

**USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY15 Final Performance Report
Due date: July 15, 2016**

Cover Page

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Fiscal Year:	2015
USDA-ARS Agreement ID:	59-0206-4-037
USDA-ARS Agreement Title:	Integrated Management of FHB and DON of Soft Winter Wheat in Michigan.
FY15 USDA-ARS Award Amount:	\$ 27,942
Recipient Organization:	Michigan State University Contract & Grant Administration Hannah Administration Building, Room 2 East Lansing, MI 48824-1046
DUNS Number:	193247145
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Project/Grant Reporting Period:	06/01/15-05/31/16
Reporting Period End Date:	05/31/16

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
MGMT	Integrated Management of FHB and DON of Soft Winter Wheat in Michigan.	\$ 27,942
	FY15 Total ARS Award Amount	\$ 27,942

Martin Nagelkirk
Principal Investigator

July 14, 2016
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

Project 1: *Integrated Management of FHB and DON of Soft Winter Wheat in Michigan.*

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

During the 2015 season, the goals was to contribute to 1) the development of integrated management strategies; 2) the development of the next generation of management tools; and 3) the understanding of factors influencing infection and toxin accumulation.

The objectives of this study are to 1) evaluate the integrated effects of fungicide treatment and genetic resistance on FHB, FDK, and DON and 2) evaluate the effects of post-anthesis fungicide treatments of FHB and DON as influenced by cultivar resistance and disease intensity.

In addition, our goal was to construct a new misting system to support FHB work (funding was allotted for this purpose under our ongoing management work).

2. What was accomplished under these goals?

1) major activities:

Field trials were conducted in Michigan's Thumb region and at MSU campus in East Lansing. Each site used a split plot design with four replications, and four cultivars (two soft red and two soft white) each possessing differing levels of susceptibility to FHB. The treatments included an untreated check, application of Prosaro® at 50% anthesis (Feekes 10.5.1), and three post-anthesis applications (2, 4, and 6 days after anthesis. FHB severity, incidence and index were determined. Grain samples from each plot were sent to the University of Minnesota DON analysis. The results were summarized and submitted to Pierce Paul for analysis.

In addition, a new field misting system for irrigating wheat trials was constructed and operated during the 2015 season.

2) specific objectives:

The key objectives of the field research were to determine 1) the best timing for applying a fungicide to deter FHB; 2) the sensitivity of application timing for achieving optimum results; and 3) the response of different varieties to fungicide application and timing. Additionally, our goal was to construct a new field misting system for FHB work.

3) significant results:

The most significant finding was that the best timing for fungicide application was 2 to 6 days later than what was previously believed and recommended. The research also indicates that the best application window spans a few days' time rather than just a day or two. Lastly, the results reinforce early findings that MR varieties can reduce DON levels by half when compared to S or VS varieties.

4) key outcomes or other achievements:

The most significant outcome of this work is that it will lead to a redefining of the optimum timing for fungicide application against FHB. This adjustment in application timing will ultimately help growers and commercial applicators achieve a significant improvement in DON reduction in many cases. The research also provides an indication of how late in wheat maturity an application can be made and still affects a reduction in DON.

In addition, a new field misting system for irrigating wheat trials was constructed and operated during the 2015 season. The new system covers nearly a half-acre and in 2015 misted 216 individual plots.

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

In conducting the trial, research technicians, summer interns and the researchers themselves were afforded the opportunity to gain first-hand experience with FHB. It was also beneficial for researchers to discuss the summary of this multi-state effort at the Fusarium Forum last December.

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

During the season, we featured this research trial during two field meetings to discuss the issue and the purposes of the trials. Some 150 growers and agribusiness personnel attended. The findings of this research were disseminated to growers and agribusiness by way of:

- A fact sheet addressing FHB disseminated electronically and in hard copy;
- News articles;
- Presentations at educational events (five state-wide IPM meetings and industry-wide Crop Summit)
- Individual consultations with growers and commercial applicators.

Training of Next Generation Scientists

Instructions: Please answer the following questions as it pertains to the FY15 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 FY15 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 FY15 award period?**
No
If yes, how many?

- 3. Have any post docs who worked for you during the FY15 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 FY15 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 FY15 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

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Publications, Conference Papers, and Presentations

Refer to the FY15-FPR_Instructions for listing publications/presentations about your work that resulted from all of the projects included in the FY15 grant. If you did not have any publications or presentations, state 'Nothing to Report' directly above the Journal publications section.

Journal publications. Nothing to report

Books or other non-periodical, one-time publications. Nothing to report

Other publications, conference papers and presentations.

Salgado, J.D., K. Ames, G. Bergstrom, C. Bradley, E. Byamukama, J. Cummings, V. Chapara, M. Chilvers, R. Dill-Macky, A. Friskop, P. Gautam, N. Kleczewski, L.V. Madden, E. Milus, M. Nagelkirk, J. Ransom, K. Ruden, J. Stevens, S. Wegulo, K. Wise, D. Yabwalo and P.A. Paul. 2015. Robust Management Programs to Minimize Losses due to FHB and DON: A Multi-state Coordinated Project. In: S. Canty, Clark, S. Vukasovich and D. Van Sanford (Eds.), *Proceedings of the 2015 National Fusarium Head Blight Forum*. East Lansing, MI/Lexington, KY: U.S. Wheat & Barley Scab Initiative. pp. 24-29.
Status: Paper Published and Poster Presented
Acknowledgement of Federal Support: Yes, but not for this agreement.