

USDA-ARS
U.S. Wheat and Barley Scab Initiative
FY20 Annual Performance Progress Report
Due date: August 31, 2021

Cover Page

Principle Investigator (PI):	Richard Horsley
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Fiscal Year:	2020
USDA-ARS Agreement ID:	59-0206-0-164
USDA-ARS Agreement Title:	Deoxynivalenol in Wheat and Inhibition of <i>F. graminearum</i> by Compounds in Wheat Bran
FY20 USDA-ARS Award Amount:	\$ 196,266
Recipient Organization:	North Dakota State University Office of Grant & Contract Accounting NDSU Dept 3130, PO Box 6050 Fargo, ND 58108-0650
DUNS Number:	80-388-2299
EIN:	45-6002439
Recipient Identifying Number or Account Number:	FAR0031947
Project/Grant Reporting Period:	6/1/20 - 5/31/21
Reporting Period End Date:	5/31/2021

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
FST-S	Deoxynivalenol (DON) Analysis in Wheat	\$ 162,715
PBG	Identification of Compounds in Wheat Bran that Inhibit the Growth of <i>F. graminearum</i>	\$ 33,551
FY20 Total ARS Award Amount		\$ 196,266



Principal Investigator

8/31/2021

Date

* MGMT – FHB Management
FST – Food Safety & Toxicology
R- Research
S – Service (DON Testing Labs)
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: 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 information to the wheat breeders, durum breeders, plant pathologists, ND wheat commodity groups, and other researchers working on developing Fusarium resistant cultivars and developing fungicide protocols, with DON analysis results that are timely and affordable.

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?

Approximately 8,360 samples (exclusive of checks and standard curve samples) were analyzed for DON during the reporting period. Twenty-one researchers from eight US states were submitted the samples and the majority of them were from breeding programs. Some the samples were from pathologists and other researchers developing fungicide protocols.

b) What were the significant results?

Results for DON content of samples sent by cooperators were obtained and provided to the cooperators. The results were obtained for about 8,360 samples. Breakdown is below:

Researcher	University	Samples		
		Estimated	Submitted	Difference
Baenziger	Neb	460	395	(65)
Bissonnette	Missouri	0	120	120
Byamukama	SDSU	360	401	41
Cai	NDSU	400	400	0
Chapara	NDSU	0	48	48
Cook (HRS)	Mt	200	201	1
Cook (HWW)	Mt	150	150	0
Elias	NDSU	800	791	(9)
Friebe	KSU	10	14	4
Friskop	NDSU	128	132	4
Giroux	Mt	30	30	0
Glover	SDSU	800	0	(800)
Green	NDSU	2500	3106	606
Hanson	NDSU	700	0	(700)
Ibrahim	TX A&M	0	0	0
Marias	NDSU	150	0	(150)

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Researcher	University	Samples		
		Estimated	Submitted	Difference
Ransom	NDSU	600	424	(176)
Rupp	KSU	1000	900	(100)
Schatz	NDSU	386	342	(44)
Sehgal	SDSU	500	496	(4)
Zhong	NDSU	800	408	(392)
TOTALS		9974	8358	(1,616)

c) List key outcomes or other achievements.

The major outcome of this project for FY20 was that we were able to effectively analyze all of the samples sent by the 21 cooperators by the end of the FY20 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. Was this research impacted by the COVID-19 pandemic (i.e. university shutdowns and/or restrictions, reduced or lack of support personnel, etc.)? If yes, please explain how this research was impacted or is continuing to be impacted.

North Dakota State University took a proactive approach on limiting University personnel and students to COVID-19 by going to an on-line classroom format for the students, closing the dormitories so most students left campus, and encouraging anyone that could work from home do so. Essential laboratories such as the USWBSI group could continue operation with one person in the lab at a time. Tasks that normally were done by two people working in tandem were curtailed and carried out many days by one person, so processing the samples slowed down considerably. Buildings were locked 24/7 so extra planning had to be done to allow students to come in and work on evenings and weekends, which was on a limited basis, as well as changes as to how we could receive mail and shipments. Some supplies that were shipped from MN, Canada, and Germany were stopped so that also caused delays. Extra cleaning and safety measures were implemented, and we will be working with the extra safety measures for the next 6 months at least. Still only one person per laboratory.

