

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

Cover Page

PI:	Paul Schwarz
Institution:	North Dakota State University
Address:	P.O. Box 5051 Fargo, ND 58105-5051
E-mail:	Paul.Schwarz@ndsu.edu
Phone:	701-231-7732
Fax:	701-231-7723 or 701-231-8474
Fiscal Year:	2008
USDA-ARS Agreement ID:	59-0790-4-122
USDA-ARS Agreement Title:	Malting Barley Deoxynivalenol Diagnostic Services.
FY08 USDA-ARS Award Amount:	\$ 146,459

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Adjusted Award Amount
FSTU	Malting Barley Deoxynivalenol Services.	\$146,459
	Total Award Amount	\$ 146,459

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: *Malting Barley Deoxynivalenol Services.*

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

Mycotoxin analyses are essential for most researchers working on FHB of cereals. However, in barley DON is a major economic factor, and new varieties must display increased resistance to DON accumulation as well as to FHB. Screening barley lines for DON is requisite for any breeding program intending to develop varieties for the upper Midwestern USA. DON analytical services are primarily provided to three barley varietal developmental programs. These breeding programs stated a need for the analysis of approximately 13,000 samples in FY08. Supporting research and extension work requires an additional 3,000 to 4,000 samples. In total, twelve collaborating scientists were served. The major issue is to provide DON analytical services in a cost effective, timely and accurate manner. Funds provided by the USWBSI have allowed us to hire additional personnel and to subsidize the cost of analysis.

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:

Approximately 16,000 samples (excluding standards) were analyzed from May 2008 to April 2009. These analyses were primarily from barley varietal development programs (n=12,997). Additional analysis were conducted for personnel involved in extension/crop production work (n= 1513) and for barley FHB research projects. Samples analyzed as part of the 2008 regional barley crop quality survey indicated that average levels of DON (0.40 mg/kg) were comparable to those seen in recent years, and were among the lowest observed since testing began in 1993. Periodic check samples (barley and malt) are analyzed by all USWBSI funded diagnostic laboratories as a means of quality assurance, to help assure that comparable results are obtained in each laboratory

Impact:

This project provides essential support to all barley breeding programs working on the development of FHB-resistant varieties for the Midwestern USA. The occurrence of FHB and DON is a primary factor in the dramatic decrease in barley acreage that has been observed over the past 15 years

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.

Publications

Delgado, J.A., Schwarz, P.B., Gillespie, J., Rivera-Varas, V., Secor, G.A. Presence and distribution of deoxynivalenol in potato tubers inoculated with *Fusarium graminearum*. *Phytopathology*, 98 (6): S45, 2008

Garbe, L.A., Schwarz, P.B. and Ehmer, A. Beer Gushing. Pages 185-212 in Beer. A Quality Perspective. C.W. Bamforth, ed. Academic Press, NY. 2009.

Presentations

Schwarz, P.B. . Food Safety in Brewing. Presented at the China-US Symposium on Barley Malt and Brewing. Jiangnan University, Wuxi China. April 28, 2009.

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: Schwarz, Paul

Project: Malting Barley Deoxynivalenol Services.

**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):

	6890		MS	5890		6890		MS	5890	
	Std HH	Std HH	Std HH	Std HH	Std HH	Std II	Std II	Std II	Std II	Std II
	Front	Back	MS	Front	Back	Front	Back	MS	Front	Back
n=detector	54	52	7	31	33	33	34	29	42	41
n=Std	177					179				
Avg=detector	3.84	4.17	4.26	4.45	3.96	21.65	24.61	24.19	23.92	23.78
Avg=Std	4.09					23.64				
STDEV=detector	0.58	0.41	1.26	0.53	0.44	3.51	4.12	3.37	4.13	4.01
STDEV=Std	0.58					3.96				
CV=detector	14.97	9.86	29.60	11.82	11.15	16.22	16.73	13.94	17.26	16.86
CV=Std	14.13					16.75				
Avg-STDEV	3.51					19.68				
Avg+STDEV	4.66					27.60				

	6890		MS	5890		6890		MS	5890	
	Std JJ	Std JJ	Std JJ	Std JJ	Std JJ	Std KK	Std KK	Std KK	Std KK	Std KK
	Front	Back	MS	Front	Back	Front	Back	MS	Front	Back
n=detector	42	44	24	46	46	45	45	31	50	49
n=Std	202					220				
Avg=detector	5.93	6.28	5.97	5.95	5.80	8.44	8.96	8.60	8.90	8.81
Avg=Std	5.99					8.75				
STDEV=detector	1.16	1.22	1.10	1.17	1.13	1.21	1.53	1.45	1.08	1.08
STDEV=Std	1.16					1.27				
CV=detector	19.55	19.45	18.34	19.64	19.51	14.39	17.09	16.86	12.14	12.32
CV=Std	19.41					14.50				
Avg-STDEV	4.83					7.49				
Avg+STDEV	7.15					10.02				

	6890		MS	5890		6890		MS	5890	
	Std LL	Std LL	Std LL	Std LL	Std LL	Std MM	Std MM	Std MM	Std MM	Std MM
	Front	Back	MS	Front	Back	Front	Back	MS	Front	Back
n=detector	44	43	31	30	30	44	45	32	36	33
n=Std	178					190				
Avg=detector	3.51	3.06	2.84	3.11	3.04	14.97	14.79	13.56	14.69	14.81
Avg=Std	3.14					14.61				
STDEV=detector	0.59	0.51	0.50	0.46	0.41	1.68	1.50	2.22	1.23	1.41
STDEV=Std	0.55					1.68				
CV=detector	16.90	16.56	17.59	14.83	13.49	11.26	10.15	16.39	8.35	9.55
CV=Std	17.57					11.51				
Avg-STDEV	2.58					12.93				
Avg+STDEV	3.69					16.29				