USDA-ARS
U.S. Wheat and Barley Scab Initiative
FY17 Final Performance Report
Due date: July 31, 2018

Cover Page

Principle Investigator (PI):	Martin Nagelkirk
Institution:	Michigan State University
E-mail:	nagelkir@msu.edu
Phone:	810-648-2515
Fiscal Year:	2017
USDA-ARS Agreement ID:	59-0206-4-037
USDA-ARS Agreement Title:	Integrated Management of FHB and DON of Soft Winter Wheat in Michigan.
FY17 USDA-ARS Award Amount:	$ 16,891
Recipient Organization:	Michigan State University Contract & Grant Administration Hannah Administration Building, Room 2 East Lansing, MI 48824-1046
DUNS Number:	193247145
EIN:	38-6005984
Recipient Identifying Number or Account Number:	RC103795
Project/Grant Reporting Period:	6/1/17 - 5/31/18
Reporting Period End Date:	05/31/18

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
MGMT	Integrated Management of FHB and DON in Soft Winter Wheat in Michigan.	$ 16,891
	FY17 Total ARS Award Amount	$ 16,891

Martin Nagelkirk 7/30/2018

Principal Investigator Date
Martin Nagelkirk

* 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 in Soft Winter Wheat in Michigan.*

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

This project was part of a multi-state effort to develop and validate integrated management strategies for FHB and mycotoxins that are robust to conditions experienced in production fields.

Our objectives were to address the stated needs of the USWBSI: 1) assist in validating the integrated strategies using the next generation of wheat varieties; 2) evaluate the flexibility of fungicide application timing within the context of integrated management strategies; and 3) enhance forecasting capabilities for FHB and continued development of FHB and DON models for wheat.

2. What was accomplished under these goals?

Goal: Develop and validate integrated management strategies for FHB and mycotoxins

1) major activities:
Field trials were established near Deckerville and East Lansing, MI. Both sites utilized varieties from soft red winter and soft white winter wheat subclasses that possessed varying levels of susceptibility to FHB. The East Lansing site had five replicated treatments involving applications of Prosaro®, Caramba®, Proline® and Folicur® fungicides. Mist irrigation and inoculation employed to encourage disease development. The Deckerville site had eight replicated treatments using various fungicide products and application timings. At both locations, FHB incidence and severity was rated along with foliar disease levels. The trials were mechanically harvested and subsamples were taken for determination of levels of damaged kernels and DON.

2) specific objectives:
- to observed the response to late application due to a curative effect of Prosaro and Caramba;
- to observe infection rates for early-flowering and late flowering tillers to various fungide applications;
- to determine if an anthesis fungicide application followed by a "late" application be more effective than single applications, and
- to evaluate the economic feasibility of a two-application fungicide program for FHB and DON management.

3) significant results and key outcomes:
Weather conditions were not conducive to FHB at either research site during the 2017 season. Therefore, the use of various fungicide products and timings resulted in no significant differences. Nevertheless, observations were made relative to the treatment effects on foliar diseases. In addition, the two locations provided observational sites and conditions that can support the FHB forecasting model.

3. Opportunities for training and professional development the project provided:

In conducting the trial, graduate students, research technicians, summer interns and the researchers themselves were afforded the opportunity to gain first-hand experience tools used to combat FHB. The trials also provided opportunities to discuss the disease and the project itself with wheat consultants and agribusiness personnel during a field meeting. Additionally, provided the opportunity for two individuals to participate in the National FHB Forum and learn from researchers around the country who are also participating in the work.

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

During the season, we featured this research trial during an annual wheat field meetings at the MSU research farm to discuss the issue and the purposes of the trials. Some 150 growers and agribusiness personnel attended.

The findings of this research were also disseminated to growers and agribusiness by way of:

- A fact sheet addressing FHB disseminated electronically and in hard copy;
- News articles;
- Presentations at six MSU Extension grower meetings (Crop and Pest Management meetings)
- Individual consultations with growers and commercial applicators.

Training of Next Generation Scientists

Instructions: Please answer the following questions as it pertains to the FY17 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 FY17 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 FY17 award period?**
   No
   If yes, how many?

3. **Have any post docs who worked for you during the FY17 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 FY17 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 FY17 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

Publications, Conference Papers, and Presentations

Instructions: Refer to the FY17-FPR_Instructions for detailed instructions for listing publications/presentations about your work that resulted from all of the projects included in the FY17 grant. Only include citations for publications submitted or presentations given during your award period (6/1/17 - 5/31/18). 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.

Journal publications.

Nothing to Report.

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

Nothing to Report.

Other publications, conference papers and presentations.

Nagelkirk, M.L., Byrne, A.M., Chilvers, M.I. 2018. Effect of fungicides on Septoria leaf spot, stripe rust, and head scab control on winter wheat, 2017. Plant Disease Management Reports 12:CF026.
Status: Published
Acknowledgement of Federal Support: No

Breunig, M., Byrne, A.M., Boyse, J.F., Nagelkirk, M., Chilvers, M.I. 2018. Effects of fungicides on the performance of winter wheat in Michigan, 2017. Plant Disease Management Reports 12:CF072.
Status: Published
Acknowledgement of Federal Support: No

Breunig, M.R., Nagelkirk, M., Byrne, A.M., Chilvers, M.I. Effects of Fungicide and Fertility on Disease Development and Yield in Winter Wheat. Annual American Phytopathological Society Aug 5-9, 2017. San Antonio, TX.
Status: Abstract Published and Poster Presented
Acknowledgement of Federal Support: YES (poster), NO (abstract)