USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY13 Final Performance Report
July 15, 2014

Cover Page

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Fiscal Year:	FY13
USDA-ARS Agreement ID:	59-0206-9-074
USDA-ARS Agreement Title:	Diagnostic Services for DON.
FY13 USDA-ARS Award Amount:	$ 210,548

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
FSTU-S	Diagnostic Services for DON.	$ 210,548
	FY13 Total ARS Award Amount	**$ 210,548**

Yanhong Dong 7/11/14
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
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 major problem or issue is being resolved relevant to Fusarium head blight (scab) and how are you resolving it?**

   Our laboratory provides deoxynivalenol (DON) and related mycotoxin diagnostic services for Fusarium Head Blight (Scab) research projects. From May 2013 to May 2014, we received samples from 34 scab research groups in 19 states. 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 receive 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 the 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 accomplishments and their impact (i.e. how are they 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 2013 to May 2014, our Laboratory analyzed 29,785 samples (**Table 1**), which was very close to the estimated number (29,848) presented in the proposal. For the past seven years, the demands for DON analyses has been very constant for our lab, which was in a range of 29,000 ~ 30,000. For this year, the samples were submitted by 34 scab research groups from 19 states, including Arkansas, Georgia, Idaho, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maryland, Michigan, Minnesota, Missouri, New York, North Carolina, North Dakota, Ohio, South Dakota, Tennessee, and Wisconsin. The samples included 24,953 regular mature grain samples (6-100 g) and 4,832 small size samples such as grain samples less than 6 g, single kernels, single spikeletes, single heads, wheat straw, and fungal cultures extracts. The target toxins included DON, 15-Acetyl-DON, 3-Acetyl-DON, and nivalenol. Zearalenone was analyzed for the samples from Dr. Carl Bradley's project with an approval from the Executive committee.

   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 2013/2014 samples				
PI	**Number of samples**			**Institution**
	Analyzed	**Estimated**	**Difference**	
Anne McKendry	468	1500	-1032	university of Missouri
Arvydas Grybauskas	0	250	-250	University of Maryland
Barton Fogleman	0	200	-200	Syngenta, Bay, AR
Brian Steffenson	3174	2000	1174	University of Minnesota
Carl Bradley	2229	1300	929	University of Illinois at Urbana Champaign
Clay Sneller	357	550	-193	Ohio State University
Corby Kistler	1954	1000	954	University of Minnesota
Christina Cowger	496	0	496	USDA-ARS, NC
David Schisler	0	120	-120	USDA-ARS, Peoria, IL
David Van Sanford	2659	2500	159	University of Kentucky
Don Hershman	94	144	-50	University of Kentucky
Elias Elias	400	600	-200	North Dakota State University
Eugene Milus	1285	1264	21	University of Arkansas
Floyd Dowell	73	0	73	USDA-ARS, KS
Frances Trail	78	50	28	Michigan State University
Frederic Kolb	2358	2000	358	University of Illinois at Urbana Champaign
Gary Bergstrom	508	0	508	Cornell University
Gary Muehlbauer	920	100	820	University of Minnesota
Guihua Bai	127	1000	-873	USDA-ARS, KS
Herbert Ohm	257	1000	-743	Purdue University
Heather Young	14	0	14	University of Tennessee
James Pestka	0	20	-20	Michigan State University
Jerry Johnson	154	200	-46	University of Georgia
Jim Anderson	1728	1000	728	University of Minnesota
Jinrong Xu	0	300	-300	Purdue University
Jochum Wiersma/Madeleine Smith	96	200	-104	University of Minnesota
Jose Costa	338	2400	-2062	University of Maryland
Juliet Marshall	52	0	52	University of Idaho
Jyoti Shah	0	150	-150	University of North Texas
Kevin Smith	1933	2800	-867	University of Minnesota
Kiesten Wise	208	450	-242	Purdue University
Mark Sorrells	436	679	-243	Cornell University
Mohamed Mergoum	982	1000	-18	North Dakota State University
Shawn Conley/Paul Esker	144	250	-106	University of Wisconsin
Paul Murphy	1533	1300	233	North Carolina State University
Pierce Paul	2793	900	1893	Ohio State University
Eric olson/Janet Lewis	956	841	115	Michigan State University
Ruth Dill-Macky	654	1080	-426	University of Minnesota
Stephen Harrison	180	200	-20	Louisiana State University
Sue Candy	27	0	27	QA samples
William Berzonsky	120	0	120	South Dakota State University
Willie Kirk	0	500	-500	Michigan State University
Total	**29785**	**29848**	**-63**	

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 FY13 grant. Please reference each item using an accepted journal format. If you need more space, continue the list on the next page.

