

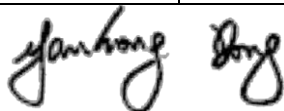
USDA-ARS
U.S. Wheat and Barley Scab Initiative
FY17 Final Performance Report – NCE for FY18
Due date: July 12, 2019

Cover Page

Principle Investigator (PI):	Yanhong Dong
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Fiscal Year:	2017 (NCE for FY18)
USDA-ARS Agreement ID:	59-0206-4-023
USDA-ARS Agreement Title:	Diagnostic Services for DON.
FY17 USDA-ARS Award Amount:	\$ 317,220
Recipient Organization:	Regents of the University of Minnesota Suite 450 Sponsored FIN RPT-P10010000 Minneapolis, MN 55455-2003
DUNS Number:	555917996
EIN:	41 -6007513
Recipient Identifying Number or Account Number:	CON000000048310
Project/Grant Reporting Period:	5/19/18 - 5/18/19
Reporting Period End Date:	05/18/19

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
FST	Diagnostic Services for DON.	\$ 241,742
	FY17 Total ARS Award Amount	\$ 317,220



Principal Investigator

7/5/2019

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: *Diagnostic Services for DON.*

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

The goal of this project is to provide rapid, cost-effective and accurate mycotoxin analysis - especially deoxynivalenol (DON) - for Fusarium Head Blight (FHB or scab) research projects.

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

1) major activities

Analyzed DON and related mycotoxins in wheat, barley and fungal culture extract using GC-MS; grinded grain seeds; extracted DON from grain samples; derivatized DON for GC-MS analysis; and prepared purification columns.

2) specific objectives

Provided reliable DON analysis services to the projects funded by the USWBSI and ensured PIs to get their results in a timely manner.

3) significant results

For 2018/2019 crop year, our laboratory analyzed 27,892 samples (**Table 1**) submitted by 36 scab research groups from 18 states including Arkansas, Georgia, Idaho, Illinois, Indiana, Kentucky, Louisiana, Maryland, Michigan, Minnesota, New York, North Carolina, North Dakota, Ohio, Pennsylvania, South Dakota, Texas, and Wisconsin. The samples included 25,844 regular mature grain samples (4-100 g) and 2,048 small size samples such as grain samples less than 4 g, single kernel, single spikelet, single head, small stem, and fungal culture extract. The target toxins included DON, 15-Acetyl-DON, 3-Acetyl-DON, and nivalenol. Zearalenone was analyzed for some samples submitted by Dr. Bergstrom's, Dr. Dill-Macky's and Dr. Paul's projects. For the past six years, the numbers of samples submitted to our lab were 79 - 85% of the anticipated numbers based on the surveys conducted before submitting the proposals, except last year, which is very close to the estimate (94%).

4) key outcomes or other achievements

The DON data has been used in all areas of scab research. By analyzing mycotoxins, the project provided support to barley and wheat breeding programs to develop resistant varieties, and to researchers to study disease mechanisms and to develop effective chemical and biological disease controls. Mycotoxin data provided to scab researchers by our laboratory gave them a means to evaluate the effectiveness of their efforts in fighting Fusarium Head Blight.

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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?

The results were emailed to researchers, and were then disseminated to communities of interest via conference papers and presentations, and journal publications.

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Table 1. Summary of 2018/2019 samples

