

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

**Cover Page**

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<b>Fiscal Year:</b>	2016
<b>USDA-ARS Agreement ID:</b>	N/A
<b>USDA-ARS Agreement Title:</b>	Evaluation of Barley Breeding Lines for FHB Resistance in Controlled Field Nursery in Idaho.
<b>FY16 USDA-ARS Award Amount:</b>	\$ 15,000

**USWBSI Individual Project(s)**

<b>USWBSI Research Category*</b>	<b>Project Title</b>	<b>ARS Award Amount</b>
BAR-CP	Evaluation of Aberdeen Barley Germplasm Lines on their FHB Resistance.	\$ 15,000
	<b>FY16 Total ARS Award Amount</b>	<b>\$ 15,000</b>

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07/25/2017

Principal Investigator

Date

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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

**Project 1:** *Evaluation of Aberdeen Barley Germplasm Lines on their FHB Resistance.*

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

The major goals of the project is to identify the FHB resistance and DON levels among the our elite barley lines in the breeding program. The local developed lines in the breeding program have accumulated good agronomic traits and some good end-user quality traits. For examples, we have developed a quit few elite malting barley lines which have very competitive yield potential in the trials and good malting quality in the AMBA's pilot tests. However the barley lines from western region have not evaluated for FHB resistance and DON levels due to the historical reason. If we could evaluate and identify some FHB resistance and low DON elite lines, it would be a very efficient way to obtain the barley lines for end-users. Identification of FHB resistance and low DON barley line will provide use information for making crosses in future cultivar or germplasm development. The evaluation for resistance is largely affected by environmental conditions and will need multiple trial results to make conclusions. We will have to continue the evaluation process in both nurseries of North Dakota State University and Aberdeen.

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

- 1) major activities: Planted 100 elite breeding barley lines at Aberdeen nursery, Fargo nursery in North Dakota with Dr. Bruggeman, and Fargo nursery with Dr. Horsley. Plants were scored for resistance. Seed samples were tested for DON. Seventeen crosses were made in greenhouse using one FHB resistance parent including CDC Mindon, Conlon, 2ND20493, Newdale, TR04282, 2ND30639, and 2Ab07-X031098-31. All the crosses produced F1 seeds.
- 2) specific objectives: to obtain more year-location data for the FHB resistance and DON level of the elite lines under test. To obtain F1 seeds for the crosses including the FHB resistance parents.
- 3) significant results: Good results were obtained from two Fargo nurseries and Aberdeen nursery. F1 seeds are harvested from 17 crosses.
- 4) key outcomes or other achievements: With more year-location data, FHB resistance and low DON lines are summarized with total 6 year-location data:

Name	Avg Scab Infection (%)	STD	AVE DON (ppm)
2Ab07-X031098-31	8.8	11.9	9.2
2Ab09-X05M049-2	8.2	12.2	9.4
2Ab09-X05M055-1	9.3	11.8	10.7
2Ab09-X06M002-17	8.0	12.3	9.4
2Ab11-X08M235-12	6.1	8.3	8.7
2Ab09-X06F058HL-68	11.3	11.1	7.7
2Ab09-X06F084HL-25	12.0	11.6	10.6
Ab09BG10HL-124	14.1	11.2	7.9
Ab09BG11HL-10	11.0	6.4	6.6
Ab09BG11HL-72	9.6	6.9	8.8
Ab09BG11HL-77	13.3	12.0	8.2
Ab09BG11HL-111	8.7	7.4	10.5
Ab09BG11HL-115	10.0	6.7	10.7
95SR316A	5.5	5.2	8.4
2Ab11-X08F208-46	8.7	7.4	9.6
2Ab11-X08F246-9	8.3	12.1	9.8
Quest (6-rowed R check)	13.8	14.9	16.9
Stander (6-rowed S check)	25.6	17.3	23.7
Conlon (2-rowed R check)	15.7	13.1	14.9

The line of 2Ab07-X031098-31 is currently under AMBA's plant scale evaluation. It is our top yield line in Idaho and Washington trials.

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

Nothing to report.

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

Reported the FHB screening results from Aberdeen breeding elite lines to the representatives of Idaho Barley Commission. They are happy to see that we have some potential resistance lines used in the breeding.

## **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. 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.**

Nothing to report

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

Nothing to report

### **Other publications, conference papers and presentations.**

Nothing to report