

**USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY08 Final Performance Report (approx. May 08 – April 09)
July 15, 2009**

Cover Page

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Fiscal Year:	2008
USDA-ARS Agreement ID:	59-0790-4-129
USDA-ARS Agreement Title:	Diagnostic Services for DON.
FY08 USDA-ARS Award Amount:	\$ 237,116

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Adjusted Award Amount
FSTU	Diagnostic Services for DON.	\$237,116
	Total Award Amount	\$ 237,116

Principal Investigator

Date

* MGMT – FHB Management
FSTU – Food Safety, Toxicology, & Utilization of Mycotoxin-contaminated Grain
GDER – Gene Discovery & Engineering Resistance
PBG – Pathogen Biology & Genetics
BAR-CP – Barley Coordinated Project
HWW-CP – Hard Winter Wheat Coordinated Project
VDHR – Variety Development & Uniform Nurseries – Sub categories are below:
 SPR – Spring Wheat Region
 NWW – Northern Winter Wheat Region
 SWW – Southern Sinter Wheat Region

Project 1: *Diagnostic Services for DON.*

1. What major problem or issue is being resolved relevant to Fusarium head blight (scab) and how are you resolving it?

Our laboratory provided deoxynivalenol (DON) and related mycotoxin diagnostic services for Fusarium Head Blight (Scab) research projects conducted by 36 PIs in 16 states last year. The major issue that we dealt with was how to efficiently handle huge amounts of samples submitted by so many groups and ensure researchers to get their results in a timely manner. In general, we analyzed samples based on a first come, first served policy. In case we received large amounts of samples from a single group or received several submissions from different groups around same time, we contacted PI(s) about their desired dates of having DON results for each set of their samples and adjusted sample analysis schedules to make sure that each PI could receive their results in a reasonable time frame. By doing so, we were able to provide DON results to PIs within their desired dates.

2. List the most important accomplishment and its impact (i.e. how is it being used) to minimize the threat of Fusarium head blight or to reduce mycotoxins. Complete both sections (repeat sections for each major accomplishment):

Accomplishment:

From May 2008 to April 2009, the Mycotoxin Diagnostic Laboratory at the University of Minnesota analyzed 28,779 samples, which was about the same as the number of samples analyzed last year (29,217), but was 18.7% (6607) less than the estimate (35,386) presented in the proposal (Table 1) due to sample re-allocation by USWBSI and sample adjustments by PIs. The samples were submitted by 36 scab research groups from 16 states including Arkansas, Georgia, Idaho, Illinois, Indiana, Kansas, Kentucky, Maryland, Michigan, Minnesota, Missouri, New York, North Carolina, North Dakota, Ohio, and South Dakota. They included 18,718 regular mature grain samples (6-100 g) and 10,061 small size samples such as grain samples less than 6 g, single kernels, single spikeletes, single heads, small stems, and fungal cultures extracts. The target toxins included DON, 15-Acetyl-DON, 3-Acetyl-DON, nivalenol and zearalenone. Ergosterol, a chemical marker for measuring fungal biomass, was also analyzed for some samples as requested by researchers.

Impact:

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 and economical chemical and biological disease controls. Mycotoxin data provided to scab researchers by our laboratory gave researchers a means to evaluate the effectiveness of their efforts in fighting Fusarium Head Blight.

