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

Cover Page

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Fiscal Year:	2018
USDA-ARS Agreement ID:	59-0206-6-009
USDA-ARS Agreement Title:	Integrated Management of FHB and DON in Soft Red Winter Wheat in Tennessee.
FY18 USDA-ARS Award Amount:	$ 12,832
Recipient Organization:	UTIA Office of Sponsored Programs 2621 Morgan Circle Drive 225 Morgan Hall Knoxville, TN 37996-4514
DUNS Number:	133891015
EIN:	62-6001636
Recipient Identifying Number or Account Number:	R11-1017-338
Project/Grant Reporting Period:	6/1/18 - 5/31/19
Reporting Period End Date:	05/31/19

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
MGMT	Integrated Management of FHB and DON in Soft Red Winter Wheat in Tennessee.	$ 12,832
	FY18 Total ARS Award Amount	$ 12,832

Heather M. Kelly

7/12/19

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

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Project 1: *Integrated Management of FHB and DON in Soft Red Winter Wheat in Tennessee.*

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.

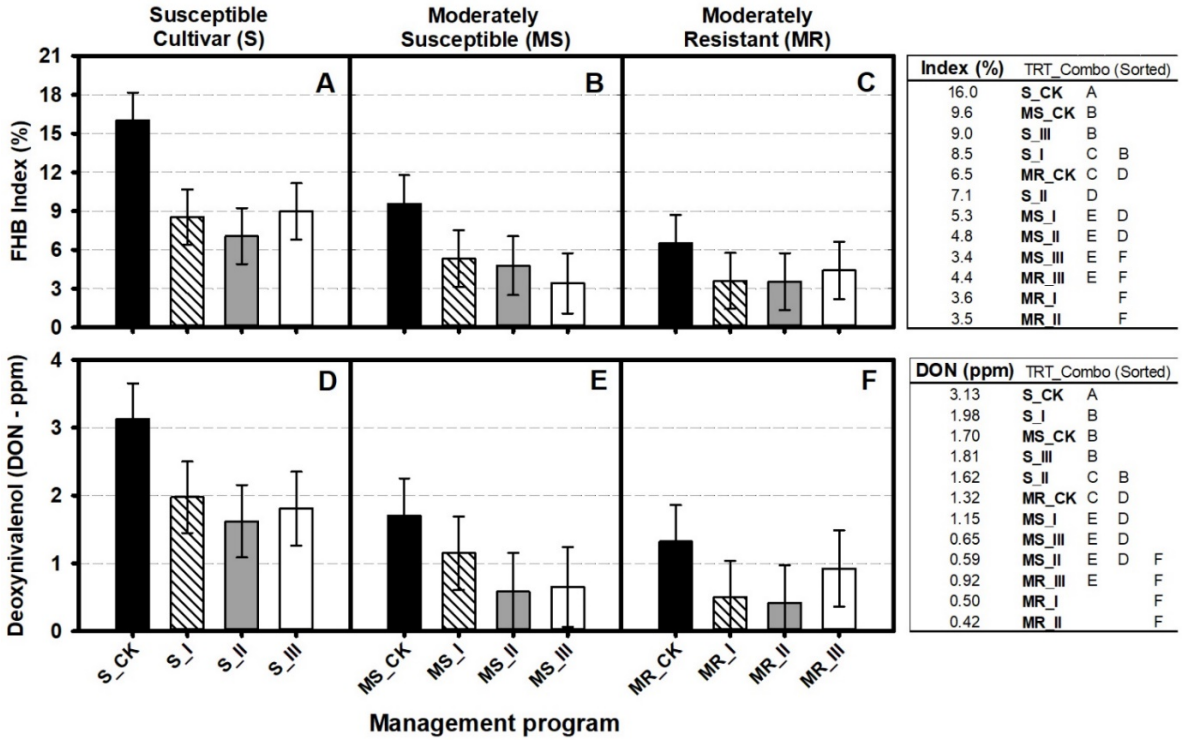

Fig. 1. Mean FHB index (**A, B, C**) and Deoxynivalenol [DON] (**D, E, F**) for different FHB management program combinations consisting of Prosaro (6.5 fl oz) at anthesis (I), Miravis Ace (13.7 fl oz) at anthesis (II), or Miravis Ace at Feekes 10.3-10.5 (III) applied to susceptible [S] (A and D), moderately 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.

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 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:

> Conley, E.J., and J.A. Anderson. 2018. Accuracy of Genome-Wide Prediction for Fusarium Head Blight Associated Traits in a Spring Wheat Breeding Program. In: Proceedings of the XXIV International Plant & Animal Genome Conference, San Diego, CA.
> 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
Newsletter/blog article. Fungicide considerations and disease identification in wheat. Apr. 4, 2019. Published: http://news.utcrops.com/2019/04/fungicide-considerations-and-disease-identification-in-wheat/
Status: Published
Acknowledgement of federal support: No

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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