4. 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.

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

The data are 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.

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Project 2: *Identification of Compounds in Wheat Bran that Inhibit the Growth of F. graminearum*

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

To determine if there were compounds in wheat bran that limited growth of *F. graminearum*

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?

The researcher hired to work on this project left the wheat project.

This project will be dropped from the agreement, and the awarded funds will be repurposed for use by the FST-S project. The next funding request/award for the FST-S project will be reduced to address the repurposed funds.

b) What were the significant results?

Nothing to report

c) List key outcomes or other achievements.

Nothing to report

3. Was this research impacted by the COVID-19 pandemic (i.e. university shutdowns and/or restrictions, reduced or lack of support personnel, etc.)? If yes, please explain how this research was impacted or is continuing to be impacted.

Nothing to report

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

Nothing to report

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

Nothing to report

Training of Next Generation Scientists

Instructions: Please answer the following questions as it pertains to the FY20 award period (6/1/20 - 5/31/21). 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 FY20 award period?**

Yes No

If yes, how many? [Click to enter number here.](#)

2. **Did any graduate students in your research program supported by funding from your USWBSI grant earn their Ph.D. degree during the FY20 award period?**

Yes No

If yes, how many? [Click to enter number here.](#)

3. **Have any post docs who worked for you during the FY20 award period and were supported by funding from your USWBSI grant taken faculty positions with universities?**

Yes No

If yes, how many? [Click to enter number here.](#)

4. **Have any post docs who worked for you during the FY20 award period and were supported by funding from your USWBSI grant gone on to take positions with private ag-related companies or federal agencies?**

Yes No

If yes, how many? [Click to enter number here.](#)

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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 FY20 award period (6/1/20 - 5/31/21). 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	FHB Rating (0-9)	Year Released
N/A	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year

NOTE: List the associated release notice or publication under the appropriate sub-section in the 'Publications' section of the FPR.

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Publications, Conference Papers, and Presentations

Instructions: Refer to the PR_Instructions for detailed more instructions for listing publications/presentations about your work that resulted from all of the projects included in the FY20 grant award. Only citations for publications published (submitted or accepted) or presentations presented during the **award period (6/1/20 - 5/31/21)** should be included. If you did not publish/submit or present anything, state 'Nothing to Report' directly above the Journal publications section.

NOTE: Directly below each citation, you **must** indicate the Status (i.e. published, submitted, etc.) and whether acknowledgement of Federal support was indicated in the publication/presentation. See example below for a poster presentation with an abstract:

Winn, Z.J., Acharya, R., Lyerly, J., Brown-Guedira, G., Cowger, C., Griffey, C., Fitzgerald, J., Mason R.E., and Murphy, J.P. (2020, Dec 7-11). Mapping of Fusarium Head Blight Resistance in NC13-20076 Soft Red Winter Wheat (p. 12). In: Canty, S., Hoffstetter, A. and Dill-Macky, R. (Eds.), *Proceedings of the 2020 National Fusarium Head Blight Forum*. https://scabusa.org/pdfs/NFHBF20_Proceedings.pdf.

Status: Abstract Published and Poster Presented

Acknowledgement of Federal Support: YES (Abstract and Poster)

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: Horsley, Richard

Project: Deoxynivalenol (DON) Analysis in Wheat

**FY20 PR – USWBSI ADDENDUM
DON Service Labs – Quality Control (QC) Data**

Note: What is being requested is the lab’s quality control (i.e. check) data.

Insert below Lab’s Quality Control Data/Results from the FY20 Award Period (6/1/20 - 5/31/21):

QC samples	Low PPM	Hi PPM
average	0.8	2.53
std dev	0.3	0.44
cv	0.3	0.17
low	0.3	1.14
hi	2.5	3.8
No.	185	185