**USDA-ARS**
**U.S. Wheat and Barley Scab Initiative**
**FY18 Performance Report**
**Due date:** September 23, 2019

## Cover Page

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|---|---|
| **Principle Investigator (PI):** | Senay Simsek |
| **Institution:** | North Dakota State University |
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| **Phone:** | 701-231-7737 |
| **Fiscal Year:** | 2018 |
| **USDA-ARS Agreement ID:** | 59-0206-7-155 |
| **USDA-ARS Agreement Title:** | Deoxynivalenol (DON) Analysis in Wheat. |
| **FY18 USDA-ARS Award Amount:** | $ 153,158 |
| **Recipient Organization:** | North Dakota State University<br>Office of Grant & Contract Accouting<br>NDSU Dept 3130, PO Box 6050<br>Fargo, ND 58108-0650 |
| **DUNS Number:** | 80-388-2299 |
| **EIN:** | 45-6002439 |
| **Recipient Identifying Number or Account Number:** | FAR0028208 |
| **Project/Grant Reporting Period:** | 8/1/18 - 7/31/19 |
| **Reporting Period End Date:** | 07/31/19 |

## USWBSI Individual Project(s)

| USWBSI Research Category* | Project Title | ARS Award Amount |
|---|---|---|
| FST | Deoxynivalenol (DON) Analysis in Wheat. | $ 153,158 |
| | **FY18 Total ARS Award Amount** | $ 153,158 |

Senay Simsek 9/23/2019
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:** *Deoxynivalenol (DON) Analysis in Wheat.*

1. **What are the major goals and objectives of the project?**
   The goal of this project is to provide information to the wheat breeders, durum breeders, pathologists, ND wheat commodity groups, and other researchers working on developing *Fusarium* resistant cultivars, also developing fungicide protocols, with DON analysis that is timely and affordable.

2. **What was accomplished under these goals?** *Address items 1-4) below for each goal or objective.*
   1) major activities
   Approximately 8,000 samples (exclusive of checks) were analyzed for DON during the reporting period. Twenty researchers from three US states (ND, SD, MT) submitted the samples and the majority of them were from breeding programs. Some the samples were from pathologists and other researchers developing fungicide protocols.
   2) specific objectives
   GC-MS analysis was successfully completed for samples sent from 20 cooperators. The analysis of these samples was completed in the beginning of June 2018. Our laboratory was capable of determining DON derivatives. However, analysis of DON derivatives was not requested by any of the cooperators.
   3) significant results
   Results for DON content of samples sent by cooperators were obtained and provided to the cooperators. The results were obtained for about 8000 samples. QC samples were also analyzed 154 times through the year to keep track of the quality of data and accuracy of the DON analysis. The mean DON contents of the low and high QC samples were 0.72 and 2.42 ppm, respectively. The DON content measured for the low QC sample ranged from 0.57 to 0.87 ppm, while the DON content measured for the high QC sample ranged from 1.97 to 2.87. The standard deviation for the low QC was 0.15 and the standard deviation for the high QC was 0.45. The C.V values for the low and high QC samples were 21.5% and 18.8%, respectively.
   4) key outcomes or other achievements
   The major outcome of this project for FY18 was that we were able to effectively analyze all of the samples sent by the 20 cooperators by the end of the FY18 funding term. We were able to catch up from our late start that occurred for our first year as part of the USWBSI and maintain progress allowing us to finish all analysis by the end of the funding term. The results were submitted to and accepted by all cooperators involved in USWBSI research.

3. **What opportunities for training and professional development has the project provided?**
   One undergraduate and one scientist assist in the laboratory with the testing. The undergraduate student has learned basic laboratory skills and laboratory quality control. He was so interested in the information he did a seminar on DON analysis for a class.

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

The data is provided directly to the researchers and commodity groups. Information on DON in wheat has been disseminated to the growers, breeders, and other scientists by written publications, conferences, and webinars.

**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?** None

   **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?** None

   **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?** None

   **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** |
|---|---|---|---|---|
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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 (8/1/18 - 7/31/19). 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.**
Nothing to Report

**Books or other non-periodical, one-time publications.**
Nothing to Report

**Other publications, conference papers and presentations**.
Nothing to Report

**PI:** Simsek, Senay
**Project:** Diagnostic Services for Deoxynivalenol in Wheat.

# FY18 FPR – USWBSI ADDENDUM
# DON Service Labs – Quality Control Data

**Insert below Quality Control Data/Results from the FY18 Award Period (8/1/18 -7/31/19) :**

The variance in check samples shown below may be higher than desired. When the mean is small, even minor varitions in results result in higher CV's.

It should be noted that the below values are from 2 instruments (2 detectors).

| *Sample* | *Low PPM QC* | *HI PPM QC* |
|---|---|---|
| *Average* | 0.72 | 2.42 |
| *Std dev* | 0.15 | 0.45 |
| *CV* | 21.54% | 18.78% |
| *Low* | 0.57 | 1.97 |
| *High* | 0.87 | 2.87 |
| *No.* | 154 | 154 |