# USDA-ARS
U.S. Wheat and Barley Scab Initiative
FY18 Performance Report
Due date: July 12, 2019

## Cover Page

<table>
<thead>
<tr>
<th>Principle Investigator (PI):</th>
<th>Heather Kelly</th>
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<tbody>
<tr>
<td>Institution:</td>
<td>University of Tennessee</td>
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<tr>
<td>E-mail:</td>
<td><a href="mailto:youngkelly@utk.edu">youngkelly@utk.edu</a></td>
</tr>
<tr>
<td>Phone:</td>
<td>731-425-4713</td>
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<tr>
<td>Fiscal Year:</td>
<td>2018</td>
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<tr>
<td>USDA-ARS Agreement ID:</td>
<td>59-0206-6-009</td>
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<tr>
<td>FY18 USDA-ARS Award Amount:</td>
<td>$12,832</td>
</tr>
<tr>
<td>Recipient Organization:</td>
<td>UTIA Office of Sponsored Programs</td>
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<tr>
<td></td>
<td>2621 Morgan Circle Drive</td>
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<tr>
<td></td>
<td>225 Morgan Hall</td>
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<td></td>
<td>Knoxville, TN 37996-4514</td>
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<tr>
<td>DUNS Number:</td>
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<tr>
<td>EIN:</td>
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<tr>
<td>Recipient Identifying Number or Account Number:</td>
<td>R11-1017-338</td>
</tr>
<tr>
<td>Project/Grant Reporting Period:</td>
<td>6/1/18 - 5/31/19</td>
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<td>Reporting Period End Date:</td>
<td>05/31/19</td>
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## USWBSI Individual Project(s)

<table>
<thead>
<tr>
<th>USWBSI Research Category*</th>
<th>Project Title</th>
<th>ARS Award Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT</td>
<td>Integrated Management of FHB and DON in Soft Red Winter Wheat in Tennessee.</td>
<td>$12,832</td>
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**FY18 Total ARS Award Amount**  
$12,832

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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

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

   1) *Develop integrated management strategies for FHB and mycotoxins that are robust to conditions experienced in production fields*

   2) *Help develop and validate the next generation of management tools for FHB/DON control*

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

   1) major activities
   
   Field trials with both tolerant and susceptible FHB varieties were planted at 2 different locations in West Tennessee. The efficacy of the most current fungicides were evaluated at anthesis and heading for both FHB, DON, and yield.

   2) specific objectives
   
   These trials covered both objectives of development of IPM strategies (plant date, variety, and fungicide-product and timing) for FHB and mycotoxins as well as help validate the FHB model and develop data to improve FHB/DON control.

   3) significant results
   
   In the 2018 wheat IM trial, trial-level mean FHB index (IND) and deoxynivalenol contamination (DON) in the non-treated, susceptible check (S.CK) ranged from 1.1 to 46.4 % and 0.4 to 9 ppm, respectively. Averaged across trials (n = 18), all cultivar x fungicide treatment combinations had significantly lower mean IND (*Fig. 1A-C*) and DON (*Fig. 1D-F*) than S.CK. The combination of a moderately resistant or moderately susceptible cultivar with a fungicide treatment resulted in the lowest mean IND and DON. Within a given cultivar resistance class, differences in mean DON between Miravis Ace and Prosaro were not statistically significant. However, there was a trend towards numerically (but not always significantly) higher means when Miravis Ace was applied early than at anthesis (*Fig. 1*).