PI	Number of Sample			Institution
	Analyzed	Estimated	difference	
Alyssa Collins	0	216	-216	Pennsylvania State University
Andrew Green	1005	1000	5	North Dakota State University
Anne McKendry	0	1000	-1000	University of Missouri
Arielle Abt/Jana Murche	151	0	151	KWS Cereals/Uniform scab nurseries
Brian Steffenson	2223	1800	423	University of Minnesota
Carl Bradley	525	800	-275	University of Kentucky
Clay Sneller	207	150	57	Ohio State University
Corby Kistler	1609	3500	-1891	USDA-ARS, St Paul, MN
Christina Cowger	300	300	0	USDA-ARS, Raleigh, NC
Damon Smith	519	250	269	University of Wisconsin-Madison
David Van Sanford	2790	3000	-210	University of Kentucky
Elias Elias	1400	1500	-100	North Dakota State University
Eric DeWolf	0	350	-350	Kansas State University
Eric Olson	1375	1500	-125	Michigan State University
Eric Stockinger	0	500	-500	Ohio State University
Floyd Dowell	0	100	-100	USDA-ARS, KS
Frances Trail	66	150	-84	Michigan State University
Frederic Kolb	673	1800	-1127	University of Illinois at Urbana Champaign
Gary Bergstrom	610	750	-140	Cornell University
Gary Muehlbauer	0	300	-300	University of Minnesota
Guihua Bai	0	1000	-1000	USDA-ARS, KS
Gongshe Hu	291	0	291	USDA-ARS, ID
Heather Kelly	0	100	-100	University of Tennessee
Jason Wight	204	350	-146	University of Maryland
Jerry Johnson	98	0	98	University of Georgia
Jianli Chen	450	600	-150	University of Idaho
Jim Anderson	752	1000	-248	University of Minnesota
Jinrong Xu	0	100	-100	Purdue University
Jochum Wiersma	0	100	-100	University of Minnesota
Juliet Marshall	450	435	15	University of Idaho
Jyoti Shah	74	100	-26	University of North Texas
Kevin Smith	2238	1000	1238	University of Minnesota
Madeleine Smith	36	200	-164	University of Minnesota
Mark Sorrells	748	400	348	Cornell University
Martin Chilvers	463	600	-137	Michigan State University
Martin Nagelkirk	192	220	-28	Michigan State University
Mohamed Mergoum	0	700	-700	University of Georgia
Mohsen Mohammadi	655	0	655	Purdue University
Nathan Kleczewski	110	500	-390	University of Delaware
Nidhi Rawat	231	0	231	University of Maryland
Pau Esker	88	0	88	Pennsylvania State University
Paul Murphy	925	1000	-75	North Carolina State University
Pierce Paul	2231	2700	-469	Ohio State University
Richard Esten Mason	1276	1500	-224	University of Arkansas
Ruth Dill-Macky	912	2000	-1088	University of Minnesota
Sharyar Kiannian	0	514	-514	USDA-ARS, St Paul, MN
Stephen Harrison	1802	1200	602	Louisiana State University
Yang Yen	195	200	-5	South Dakota State University
QA	18	0	18	Trilogy QA samples
Total	27892	35485	-7593	

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Training of Next Generation Scientists

Instructions: Please answer the following questions as it pertains to the FY17-NCE 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 FY17-NCE 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 FY17-NCE period?**

No

If yes, how many?

3. **Have any post docs who worked for you during the FY17-NCE 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 FY17-NCE 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?

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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 FY17-NCE 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

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

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Publications, Conference Papers, and Presentations

Instructions: Refer to the FY17-NCE_FPR-Instructions for detailed instructions for listing publications/presentations about your work that resulted from all of the projects included in the FY17-NCE grant period. Only include citations for publications submitted or presentations given during your award period (5/19/18 - 5/18/19). If you did not have any publications or presentations, state ‘Nothing to Report’ directly above the Journal publications section.

Journal publications.

Sarowar, S., Alam, S., Makandar, R., Lee, H., Trick, H. N., Dong, Y., Shah, J. “Targeting the pattern-triggered immunity pathway for enhancing resistance to *Fusarium graminearum*”, *Molecular Plant Pathology*, **2019**, 20(5), 626-640 (DOI: 10.1111/mpp.12781).

Status: Published

Acknowledgement of Federal Support: Yes

Tessman, E., Dong, Y., Van Sanford, D., Anthony, D. “GWAS for Fusarium Head Blight Traits in a Soft Winter Wheat Mapping Panel”, *Crop Science*, Submitted (Aug, 2018).

Status: Submitted

Acknowledgement of Federal Support: Yes

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

Other publications, conference papers and presentations.

Arcibal, S.S., Jackson, C.A., Dong, Y., Marshall, J.M. 2018. *Efficacy of a new fungicide (MIRAVIS® ACE) for managing FHB and DON in southern Idaho*. In: Canty, S.; Hoffstetter, A.; Wiermer, B.; Dill-Macky, R. (Eds.), *Proceedings of the 2018 National Fusarium Head Blight Forum* (P. 7). East Lansing, MI/Lexington, KY: U.S. Wheat & Barley Scab Initiative.

Status: Abstract Published and Poster Presented

Acknowledgement of Federal Support: YES (poster), NO (abstract)

O’Mara, S., Dong, Y., Kistler, H.C. (2018). *Mutations in genes for Fusarium transporters result in reduced DON accumulation and virulence*. In: Canty, S.; Hoffstetter, A.; Wiermer, B.; Dill-Macky, R. (Eds.), *Proceedings of the 2018 National Fusarium Head Blight Forum* (P.89). East Lansing, MI/Lexington, KY: U.S. Wheat & Barley Scab Initiative.

Status: Abstract Published and Poster Presented

Acknowledgement of Federal Support: YES (poster), NO (abstract)

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Project: Diagnostic Services for DON.

**FY17-NCE FPR – 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 FY17-NCE Award Period (5/19/18 - 5/18/19):

	Check 1	Check 2
N^a	492	563
Mean (ppm)	4.04	4.54
SD^b	0.32	0.42
% CV^c	8.0	9.2

^aNumber of check samples. ^bStandard deviation. ^cCoefficient of variance



07/05/2019