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:	59-0206-6-002
USDA-ARS Agreement Title:	Value of Genetic Resistance and Fungicides on FHB Control in Durum.
FY16 USDA-ARS Awarnh ,d Amount:	$ 6,898
Recipient Organization:	North Dakota State University Office of Grant & Contract Accouting NDSU Dept 3130, PO Box 6050 Fargo, ND 58108-0650
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Project/Grant Reporting Period:	5/12/16 - 5/11/17
Reporting Period End Date:	05/11/17

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
DUR-CP	Value of Genetic Resistance and Fungicides on FHB Control in Durum.	$ 6,898
	FY16 Total ARS Award Amount	**$ 6,898**

Joel K Ransom 7/7/17

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: *Value of Genetic Resistance and Fungicides on FHB Control in Durum.*

1. **What are the major goals and objectives of the project?**
   FHB has been a serious constraint to quality durum production recently in some of the major durum producing regions of North Dakota and was particularly devastating to the North Dakota crop in 2016. When conditions are favorable for FHB development, controlling DON levels and FHB is more problematic in durum than in spring wheat due to the lack of genetic resistance to FHB in currently available durum cultivars. The objective of this research was to quantify the effect of currently available durum cultivars when combined with the best fungicide practice on the control of FHB and DON. This research was conducted under misted and inoculate conditions and under natural levels of inoculum and without misting.

2. **What was accomplished under these goals?** *Address items 1-4) below for each goal or objective.*
   1) Major activities: Variety by fungicide trials were planted in REC Carrington under misting conditions and at Prosper under natural conditions. At Carrington, modest levels of FHB were obtained with DON levels in harvested grain averaging 2 ppm. In the Prosper experiment DON levels averaged 1.8 ppm.
   2) Specific objectives: To determine the relative importance of variety and fungicide on the control of FHB and level of DON in the grain at harvest.
   3) Significant results: Genetic resistance and a fungicide application (Prosaro at flowering) provided similar levels of control. DON levels in the 10 genotypes ranged from 3.6 to 1.7 ppm when no fungicide was applied. The DON levels for fungicide treatment (averaged over genotypes) ranged from 2.5 (no fungicide) to 1.2 ppm (with fungicide). The genotypes with the lowest DON levels was D09557 at Carrington and Alkabo and D09557 at Prosper. The genotypes with the highest DON levels were D09555 and Tioga. The overall best combination of genotype and fungicide reduced DON levels to 0.2 ppm.
   4) Key outcomes or other achievements: The information provided practical guidance to growers who have been seeing FHB damage more frequently in recent years, on the importance of combining genetic resistance with fungicides in order to obtain the best FHB control. It has also provided reliable data on which varieties are more tolerant and should be used in areas where scab is likely to be problematic, even if a fungicide is going to be applied.

3. **What opportunities for training and professional development has the project provided?**
   Five graduate students were trained in the how to evaluated FHB damage and in how to apply fungicides and evaluate their effectiveness.

4. **How have the results been disseminated to communities of interest?**
   The results of this experiment were posted on the variety trial results section of the NDSU Extension Service's website. They were used to update variety information on the published durum variety selection guide, and were included in presentations made at four major meetings attended by growers and crop consultants.

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 (5/12/16 - 5/11/17). 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 presented at the FHB Forum:

> Conley, E.J., and J.A. Anderson. 2016. 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.
None

Books or other non-periodical, one-time publications.
None

Other publications, conference papers and presentations.
Gross, P.L., V. Chapara, J. Ransom, R. Brueggeman, Blaine Schatz, A. Kalil, D. Fonseka, C. Deplazes, A. Arens, and A. Friskop. 2016. The Use of Integrated Management Strategies to Lower Fusarium Head Blight and Deoxynivalenol in Spring Barley. In: S. Canty, A. Clark, K. Wolfe and D. Van Sanford (Eds.), Proceedings of the 2016 National Fusarium Head Blight Forum (pp. 27). East Lansing, MI/Lexington, KY: U.S. Wheat & Barley Scab Initiative.
Status: Abstract Published and Poster Presented
Acknowledgement of Federal Support: YES (poster), Yes (abstract)