USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY15 Final Performance Report
Due date: November 1, 2016

Cover Page

<table>
<thead>
<tr>
<th>Principle Investigator (PI):</th>
<th>Carl Bradley</th>
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<tbody>
<tr>
<td>Institution:</td>
<td>University of Kentucky</td>
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<td>Phone:</td>
<td>270-365-7541 ext. 215</td>
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<td>Fiscal Year:</td>
<td>2015</td>
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<tr>
<td>USDA-ARS Agreement ID:</td>
<td>59-0206-5-007</td>
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<tr>
<td>USDA-ARS Agreement Title:</td>
<td>Applied Management of Fusarium Head Blight in Kentucky.</td>
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<tr>
<td>FY15 USDA-ARS Award Amount:</td>
<td>$29,379</td>
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<td>Recipient Organization:</td>
<td>University of Kentucky Research Foundation</td>
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<td></td>
<td>University Station</td>
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<td>Lexington, KY 40506-0057</td>
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<td>Project/Grant Reporting Period:</td>
<td>09/08/15-09/07/16</td>
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<td>Reporting Period End Date:</td>
<td>09/07/16</td>
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USWBSI Individual Project(s)

<table>
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<tr>
<th>USWBSI Research Category*</th>
<th>Project Title</th>
<th>ARS Award Amount</th>
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<tr>
<td>MGMT</td>
<td>Integrated Management Strategies for Scab in Kentucky.</td>
<td>$19,661</td>
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<td>MGMT</td>
<td>Uniform Fungicide Tests for Control of Fusarium Head Blight in Kentucky.</td>
<td>$9,718</td>
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<td><strong>FY15 Total ARS Award Amount</strong></td>
<td><strong>$29,379</strong></td>
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Principal Investigator  Date

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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
FY15 Final Performance Report
PI: Bradley, Carl
USDA-ARS Agreement #: 59-0206-5-007

**Project 1: Integrated Management Strategies for Scab in Kentucky.**

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

   There major goals and objectives of this project are:
   1. To demonstrate that integrated management is the most effective and economical means of reducing losses to FHB/DON.
   2. To increase grower adoption of integrated strategies to control FHB.

2. **What was accomplished under these goals? Address each item below.**

   1) **Major activities.** The major activities undertaken included conducting field research trials at Princeton, KY and Dixon Springs, IL. In addition, results from these trials were presented at Extension meetings and field days.

   2) **Specific objectives.** The specific objectives were to investigate management of Fusarium head blight (FHB) and deoxynivalenol (DON) contamination in wheat grain. Specifically, moderately-resistant varieties and fungicide applications (solo and sequential) fungicide applications were evaluated.

   3) **Significant results.** Overall, FHB index values and DON levels were relatively low at both locations in 2016 except for the non-treated susceptible variety. FHB index and DON values were lowest in moderately-resistant varieties applied with a fungicide at the Feekes 10.5.1 growth stage. A sequential fungicide application did not appear to provide any additional significant control of FHB index or DON over a solo application at Feekes 10.5.1.

   4) **Key outcomes or other achievements.** The key outcome of this research continues to be that integrated management practices (applying an effective fungicide at the right timing to a moderately-resistant variety) are necessary to achieve the greatest level of control of FHB and DON. From these results it also appears that sequential applications of a fungicide may not provide any added benefit to management of FHB and DON; however, FHB and DON values were relatively low, and continued evaluation of sequential applications is important to be able to determine if this holds true in high FHB and DON environments.

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

   This project has allowed a graduate student and the PI to attend the National Fusarium Head Blight Forum, which has allowed them to interact with and learn from other scientists working on this disease. This project also has allowed a graduate student to learn research techniques in plant pathology.
4. How have the results been disseminated to communities of interest?

Results of this research have been disseminated to the scientific community thru posters presented at the National Fusarium Head Blight Forum and the American Phytopathological Society Annual Meeting. Results have been disseminated to stakeholders (i.e. farmers, Extension personnel, crop consultants, industry representatives, and commodity representatives) through presentations at Extension meetings, field days, and articles written in Extension newsletters and blogs.
Project 2: Uniform Fungicide Tests for Control of Fusarium Head Blight in Kentucky.

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

   The goal of this project is to test the efficacy of fungicides for their effects on Fusarium head blight (FHB) control and their ability to reduce deoxynivalenol (DON) levels in harvest soft red winter wheat grain.

2. What was accomplished under these goals? Address each item below.

   1) Major activities. A field trial was conducted in Princeton, KY to evaluate the effect of foliar fungicides in controlling FHB and DON.

   2) Specific objectives. The specific objective was to evaluate the effect of any new fungicides in controlling FHB and DON under a mist-irrigated FHB nursery.

   3) Significant results. A new experimental coded fungicide from Syngenta provided significant control of FHB and DON. Although not statistically significant than Prosaro, application of the new coded fungicide resulted into a numerically lower FHB index and DON value than Prosaro.

   4) Key outcomes or other achievements. This research helped evaluate a new experimental fungicide that may eventually provide a new tool wheat growers can use to combat FHB and DON. This new fungicide is in a different chemistry class than the current standard fungicides, Prosaro and Caramba, which also would help in managing fungicide resistance. Additional research on this new fungicide is needed to better understand its effects on FHB and DON across multiple years and locations.

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

   This project has allowed a graduate student and the PI to attend the National Fusarium Head Blight Forum, which has allowed them to interact with and learn from other scientists working on this disease. This project also has allowed a graduate student to learn research techniques in plant pathology.

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

   Results of this research have been disseminated to the scientific community thru posters presented at the National Fusarium Head Blight Forum. Results have been disseminated to stakeholders (i.e. farmers, Extension personnel, crop consultants, industry representatives,
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?

If yes, how many? Yes, one M.S. student graduated in May 2015 (University of Illinois).

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?

If yes, how many? Yes, 2 Ph.D. students graduated in May 2015 (University of Illinois).

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?

If yes, how many? No.

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?

If yes, how many? No.
**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.

<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
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.
Status: Published
Acknowledgement of Federal Support: Yes

Other publications, conference papers and presentations.
Status: Published
Acknowledgement of Federal Support: Yes

Status: Published
Acknowledgement of Federal Support: Yes

Status: Published
Acknowledgement of Federal Support: Yes
Acknowledgement of Federal Support: Yes

Acknowledgement of Federal Support: No

Acknowledgement of Federal Support: Yes

Acknowledgement of Federal Support: Yes

Acknowledgement of Federal Support: Yes

Acknowledgement of Federal Support: Yes

(Form – FPR15)