Table 1. Summary of 2008 DON Samples

PI	Number of Samples			Institution
	Analyzed	Estimated	Difference	
Anne Mckendry	252	0	252	University of Missouri
Brian Steffenson	1293	2000	-707	University of Minnesota
Carl Bradley	526	850	-324	University of Illinois at Urbana Champaign
Char Hollingsworth	2053	2500	-447	University of Minnesota
Clay Sneller	876	150	726	Ohio State University
Corby Kistler	1688	1200	488	University of Minnesota
David Schisler	96	0	96	USDA-ARS, Peorial
David Van Sanford	2374	2500	-126	University of Kentucky
Diane Brown-Rytlewski	157	0	157	Michigan State University
Don Hershman	160	175	-15	University of Kentucky
Elias Elias	500	0	500	North Dakota State University
Floyd Dowell	351	0	351	USDA-ARS, KS
Frances Trail	4	0	4	Michigan State University
Frederic Kolb	1163	1700	-537	University of Illinois at Urbana Champaign
Gary Bergstrom	28	528	-500	Cornell University
Gary Muehlbauer	240	300	-60	University of Minnesota
Gene Milus	2059	1728	331	University of Arkansas
Guihua Bai	518	800	-282	USDA-ARS, Kansas State university
Herbert Ohm	450	650	-200	Purdue University
Janet Lewis	1387	1200	187	Michigan State University
Jerry Johnson	165	0	165	University of Georgia
Jim Anderson	358	1000	-642	University of Minnesota
Jinrong Xu	163	700	-537	Purdue University
Jose Costa	755	0	755	University of Maryland
Juliet Windes	31	0	31	University of Idaho
Kevin Smith	2223	4000	-1777	University of Minnesota
Kiesten Wise	76	0	76	Purdue University
Mark Sorells	236	200	36	Cornell University
Mohamed Mergoum	996	0	996	North Dakota State University
Paul Murphy	158	300	-142	North Carolina State University
Paul Schwarz	12	0	12	North Dakota State University
Pierce Paul	2533	1000	1533	Ohio State University
Ruth Dill-Macky	4298	3868	430	University of Minnesota
Willie Kirk	139	300	-161	Michigan State University
Xiwen Cai	292	0	292	North Dakota State University
Yang Yen	169	2500	-2331	South Dakota State University
Arvydas Graybauskas	0	300	-300	University of Maryland
Carl Griffey	0	406	-406	Verginia Polytechnic Institute and State Univ
Christina Cowger	0	3000	-3000	USDA-ARS, North Carolina State University
Jianli Chen	0	500	-500	University of Idaho
Jochum Wiersma	0	200	-200	University of Minnesota
Jyoti Shah	0	40	-40	University of North Texas
Stephen Harrison	0	791	-791	Louisiana State University
Total	28779	35386	-6607	

Include below a list of the publications, presentations, peer-reviewed articles, and non-peer reviewed articles written about your work that resulted from all of the projects included in the grant. Please reference each item using an accepted journal format. If you need more space, continue the list on the next page.

Menke, J. R.; Dong, Y.; Kistler, H. C. “Comparative Gene Expression Analysis of *Fusarium graminearum* in *Triticum aestivum* and *Oryza sativa* spp. Japonica.” *Proceedings of the 2008 National Fusarium Head Blight Forum*, **2008**, 88.

Agostinelli, A.; Clark, A.; Brown-Guedira, G.; Dong, Y.; Van Sanford, D. A. “Genotypic and Phenotypic Selection for Head Scab Resistance in Wheat.” *Proceedings of the 2008 National Fusarium Head Blight Forum*, **2008**, 129.

Beaubien, K. A.; Dill-Macky, R.; Dong, Y.; Steffenson, B. J.; Smith, K. P. “Characterizing Barley Near-isogenic Lines for a DON QTL on Chromosome 3H.” *Proceedings of the 2008 National Fusarium Head Blight Forum*, **2008**, 134.

Beaubien, K. A.; Dill-Macky, R.; Dong, Y.; Roy, J. K.; Steffenson, B. J.; Smith, K. P. “Investigating Host Variation for DON Accumulation in Wild Barley” *Proceedings of the 2008 National Fusarium Head Blight Forum*, **2008**, 137.

Deb, Mahua.; Lindell, J.; Kong, L.; Dong, Y.; Ohm, H. “Deoxynivalenol (DON) Accumulation in Eight Wheat Lines with Various Fusarium Head Blight Resistance Genes.” *Proceedings of the 2008 National Fusarium Head Blight Forum*, **2008**, 158.

Peiris, K. H. S.; Pumphrey, M. O.; Dong, Y.; Wegulo, S.; Berzonsky, W.; Baenziger, P. S.; Dowell, F. E. “Progress on Development and Application of Single Kernel NIR Sorting Technology for Assessment of FHB Resistance in Wheat Germplasm.” *Proceedings of the 2008 National Fusarium Head Blight Forum*, **2008**, 192.

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PI: Dong, Yanhong

USDA-ARS Agreement #: 59-0790-4-129

If your FY08 USDA-ARS Grant contained a VDHR-related project, include below a list all germplasm or cultivars released with full or partial support of the USWBSI. List the release notice or publication. Briefly describe the level of FHB resistance. If this is not applicable (i.e. no VDHR-related project) to your FY08 grant, please insert ‘Not Applicable’ below.

Not Applicable.

PI: Dong, Yanhong

Project: Diagnostic Services for DON.

**FY08 FPR – USWBSI ADDENDUM
DON Service Labs – Quality Control Data**

Insert below Quality Control Data/Results from the FY08 Award Period (May 08-May 09):

	Wheat			Barley
	Check 1	Check 2	Check 3	Check
N^a	198	519	148	73
Mean (ppm)	5.54	6.47	19.41	12.49
SD^b	0.90	1.09	2.23	1.26
% CV^c	16.2	16.8	11.5	10.1

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