied at flowering.

Note: The same setup as spring wheat was done for winter wheat but all winter wheat plots were lost due to winter kill at both locations.

4) key outcomes or other achievements
The heading timing for applying Miravis Ace may not be the best timing as indicated by the manufacturer.

Obj. 2. Determine the efficacy of Miravis Ace fungicide treatment at flowering for FHB and DON management in wheat.

1) Major activities:
The experimental set up described in objective 1 above was used.

2) Specific objective was to evaluate the efficacy of the new fungicide Miravis Ace applied at heading in controlling FHB/DON.

3) Significant results: Miravis Ace applied at flowering timing significantly reduced FHB index and DON at levels comparable to Prosaro applied at the same timing.

4) Key outcomes or other achievements
The best timing for applying Miravis Ace based on one year testing in our plots is at flowering. This timing gave the best reduction in FHB index and also DON.

Obj. 3. Generate data to advance the FHB and DON risk prediction effort.

1) Major activities: Scouted and recorded the incidence and severity of FHB in winter and spring wheat in South Dakota.

2) Specific objective was to contribute data towards improvement of FHB and DON prediction models

3) Significant results: FHB incidence and severity in 2018 wheat growing season was very high with some fields having over 80% incidence. This was correctly predicted by FHB prediction tool. FHB and DON data collected from non-treated non inoculated plots at the two locations were supplied to model prediction collaborators.

4) Key outcomes or other achievements FHB prediction system is a reliable tool to help growers make FHB and DON management decisions

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

The project provided training opportunities for a research associate. He attended and presented a poster at the USWBSI National Forum.

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

Miravis Ace time of application efficacy results and FHB risk predictions for South Dakota were communicated through extension articles, newsletter articles, grower meetings, and during the Ag Horizon Workshop, field days, IPM field school, and pesticide applicator trainings.

Training of Next Generation Scientists

Instructions: Please answer the following questions as it pertains to the FY18 award period. includes any level of benefit to the student, ranging from full stipend $ 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?**

   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 FY18 award period?**

   No

   If yes, how many?

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

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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 (4/6/18 - 4/5/19). If you did not have any publications or presentations, state

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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.

Nothing to report

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

Other publications, conference papers and presentations.