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

Cover Page

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Fiscal Year:	2016
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.
FY16 USDA-ARS Award Amount:	$ 10,713
Recipient Organization:	UTIA Office of Sponsored Programs 2621 Morgan Circle Drive 225 Morgan Hall Knoxville, TN 37996-4514
DUNS Number:	133891015
EIN:	62-6001636
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Project/Grant Reporting Period:	6/1/16 - 5/31/17
Reporting Period End Date:	05/31/17

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.	$ 10,713
	FY16 Total ARS Award Amount	**$ 10,713**

Heather M. Kelly 8/5/2017
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

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?

The overall project goal of the proposed MGMT_CP project is to improve management of FHB and DON by evaluating integrated management strategies. Specific project objectives and expected outcomes include:
1) Evaluate the integrated effects of fungicide and genetic resistance on FHB and DON in soft red winter wheat with emphasis on double applications and new genotypes;
2) Generate data to conduct an economic analysis of the integrated effects of fungicide and resistance on FHB/DON;
3) Develop more robust "best-management practices" for FHB and DON; and
4) Generate data to advance the FHB and DON risk prediction effort.

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

1) major activities
Field Trials were conducted at two locations in west Tennessee with two cultivars (moderately resistant and susceptible to FHB) investigating five fungicide treatments. While very little to no FHB developed in the trials the data on FHB severity, incidence, and yield will be shared and compiled with others in the MGMT_CP.

2) specific objectives
Due to the lack of FHB developing in the trials the data will contribute to the following objectives:
3) Develop more robust "best-management practices" for FHB and DON; and
4) Generate data to advance the FHB and DON risk prediction effort.

3) significant results
While the Milan location had FHB and the resistant variety significantly reduced FHB incidence and severity, yield was not significantly affected by variety or fungicide application (Table 1). Only at 90% confidence level did Caramba® (10 fl oz/a) followed by Tebustar® (4 fl oz/a) and Proline® (5 fl oz/a) followed by Tebustar (4 fl oz/a) significantly reduce FHB severity compared to non-treated check, but did not affect incidence or yield at the Milan location. Initial applications were made a bloom and second applications were 4 days after initial application.

While no significant level of FHB developed at the Jackson location, variety and fungicide had a significant effect on yield and other leaf disease (Stagnospora leaf spot). The FHB moderately resistant variety, Pioneer 26R36, had significantly lower disease and greater yield. All fungicide treatments reduced disease and increased yield compared to the non-treated check across both varieties. There was a significant interaction between variety and fungicide (Table 2), where the non-treated Pioneer25R78 had significantly more disease than all other variety x fungicide treatments. Similarly, Pioneer25R78 non-

treated had the lowest yield and Pioneer 26R36 treated with Prosaro (6.5 fl oz/a) alone and Prosaro® (6.5 fl oz/a) followed by Caramba (10 fl oz/a) had the greatest yield.

Table 1. Milan Trial						
Variety	FHB Incidence		FHB Severity		Yield (bu/a)	
Pioneer25R78	70.5	a	73.5	a	70.9	a
Pioneer26R36	1.6	b	2.7	b	68.5	a

Table 2. Jackson Trial									
Treatment	Variety	Bloom application	4 days after bloom	Incidence Leaf Spot		Severity Leaf Spot		Yield (bu/a)	
6	Pioneer26R36	Prosaro 421SC	Caramba	0	b	0	b	97.4	a
4	Pioneer26R36	Prosaro 421SC		0	b	0	b	96.1	a
8	Pioneer26R36	Caramba	Tebustar 3.6L	3.8	b	0.5	b	88.9	ab
10	Pioneer26R36	Proline 480	Tebustar 3.6L	0	b	0	b	88	ab
5	Pioneer25R78	Prosaro 421SC	Caramba	26.3	b	4	b	82.4	b
2	Pioneer26R36	NTC		5	b	5.3	b	82.3	b
7	Pioneer25R78	Caramba	Tebustar 3.6L	21.3	b	8.8	b	82.3	b
9	Pioneer25R78	Proline 480	Tebustar 3.6L	18.8	b	6.5	b	81.3	b
3	Pioneer25R78	Prosaro 421SC		10	b	7.8	b	80.6	b
1	Pioneer25R78	NTC		95	a	88.8	a	69.1	c

4) key outcomes or other achievements

Data from the research trials and correlation to the FHB forecast model will be used at production meetings during the winter months to producers, consultants, and Extension agents in Tennessee.

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

A new research specialist within the Field Crops Plant Pathology program at University of Tennessee was able to use the trials within this project to learn to identify and rate wheat diseases – specifically FHB and stagnospora leaf spot. Additionally, undergraduate student workers helped establish and treatment the field trials within this project which helped them understand details of research (i.e. randomized complete block design, factorial design, need for replication, etc.). Also data from the research trials and correlation to the FHB forecast model will be used at production meetings during the winter months to producers, consultants, and Extension agents in Tennessee.

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

Data from the research trials and correlation to the FHB forecast model will be used at production meetings during the winter months to producers, consultants, and Extension agents in Tennessee.

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?

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

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.

Nothing to Report (first year of project)

Journal publications.

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

Other publications, conference papers and presentations.