1. Bemardo, A.; Bai, G.H.; Yu, J.; Kolb, F.; Bockus, W.; Dong, Y. "Registration of near-isogenic winter wheat germplasm contrasting in Fhb1 for Fusarium heat blight resistant" *Journal of Plant Registrations*, **2014**, 8(1), 106-108.
2. Clark, A.J.; Costa, J.M.; Griffey, C.A.; Brown-Guedira, G.L.; Dong, Y.; Souza, E.J.; Murphy, J.P; Van Sanford, D.A. "Registration of Scab-Resistant KY06C-11-3-10 Soft Red Winter Wheat Germplasm" *Journal of Plant Registrations,* **2014**, 8(2), 211-216.
3. Peiris, K.H.S; Dong, Y**.**; Bockus, W.W.; Dowell, F.E. "Single-Kernel NIR Analysi for Evaluatin Wheat Samples for Fusarium Head Blight Resistance" *Cereal Chemistry*, **2014**, 91 (1), 35-40.
4. Spolti, P.; Del Ponte, E.M.; Cummings,J.A.; Dong, Y.; Bergstrom, G.C. "Fitness Attributes of *Fusarium Graminearum* Isolates from Wheat in New York Possessing a 3-ADON or 15-ADON Trichothecene Genotype" Phytopathology, **2014,** 104(5), 513-519.
5. Spolti, P.; Del Ponte, E.M.; Dong, Y.; Cummings,J.A.; Bergstrom, G.C. "Triazole Sensitivity in a Contemporary Population of *Fusarium Graminearum* from New York Wheat and Competitiveness of a Tebuconazole-Resistant Isolate" Plant Disease, **2014,** 98 (5), 607-613.
6. Jin, F.; Bai, G.H.; Zhang, D.D.; Dong, Y.; Ma, L.J.; Bockus, W.; Dowell, F. "*Fusarium* Damaged Kernels and Deoxynivalenol in Fusarium Infected U.S. Winter Wheat" *Phytopathology*, **2013,** 104(5), 472-478.
7. Conway, B.; Murphy, J.P.; Brown-Guedira, G.; Dong, D.; Chao, S.; Griffey, C. and Costa, J. 2013. "Mapping wheat Fusarium Head Bligh resistance QTL in the MD01W233-06-1/SS8641 doubled haploid mapping population" In: Canty, S.; Clark, A.; Salat, Y. and Van Sanford, D. (Eds.), *Proceedings of the 2013 National Fusarium Head Blight Forum* (pp. 14). East Lansing, MI/Lexington, KY: U.S. Wheat & Barley Scab Initiative.
8. Pun, M.; Dong, Y. and Milus, E.A. 2013. "Effects of late-season rain/simulated rain and grain drying on selection for low DON concentration in wheat grain" In: Canty, S.; Clark, A.; Salat, Y. and Van Sanford, D. (Eds.), *Proceedings of the 2013 National Fusarium Head Blight Forum* (pp. 40). East Lansing, MI/Lexington, KY: U.S. Wheat & Barley Scab Initiative.
9. Bissonnette, K.M.; Ames, K.A.; Kolb, F.L.; Dong, Y. and Bradley, C.A. 2013. "Effect of cultivar and fungicide on *Fusarium* mycotoxins in wheat straw" In: Canty, S.; Clark, A.; Salat, Y. and Van Sanford, D. (Eds.), *Proceedings of the 2013 National Fusarium Head Blight Forum* (pp. 95). East Lansing, MI/Lexington, KY: U.S. Wheat & Barley Scab Initiative.
10. Peiris, K.H.S; Dong, Y**.**; Bockus, W.W.; Dowell, F.E. 2013 "Estimation of bulk DON content of small grain samples for comprehensive evaluation of Fusarium head blight resistance in wheat" *American Society of Agricultural and Biological Engineers Annual Interntional Meeting,* **2013**, 2:1215-1224.
11. Peiris, K.H.S; Dong, Y**.**; Bockus, W.W.; Dowell, F.E. 2013 "Estimation of bulk deoxynivalenol and moisture content of wheat grain samples by FT-NIR spectroscopy" *American Society of Agricultural and Biological Engineers Annual Interntional Meeting,* **2013**, 2:1244-1251.

PI: Dong, Yanhong
Project: Diagnostic Services for DON.

FY13 FPR – USWBSI ADDENDUM
DON Service Labs – Quality Control Data

Insert below Quality Control Data/Results from the FY13 Award Period (approx. May 2013-May 2014):

	Check 1	Check 2
N[a]	648	399
Mean (ppm)	10.01	14.50
SD[b]	1.48	1.88
% CV[c]	14.8	13.0

[a]Number of check samples. [b]Standard deviation. [c]Coefficient of variance