USDA-ARS
U.S. Wheat and Barley Scab Initiative
FY17 Final Performance Report
Due date: July 31, 2018

Cover Page

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Fiscal Year:	2017
USDA-ARS Agreement ID:	59-0206-6-002
USDA-ARS Agreement Title:	Value of Genetic Resistance and Fungicides on FHB Control in Durum.
FY17 USDA-ARS Award Amount:	$ 6,885
Recipient Organization:	North Dakota State University Office of Grant & Contract Accouting NDSU Dept 3130, PO Box 6050 Fargo, ND 58108-0650
DUNS Number:	80-388-2299
EIN:	45-6002439
Recipient Identifying Number or Account Number:	FAR0025286
Project/Grant Reporting Period:	5/10/17 - 5/9/18
Reporting Period End Date:	05/09/18

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.	$ 6,885
	FY17 Total ARS Award Amount	$ 6,885

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. 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 high levels 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. We also included a few promising advanced lines in order to get a larger plot view of their performance.

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, good levels of FHB were obtained with DON levels in harvested grain averaging 5.1 ppm for plots not receiving fungicide and 0.6 ppm for sprayed plots. In the Prosper experiment, DON levels averaged 2.4 ppm with fungicides having no significant difference.

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*: Depending on the location, the factors tested had differing impact. Genetic resistance and fungicide treatments were significantly different at Carrington with two of the advance lines showing very good resistance (1.5 and 1.6 ppm compared to 6.7 ppm for Carpio). The fungicide (Prosaro at flowering) brought DON levels down to less than 1 ppm in all varieties. At Prosper there was no significant difference between cultivars (average DON of 2.4 ppm) and a fungicide application reduced DON levels by only 0.1 ppm. There was not enough seed to include the two promising lines that did very well at Carrington at this location, so we did not obtain data on their performance without misting.

4) *Key outcomes or other achievements*: The information on the released varieties 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 also provided reliable data on how the new lines are performing in a larger plot configuration.

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

Five graduate students were trained in the how to evaluate FHB damage and in how to apply fungicides and evaluate their effectiveness (they were not funded by the Scab Initiative, but were active in the research as a member of the research team).

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 FY17 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 FY17 award period?**
   Yes
   If yes, how many?
   5

2. **Did any graduate students in your research program supported by funding from your USWBSI grant earn their Ph.D. degree during the FY17 award period?**
   No
   If yes, how many?

3. **Have any post docs who worked for you during the FY17 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 FY17 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 FY17 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 FY17-FPR_Instructions for detailed instructions for listing publications/presentations about your work that resulted from all of the projects included in the FY17 grant. Only include citations for publications submitted or presentations given during your award period (5/10/17 - 5/9/18). 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.

Journal publications.
None

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

Other publications, conference papers and presentations.

Goss, P.L., V. Chapara, J. Rnasom, R. Brueggeman, B. Schatz, A. Kalil, D. Fonseka, C. Deplazes, A. Arens and A. Fiskop. 2017. Integrated Management strategies to lower fusarium head blight and deoxynivalenol in spring barley over multiple years and locations. 2017. In: S. Canty, B. Wiermer and D. Van Sanford (Eds.), Proceedings of the 200174 National Fusarium Head Blight Forum (pp. 14). East Lansing, MI/Lexington, KY: U.S. Wheat and Barley Scab Initiative.
Status: Abstract Published and Poster Presented
Acknowledgement of Federal Support: YES (poster), YES (abstract)

Ransom, J. and S. Forster. 2017. Durum Wheat Production Constraints and Recent Research Findings in North Dakota. Abstracts of American Society of Agronomy Meeting, Tampa, FL.
Status: Abstract Published and Presentation Given
Acknowledgement of Federal Support: NO (presentation), NO (abstract)