

## **Project FY22-FS-003:** Evaluation of Barley and Spring Wheat for Deoxynivalenol

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### **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.)**

#### **What were the major activities?**

Analysis of 17,456 samples, including 10,238 wheat, 6,650 barley, and 568 rice samples (exclusive of checks and standard curves) were analyzed for DON during the reporting period. Almost 2000 samples were ground at the NDSU DON lab. Thirty-eight researchers from 11 US states (ND, SD, MT, MN, NE, NC, KS, TX, ID, CA and NY) submitted the samples and the majority of them were from breeding and pathology programs. Some of the samples were from other researchers.

The number of tested samples exceeded the 2024 allotment (17,456 versus 15,842).

#### **What were the significant results?**

Completion of analyzing submitted samples largely within the reporting period or following the receipt of submitted samples. The results were submitted to and accepted by all cooperators involved in USWBSI research, except for 300 samples was sent to us after the DON lab shut down for annual maintenance. We will assist to grind the sample and analyze the toxins as soon as possible when the new FY testing starts.

#### **List key outcomes or other achievements.**

The major outcome of this project was that we were able to effectively analyze all of the samples sent by the 38 cooperators by the end of the funding term. Results were sent back and accepted by the cooperators of USWBSI.

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

An undergraduate student and a graduate student assisted in the laboratory with the testing. They have learned basic laboratory skills and laboratory quality control.

### **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.

**5. What do you plan to do during the next reporting period to accomplish the goals and objectives?**

Between May and July, we allocate additional time to complete testing for samples that exceeded the original allotment or were submitted late. As part of our operations planning for the next reporting period, the following steps will be taken: (i) Complete equipment maintenance between June and August; (ii) Conduct a survey to estimate the number of samples expected from cooperators in the upcoming year, and provide guidance on samples preparation and submission and result reporting; (iii) Procure supplies and prepare the internal lab check samples used for the DON testing in the next reporting period; (iv) Start analyzing samples upon receipt and promptly send back the results to the cooperators; (v) Perform monthly tests of Trilogy QC samples to ensure consistent quality and reliability of results.

## FY24 Annual DON Lab Report on Sample Numbers

Please complete the following required data points for your DON lab analysis that took place during May 1, 2024 – April 30, 2025.



U.S. Wheat & Barley  
Scab Initiative

### Detailed DON Lab PI Sample Result Breakdown

(additional rows can be added as needed)

Principal Investigator	Grain Class (*Indicate sample type: BAR, HRSW, HWW, SWW, DUR)	Institution	Allotment FY Budgeted #	# Samples Analyzed in FY	# Samples Ground by DON Lab
Baldwin	BAR	NDSU	2500	2334	
Cai	HRSW/DUR	USDA-ARS NE	300	387	387
Chapara	BAR	NDSU	272	71	
Chapara	HRSW	NDSU	272	136	
Crutcher/Yimer	BAR	MSU	174	234	
Crutcher	DUR	MSU	90	90	
Crutcher	HRSW	MSU	232	232	
Crutcher	WW	MSU	100	100	
Elias	DUR	NDSU	600	408	
Forester	HRSW	NDSU	100	18	
Frels	WW/BAR	UNE-Lincoln	470	475	
Friskop	BAR	NDSU	328	104	
Friskop	HRSW	NDSU	328	220	
Friskop	DUR	NDSU	328	88	
Gao/Hu	BAR	USDA -ARS ID	1500	1557	500
Green	HRSW	NDSU	2000	2448	
Horsley	BAR	NDSU	2000	1272	
Ibrahim/Liu	HRSW	TX A&M	100	232	
Jin	BAR	NDSU	500	345	345
Jordan	HRSW	KSU	600	540	
Keene	HRSW	NDSU	324	1350	
Li	DUR	USDA ND	60	76	
Marais	WW	NDSU	0	0	
Muehlbauer	BAR	UMN	0	50	
Nonoy	HRSW	USDA-ARS NC	400	400	
Ostlie	DUR	NDSU	400	36	
Ostlie	HRSW	NDSU	400	84	
Rao	HRSW	NDSU	400	162	
Rao	Rice	NDSU	400	568	
Rupp	HRSW	KSU	960	180	
Sehgal	DUR	SDSU	850	938	
Shires	HRSW	SDSU	550	505	
Smith	BAR	UMN	80	200	
Sorrels	BAR	Cornell	392	340	
Timmerman	BAR	Bush Ag	0	0	
Shengming Yang	BAR	USDA	Added after survey	43	
Steven Xu	HRSW	USDA	Added after survey	741	741
Zhang	BAR	UC-Davis	100	100	
Zhong	HRSW	NDSU	250	392	

\*BAR=Barley, HRSW=Hard Red Spring Wheat, HWW=Hard Winter Wheat, SWW=Soft Winter Wheat, DUR= Durum

<b>TOTALS</b>	<b># Analyzed</b>
Total # Overall of Samples Analyzed	17456
Total # of Regular Grain Samples (4-100g)	16287
Total # of Small Grain Samples (<4g)	601
Total # of Specialty Samples, please specify:	Rice 568
Total # of Specialty Samples, please specify:	
Total # of Specialty Samples, please specify:	

#### Target Toxins Analyzed

Check all analyzed:	<b>Toxin</b>	<b># Analyzed</b>
<input checked="" type="checkbox"/>	DON	17456
<input checked="" type="checkbox"/>	DON3G	34
<input checked="" type="checkbox"/>	15-Acetyl-DON	568
<input checked="" type="checkbox"/>	3-Acetyl-DON	568
<input checked="" type="checkbox"/>	Nivalenol	568
<input type="checkbox"/>	Zearalenone	
<input type="checkbox"/>	NX3	
<input type="checkbox"/>	Other, please specify:	

#### Annual DON Quality Control Data

Internal lab quality control data (separate QC from Trilogy)

	<b>Check 1</b>	<b>Check 2</b>	<b>Check 3</b>	<b>Check 4</b>
N <sup>a</sup>	247	233	220	209
Mean (ppm)	2.21	0.49	8.79	17.13
SD <sup>b</sup>	0.40	0.13	1.28	2.31
%CV <sup>c</sup>	17.86	26.03	14.5	13.48

<sup>a</sup> Number of check samples. <sup>b</sup> Standard deviation. <sup>c</sup> Coefficient of variance

Return your completed report along with your annual Performance Report submission. Please direct any questions to the USWBSI Networking and Facilitation Office (NFO) at [nfo@scabusa.org](mailto:nfo@scabusa.org). Thank you!