USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY12 Final Performance Report
July 16, 2013

Cover Page

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Fiscal Year:	FY12
USDA-ARS Agreement ID:	59-0206-2-082
USDA-ARS Agreement Title:	Diagnostic Testing Services for Deoxynivalenol in the Eastern U.S.
FY12 USDA-ARS Award Amount:	$ 64,523*

USWBSI Individual Project(s)

USWBSI Research Category**	Project Title	ARS Award Amount
FSTU-S	Diagnostic Testing Services for Deoxynivalenol in the Eastern United States.	$ 64,523
	Total ARS Award Amount	**$ 64,523**

Principal Investigator Date

* Award Amount does not include additional funding awarded in September of 2012 earmarked for other PIs at same institution

** 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 Testing Services for Deoxynivalenol in the Eastern United States.*

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

   Demand continues for USWBSI diagnostic testing services for mycotoxins across the United States. DON testing services are vital to the development of new varieties of wheat and barley with reduced mycotoxin potential and are necessary to identify and/or exclude appropriate strategies for managing FHB. FY12 DON testing services at Virginia Tech provided analytical services necessary to develop new cultivars of wheat and barley with reduced potential for DON contamination and to improve chemical and cultural practices necessary to reduce DON contamination in wheat and barley.

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:
   In FY12, DON data was delivered for 4,557 wheat and barley samples from five USWBSI investigators and stakeholders (Griffey, Grybauskas, Rideout, Laskar, and Schmale) in five states (Virginia, Maryland, and Indiana). This number does not include controls, checks, and re-runs. Most of the samples tested in FY12 were 100g kernel lots from FHB field trials, but some were smaller lots (~5g samples) from greenhouse and laboratory experiments. We also processed samples associated with ethanol co-products from ethanol plants across the U.S. Extraction, clean-up, and quantification of DON were conducted following standard protocols using a GC/MS. DON testing services were coordinated, supported, and managed by a talented research associate (Niki McMaster). The Schmale Lab at Virginia Tech continues to be committed to the long-term management of a successful and productive mycotoxin testing lab for the USWBSI.

   Impact:
   The goals of this work were to provide analytical services necessary to develop new cultivars of wheat and barley with reduced potential for DON contamination and to facilitate DON testing that will improve chemical and cultural practices necessary to reduce DON contamination in wheat and barley. This work directly addresses Goal #1 of the Action Plan to 'Provide analytical support for DON/trichothecene quantitation for Initiative's stakeholders'. We are providing DON testing services for wheat and barley samples from USWBSI investigators. Schmale routinely interacts with stakeholders in the mid-Atlantic to discuss new diagnostic technologies for DON and related management strategies for FHB, an effort aligned with Goal #2 of the Action Plan to 'Provide requisite information on DON/ trichothecene safety issues to producers, millers, researchers, risk assessors and regulators'.

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.

Liu, S., Griffey, C.A., Hall, M.D., McKendry, A.L., Chen, J.L., Brooks, W.S., Brown-Guedira, G., Van Sanford, D., and Schmale, D.G. 2013. Molecular characterization of field resistance to Fusarium head blight in two US soft red winter wheat cultivars. Theoretical and Applied Genetics. Online July 2013.

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FY12 FPR – USWBSI ADDENDUM
DON Service Labs – Quality Control Data

Insert below Quality Control Data/Results from the FY12 Award Period (May 2012-May 2013):

Quality control data was collected at Virginia Tech through (1) the blind testing of samples with unknown DON levels (coordinated by the USWBSI through Trilogy Analytical Laboratories), and (2) the testing of subsamples of grain lots from the Trilogy and Schmale Labs in each GC/MS run (to test for consistency among GC/MS runs). Known standards are run throughout the the GC/MS run to establish our standard curves.

a. QC data for blind testing of samples from Trilogy Labs (coordinated by Trilogy Labs, and communicated through Sue Canty; scabusa@scabusa.org). Lab ID 'Lab3' is the Virginia Tech lab (highlighted in grey). Lab IDs 1-4 are other USWBSI labs. Data are in ppm.

	Trilogy Sample	Trilogy Quant	Lab1	Lab2	Lab3	Lab4-1	Lab4-2
	Low	0.70	0.71	0.60	0.45	0.42	0.52
	High	6.20	6.51	5.20	3.65	3.66	4.38
Mar 2012	**Med**	3.50	3.44	2.70	1.97	2.32	2.72
	Low	0.50	0.50	0.50	0.53	0.49	0.47
	High	6.40	6.40	5.6	6.02	5.02	5.20
April 2012	**Med**	3.90	3.90	3.00	3.14	2.87	2.84
	Low	0.50	0.46	0.50	0.46	0.44	0.46
	High	6.40	5.51	5.70	6.16	4.59	4.77
Sept 2012	**Med**	3.50	2.49	2.90	3.29	2.59	2.81
	Low	1.40	0.86	1.10	1.17	1.07	1.15
	High	6.20	4.13	5.10	5.89	4.61	4.56
Oct 2012	**Med**	4.90	2.90	4.40	4.86	3.81	3.83
	Low	1.00	1.00	0.90	0.89	0.88	0.90
	High	6.40	5.80	4.90	6.00	4.66	4.69
Nov 2012	**Med**	4.00	3.10	2.40	2.80	2.46	2.70
	Low	0.90	1.40	0.80	0.73	0.78	0.78
	High	6.20	7.10	4.70	6.41	5.01	4.97
Dec 2012	**Med**	3.90	4.10	2.40	3.56	2.81	2.78
	Low	0.50	0.62	0.60	0.56	0.37	0.39
	High	6.40	6.44	5.80	5.20	4.04	4.44
Mar 2013	**Med**	3.50	3.79	3.10	3.02	2.12	2.25

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b. QC data from internal checks of subsamples of grain lots from the Trilogy (12-Nov-02) and Schmale Labs (VTWP1) in each GC/MS run (to test for consistency among GC/MS runs). The expected range for the 12-Nov-02 samples was 0.9 to 1.1. The expected range for the VTWP1 samples was 0.9 to 1.3.