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

Cover Page

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| Phone: | 608-262-5716 |
| Fiscal Year: | 2016 |
| USDA-ARS Agreement ID: | 59-0206-6-012 |
| USDA-ARS Agreement Title: | IPM for FHB and DON in SRWW in Wisconsin. |
| FY16 USDA-ARS Award Amount: | $ 18,689 |
| Recipient Organization: | University of Wisconsin - Madison Office of Research & Sponsored Programs 21 N. Park Street, Suite 6401 Madison, WI 53715-1218 |
| DUNS Number: | 161202122 |
| EIN: | 39-6006492 |
| Recipient Identifying Number or Account Number: | AAB3147 |
| Project/Grant Reporting Period: | 6/6/16 - 6/5/17 |
| Reporting Period End Date: | 06/05/17 |

USWBSI Individual Project(s)

<table>
<thead>
<tr>
<th>USWBSI Research Category*</th>
<th>Project Title</th>
<th>ARS Award Amount</th>
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<tbody>
<tr>
<td>MGMT</td>
<td>Efficacy and Economics of IPM for FHB and DON in SRWW in Wisconsin.</td>
<td>$ 18,689</td>
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FY16 Total ARS Award Amount | $ 18,689

Principal Investigator                                             Date  

7/27/17

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* 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: Efficacy and Economics of IPM for FHB and DON in SRWW in Wisconsin.

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

   Overall Project Goal: Develop integrated management strategies for FHB and mycotoxins specific to Wisconsin soft red winter wheat production.

   Objectives:
   1. Investigate the utility of using a two-spray program for controlling FHB and mycotoxins compared to single-application programs on SRWW with varying levels of FHB resistance.
   2. Investigate chemical control options for FHB management in Wisconsin SRWW production and calculate return on investment of the programs

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

   Develop integrated management strategies for FHB and mycotoxins specific to Wisconsin soft red winter wheat production.
   1. Investigate the utility of using a two-spray program for controlling FHB and mycotoxins compared to single-application programs on SRWW with varying levels of FHB resistance.
   2. Investigate chemical control options for FHB management in Wisconsin SRWW production and calculate return on investment of the programs

   Major activities: The IM-CP standard protocol was followed and implemented in Wisconsin on soft red winter wheat (SRWW). An additional set of trials was implemented to investigate the utility of compounds other than Carmaba and Prosaro for FHB management.

   Specific objectives: Implement field-research trials to evaluate two-spray programs and additional chemistries for FHB management on multiple varieties.

   Significant results: Levels of FHB during the funding period were relatively low compared to other years due to unseasonably high air temperatures during anthesis (flowering period that is critical for fungal infection). Despite this issue, we did record some FHB damage and obtained mycotoxin concentrations in finished grain samples. Two-spray programs do result in a reduction of deoxynivalenol (DON) over not treating, on susceptible varieties. However, under low FHB pressure, the two-spray programs do not result in a significant savings over a single-spray program. In fact, we see in Wisconsin, adequate control of FHB and significant reductions in DON concentrations when a single fungicide application is applied 5 days after the start of anthesis. This fungicide application timing has proven to be quite beneficial in our environment in Wisconsin, where many wheat fields often have an array of growth stages. By waiting an extra 5 days until after the start of anthesis, we can allow “uneven” fields to equalize in timing of flowering, thereby maximizing fungicide application. We also did not...
observe any additional fungicide products (other than Prosaro and Caramba) that perform well on FHB in Wisconsin. We continue to recommend only Caramba and Prosaro for FHB management in Wisconsin.

**Key outcomes or other achievements:** Key outcomes of this work have been improved recommendations for FHB management in Wisconsin. Prior to this work, we were recommending that farmers apply fungicide simply at the start of anthesis. However, this work prompted us to investigate further, different application timings. In Wisconsin, a single fungicide application timed 5 days after the start of anthesis as resulted in the best management of FHB and a significant reduction in DON concentrations, while maximizing economic returns. We know that Prosaro and Caramba continue to be the two best fungicide choices for FHB management in Wisconsin.

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

This project has provided an opportunity to train a M.S. level graduate research assistant (Brian Mueller). Mr. Mueller has been able to participate in this project and also address more specific questions in his degree work, which were generated out of the work conducted here. We have been able to use the information in this project to leverage a follow-up project to investigate the *Fusarium spp.* populations in winter wheat grown throughout the state of Wisconsin. This project allowed us the opportunity to determine the primary species causing Fusarium head blight and the primary chemotype profiles of these isolates. In addition, Mr. Mueller received training and experience in conducting field research trials, data acquisition, and data analysis and reporting while participating in this project.

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

Results obtained were disseminated to stakeholders using cooperative extension outlets. The University of Wisconsin Field Crops Pathology program maintains a website(s) ([http://fyi.uwex.edu/fieldcroppathology](http://fyi.uwex.edu/fieldcroppathology)) for data distribution. All pertinent results from these trials were posted in online portals. In addition, data were delivered to growers via annual cooperative extension Pest Management Update Meetings and Winter Agronomy meetings. Our results were also disseminated the Fusarium Head Blight Prediction center the SCABSMART information portal.
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? Yes

   If yes, how many? 1

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?
**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.

<table>
<thead>
<tr>
<th>Name of Germplasm/Cultivar</th>
<th>Grain Class</th>
<th>FHB Resistance (S, MS, MR, R, where R represents your most resistant check)</th>
<th>FHB Rating (0-9)</th>
<th>Year Released</th>
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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

(Form – FPR16)
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 (6/6/16 - 6/5/17). If you did not have any publications or presentations, state ‘Nothing to Report’ directly above the Journal publications section.

Journal publications.

Acknowledgement of Federal Support: Not applicable

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

Acknowledgement of Federal Support: YES (poster), NO (abstract)

Other publications, conference papers and presentations.

Extension Presentations
Disease Management and diagnostic training. 2016 Wisconsin Pest Management Update Meetings. November 7-11, 2016. Marshfield, Chippewa Falls, Belmont, Fond du Lac, Kimberly, Sparta, and Janesville, WI. *(Total of 7 presentations and 354 contacts)*

Outreach Videos

(Form – FPR16)