   Within just TN data set. Milan field trial had significantly higher yield (as could be expected with the lack of disease pressure, <5% across trial) with 62.3 bu/a vs. WTREC trial at 55.4 bu/a. There was not a significant interaction between location and treatment effect on yield. As expected, the more tolerant variety had significantly greater yield (Pioneer 26R36 – 65.0 bu/a vs. Pioneer 26R59 – 52.6 bu/a). Similar to the regional data set, product did not significantly impact yield, although there was a numerical trend where Miravis Ace was applied and when comparing the early and anthesis application, anthesis application trended higher (61.0 bu/a vs. 56.9 bu/a). Keeping in mind the trials conducted in TN used a lower rate of Miravis Ace (11.5 fl oz/a) instead of the set label rate of 13.7 fl oz/a.
Fig. 1. Mean FHB index (A, B, C) and Deoxynivalenol [DON] (D, E, F) for different FHB management program combinations consisting of Prosaro (6.5 fl oz) at anthesis (I), Miravis Ace (13.7 fl oz) at anthesis (II), or Miravis Ace at Feekes 10.3-10.5 (III) applied to susceptible [S] (A and D), moderately susceptible [MS] (B and E), or moderately resistant [MR] (C and F) cultivars. Analyses and mean comparisons were done of arcsine square root-transformed IND and log-transformed DON. Different letters indicate significant differences among management combinations.

4) key outcomes or other achievements
These data will be presented at county production meetings, grain conferences, and in newsletter/blog articles to further educate and promote adoption of FHB tolerant varieties and use of FHB modeling to guide fungicide application decisions in wheat in Tennessee.

3. What opportunities for training and professional development has the project provided?
Local county agents, industry reps, and some consultants have toured the research plots and learned to identify FHB. Similarly, previous years’ data and the forecasting model website have been highlighted at production meetings, grain conferences, and newsletters demonstrating how to interpret results and use the forecasting site.
4. **How have the results been disseminated to communities of interest?**

   County production meetings, grain conferences, and newsletters
Training of Next Generation Scientists

Instructions: Please answer the following questions as it pertains to the FY18 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 FY18 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 FY18 award period? No
   If yes, how many?

3. Have any post docs who worked for you during the FY18 award period and were supported by funding from your USWBSI grant taken faculty positions with universities? None
   If yes, how many?

4. Have any post docs who worked for you during the FY18 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 FY18 award period. All columns must be completed for each listed germplasm/cultivar. Use the key below the table for Grain Class abbreviations.

**NOTE:** 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 – PR18)
Publications, Conference Papers, and Presentations

Instructions: Refer to the FY18-FPR_Instructions for detailed instructions for listing publications/presentations about your work that resulted from all of the projects included in the FY18 grant. Only include citations for publications submitted or presentations given during your award period (6/1/18 - 5/31/19). 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. See example below for a poster presentation with an abstract:

Status: Abstract Published and Poster Presented
Acknowledgement of Federal Support: YES (poster), NO (abstract)

Journal publications.

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

Other publications, conference papers and presentations.

Presentations:
County Agent In-service training, Nov. 26-27. Wheat disease management training
Private consultants training, Jan. 14. Wheat disease, product, and application timing presentation
Tipton Co. Production meeting, Jan. 23. IPM for wheat diseases presentation
Gibson Co. Production meeting, Jan. 25. IPM for wheat diseases presentation
Haywood Co. Production meeting, Jan. 28. IPM for wheat diseases presentation
Crockett Co. Production meeting, Jan. 29. IPM for wheat diseases presentation
Henderson Co. Production meeting, Feb. 4. IPM for wheat diseases presentation
Lauderdale Co. Production meeting, Feb. 14. IPM for wheat diseases presentation
Madison Co. Production meeting, Feb. 18. IPM for wheat diseases presentation
Lake/Obion Co. Farm School meeting, Feb. 25. IPM for wheat diseases presentation

Publications
Status: Published
Acknowledgement of federal support: No

(Form – PR18)
FY18 Performance Report
PI: Kelly, Heather
USDA-ARS Agreement #: 59-0206-6-009
Reporting Period: 6/1/18 - 5/31/19

Update of material on field guide website for FHB – Published: https://guide.utcrops.com/wheat/
Status: Published
Acknowledgement of federal support: yes

Update of fungicide efficacy table publication, published:
https://extension.tennessee.edu/publications/Documents/W341.pdf
Status: Published
Acknowledgement of federal support: yes