


**USDA-ARS/  
U.S. Wheat and Barley Scab Initiative  
FY16 Final Performance Report  
Due date: July 28, 2017**

**Cover Page**

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<b>Fiscal Year:</b>	2016
<b>USDA-ARS Agreement ID:</b>	59-0206-4-037
<b>USDA-ARS Agreement Title:</b>	Integrated Management of FHB and DON of Soft Winter Wheat in Michigan.
<b>FY16 USDA-ARS Award Amount:</b>	\$ 16,926
<b>Recipient Organization:</b>	Michigan State University Contract & Grant Administration Hannah Administration Building, Room 2 East Lansing, MI 48824-1046
<b>DUNS Number:</b>	193247145
<b>EIN:</b>	38-6005984
<b>Recipient Identifying Number or Account Number:</b>	RC103795
<b>Project/Grant Reporting Period:</b>	6/1/16 - 5/31/17
<b>Reporting Period End Date:</b>	05/31/17

**USWBSI Individual Project(s)**

<b>USWBSI Research Category*</b>	<b>Project Title</b>	<b>ARS Award Amount</b>
MGMT	Integrated Management of FHB and DON in Soft Winter Wheat in Michigan.	\$ 16,926
	<b>FY16 Total ARS Award Amount</b>	<b>\$ 16,926</b>



July 28, 2017

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

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

During the 2016 season, the goals was to complete a second year of a trial to contribute toward: 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 were 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.

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

### 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.

### 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 incidence of Fusarium head scab was extremely low, minimizing the strength of any analysis. While the trends from this season were not conclusive, they did not contradict the findings from the same trial in 2015. Across the 2 year study, our conclusion is that the best timing for fungicide application was 2 to 6 days later than what was previously believed and recommended and 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:

Considering the two years of data (2015 and 2016), 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

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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.

**3. What opportunities for training and professional development has 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 with FHB. It was also beneficial for researchers to discuss the summary of this multi-state effort at the Michigan Wheat Program field day and Fusarium Forum last December.

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

During the season, we featured this research trial during an annual wheat field meetings at the Saginaw Valley Research and Extension Center 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 educational events (five state-wide IPM meetings)
- Individual consultations with growers and commercial applicators.

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### **Training of Next Generation Scientists**

**Instructions:** Please answer the following questions as it pertains to the FY16 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 FY16 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 FY16 award period? No**

**If yes, how many?**

3. **Have any post docs who worked for you during the FY16 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 FY16 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?**

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### 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 FY16 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**

**Instructions:** Refer to the FY16-FPR\_Instructions for detailed instructions for listing publications/presentations about your work that resulted from all of the projects included in the FY16 grant. Only include citations for publications submitted or presentations given during your award period (6/1/16 - 5/31/17). If you did not have any publications or presentations, state 'Nothing to Report' directly above the Journal publications section.

### **Journal publications.**

Byrne, A.M., Chilvers, M.I. M. Breunig, Olson, E., Siler, L. 2017. Effect of fungicides on performance of winter wheat in Michigan, 2016. Plant Disease Management Reports 11:FC029.

Status: published

Acknowledgement of Federal Support: **No**

Breunig, M., Byrne, A.M., Chilvers, M.I., Nagelkirk, M. 2017 Effects of post-flowering applications of fungicides on stripe rust control and performance of winter wheat, 2016. Plant Disease Management Reports 11:CF027.

Status: published

Acknowledgement of Federal Support: No

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

### **Other publications, conference papers and presentations.**