

**FY22 Performance Progress Report****Due date:** July 26, 2023**Cover Page**

<b>USDA-ARS Agreement ID:</b>	59-0206-2-123
<b>USDA-ARS Agreement Title:</b>	Deoxynivalenol (DON) in Wheat and Barley
<b>Principle Investigator (PI):</b>	Zhao Jin
<b>Institution:</b>	North Dakota State University
<b>Institution UEI:</b>	EZ4WPGRE1RD5
<b>Fiscal Year:</b>	2022
<b>FY22 USDA-ARS Award Amount:</b>	\$456,280
<b>PI Mailing Address:</b>	North Dakota State University, Department of Plant Sciences NDSU Dept # 7670, PO Box 6050 Fargo, ND 58108-6050
<b>PI E-mail:</b>	zhao.jin@ndsu.edu
<b>PI Phone:</b>	701-231-7732
<b>Period of Performance:</b>	May 1, 2022 – April 30, 2026
<b>Reporting Period End Date:</b>	April 30, 2023

**USWBSI Individual Project(s)**

USWBSI Research Category*	Project Title	ARS Award Amount
FST-S	Deoxynivalenol (DON) Analysis in Wheat	\$456,280
<b>FY22 Total ARS Award Amount</b>		<b>\$456,280</b>

I am submitting this report as an:  Annual Report

*I certify to the best of my knowledge and belief that this report is correct and complete for performance of activities for the purposes set forth in the award documents.*

Zhao Jin

06/30/2023

Principal Investigator Signature

Date Report Submitted

† BAR-CP – Barley Coordinated Project  
 DUR-CP – Durum Coordinated Project  
 EC-HQ – Executive Committee-Headquarters  
 FST-R – Food Safety & Toxicology (Research)  
 FST-S – Food Safety & Toxicology (Service)  
 GDER – Gene Discovery & Engineering Resistance  
 HWW-CP – Hard Winter Wheat Coordinated Project

MGMT – FHB Management  
 MGMT-IM – FHB Management – Integrated Management Coordinated Project  
 PBG – Pathogen Biology & Genetics  
 TSCI – Transformational Science  
 VDHR – Variety Development & Uniform Nurseries  
 NWW – Northern Soft Winter Wheat Region  
 SPR – Spring 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 research project?**

The goal of this project is to provide barley, wheat and durum breeders, plant pathologists, and other researchers working on the development of Fusarium resistant barley, wheat and durum with affordable, accurate and timely DON analysis.

**2. What was accomplished under these goals or objectives? (For each major goal/objective, address these three items below.)**

**a) What were the major activities?**

Analysis of 18,568 samples, including 10,642 barley samples and 7,926 wheat samples for DON during this reporting period (exclusive of checks and standard curves) were analyzed for DON during the reporting period. Approximately 39 researchers from 13 US states (NC, ND, MN, SD, MT, CO, NE, KS, TX, ID, OH, CA and NY) were submitted the samples and the majority of them were from breeding and pathology programs. Some of the samples were from other researchers.

**b) What were the significant results?**

Completion of analyzing submitted samples largely within the reporting period. The results were submitted to and accepted by all cooperators involved in USWBSI research.

**c) List key outcomes or other achievements.**

Improvement in the intra-lab QC, as evidenced by lower check samples coefficients of variation.

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

One graduate student and two undergraduate students assisted in the laboratory with the testing. The students have learned basic laboratory skills and laboratory quality control, and the graduate student has developed relevant research on Fusarium-produced mycotoxins in cereals.

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

Results have been sent directly to investigators. Lab protocol and allotments are posted on the USWBSI website.

## Publications, Conference Papers, and Presentations

Please include a listing of all your publications/presentations about your FHB work that were a result of funding from your FY22 grant award. Only citations for publications published (submitted or accepted) or presentations presented during the **award period** should be included.

**Did you publish/submit or present anything during this award period May 1, 2022 – April 30, 2023?**

- Yes, I've included the citation reference in listing(s) below.  
 No, I have nothing to report.

### Journal publications as a result of FY22 award

*List peer-reviewed articles or papers appearing in scientific, technical, or professional journals. Include any peer-reviewed publication in the periodically published proceedings of a scientific society, a conference, or the like.*

Identify for each publication: Author(s); title; journal; volume; year; page numbers; status of publication (published [include DOI#]; accepted, awaiting publication; submitted, under review; other); acknowledgement of federal support (yes/no).

### Books or other non-periodical, one-time publications as a result of FY22 award

*Report any book, monograph, dissertation, abstract, or the like published as or in a separate publication, rather than a periodical or series. Include any significant publication in the proceedings of a one-time conference or in the report of a one-time study, commission, or the like.*

Identify for each one-time publication: Author(s); title; editor; title of collection, if applicable; bibliographic information; year; type of publication (book, thesis, or dissertation, other); status of publication (published; accepted, awaiting publication; submitted, under review; other); acknowledgement of federal support (yes/no).

### Other publications, conference papers and presentations as a result of FY22 award

Identify any other publications, conference papers and/or presentations not reported above. Specify the status of the publication.

Jin Z. (2022). The Role of Fusarium Damaged Kernels in DON Accumulation during the Malting of FHB Infected Wheat. *Proceedings of the 2022 National Fusarium Head Blight Forum*; Tampa, FL. December 4-6, 2022. Retrieved from: <https://scabusa.org/forum/2022/2022NFHBForumProceedings.pdf>

## USWBSI ADDENDUM

### DON Service Labs – Quality Control (QC) Data

Note: What is being requested is the across lab quality control data (separate QC from Trilogy).

**Insert below Quality Control Data/Results from the Award Period (5/1/22 -4/30/23):**

Table 1. Quality Control Data on Wheat DON Internal Checks

DON level ID#	Low PPM 1	High PPM 2
Average	0.90	3.10
Std dev	0.60	1.80
cv	0.70	0.58
Min	0.39	1.11
Max	2.10	5.30
N	186	186

Table 2. Quality Control Data on Barley DON Internal Checks

DON level ID#	Clean 22	Low PPM 17	Middle PPM 7	High PPM 44/45	High PPM mix	High PPM 50	High PPM 51
Average	0.03	0.59	4.52	25.87	29.10	157.40	89.79
Std dev	0.03	0.21	0.81	2.94	4.27	34.53	17.60
cv	None	36.26	17.91	11.35	14.66	21.94	19.60
Min	0.00	0.37	3.71	22.93	24.83	122.87	72.20
Max	0.07	0.80	5.33	28.80	33.37	191.93	107.39
N	61	66	80	34	33	78	79

Table 3. Quality Control Data on Barley Malt DON Internal Checks

DON level ID#	Low PPM 20	Middle PPM 5	Middle PPM 31	High PPM 29	High PPM 15	High PPM 32
Average	2.26	8.46	11.84	19.80	20.96	28.19
Std dev	0.57	1.49	1.68	3.28	3.92	4.76
cv	25.24	17.64	14.21	16.55	18.72	16.90
Min	1.69	6.97	10.16	16.52	17.03	23.43
Max	2.84	9.95	13.52	23.08	24.88	32.96
N	75	86	74	73	73	72