

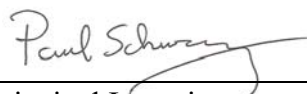
USDA-ARS
U.S. Wheat and Barley Scab Initiative
FY17 Preliminary Final Performance Report
Due date: July 31, 2018

Cover Page

Principle Investigator (PI):	Paul Schwarz
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Fiscal Year:	2017
USDA-ARS Agreement ID:	59-0206-4-015
USDA-ARS Agreement Title:	Evaluation of Barley and Malt for Don and Deoxinivalenol-3-Glucoside.
FY17 USDA-ARS Award Amount:	\$ 255,611
Recipient Organization:	North Dakota State University Office of Grant & Contract Accounting NDSU Dept 3130, PO Box 6050 Fargo, ND 58108-0650
DUNS Number:	80-388-2299
EIN:	45-6002439
Recipient Identifying Number or Account Number:	FAR0022048
Project/Grant Reporting Period:	5/5/17 - 5/4/18
Reporting Period End Date:	5/4/2018

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
FST	Evaluation of Barley and Malt for DON and Deoxynivalenol-3-Glucoside.	\$ 155,530
	FY17 Total ARS Award Amount	\$ 255,611



 Principal Investigator

July 31, 2018

 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: *Evaluation of Barley and Malt for DON and Deoxynivalenol-3-Glucoside.*

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

The goal of this project is to provide barley breeders, pathologists, and other researchers working on the development of *Fusarium* resistant barley, with affordable, accurate and timely DON analysis.

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

1) major activities

Approximately 12,600 samples were analyzed for DON during the reporting period (exclusive of checks=1656). Twenty-six researchers, in fifteen states were served. The majority of samples (8816) were submitted by three barley breeding programs (ND, ID, CO) and one barley pathology project (ND). A significant portion of samples (1500) were also analyzed for a new USWBSI project on use of nano-emulsions for *Fusarium* control.

2) specific objectives: none to report.

3) significant results: none to report

4) key outcomes or other achievements

- Rye samples from University of Minnesota trials (50) have been screened for DON. While it was previously believed that rye is less susceptible to FHB, our research has shown that FHB infected rye is very prone to the development of DON during malting. This is of interest as rye is gaining popularity in brewing and distilling.
- The objective of the Eastern Spring Barley Nursey (ESBN) is to evaluate malting barley varieties for production in eastern states. FHB can be a major obstacle to production in some regions. 325 samples from researchers in IN, OH, MI, ME, MA, VT, FL, PA, NY were tested for DON
- DON-3-glucoside is a detoxification product formed by the host and may be associated with resistance. 980 samples from a researcher in OH were analyzed for DON-3-G. We are currently the only USWBSI lab offering this service.

3. What opportunities for training and professional development has the project provided?

One undergraduate student, one graduate student and one post-doctoral researcher assist in the laboratory. Undergraduate students have learned basic laboratory skills, while graduate students have learned DON, DON-3-glucoside and other trichothecenes analysis and laboratory quality control. The post-doctoral researcher has been provided with opportunities

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to learn mycotoxin analysis by GC, GC-MS, LC-MS, some aspects of laboratory management and has also conducted independent research on FHB.

4. How have the results been disseminated to communities of interest?

Data is provided directly to collaborating scientists. Information on DON, DON-3-glucoside and other trichothecenes in barley, malt and beer has been disseminated by presentations at conferences and webinars.

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Training of Next Generation Scientists

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

If yes, how many? None

- 2. Did any graduate students in your research program supported by funding from your USWBSI grant earn their Ph.D. degree during the FY17 award period?**

If yes, how many? None

- 3. Have any post docs who worked for you during the FY17 award period and were supported by funding from your USWBSI grant taken faculty positions with universities?**

If yes, how many? None

- 4. Have any post docs who worked for you during the FY17 award period and were supported by funding from your USWBSI grant gone on to take positions with private ag-related companies or federal agencies?**

If yes, how many? None

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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 award period. All columns must be completed for each listed germplasm/cultivar. Use the key below the table for Grain Class abbreviations. *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-FPR_Instructions for detailed instructions for listing publications/presentations about your work that resulted from all of the projects included in the FY17 grant. Only include citations for publications submitted or presentations given during your award period (5/5/17 - 5/4/18). If you did not have any publications or presentations, state 'Nothing to Report' directly above the Journal publications section.

NOTE: Directly below each reference/citation, you must indicate the Status (i.e. published, submitted, etc.) and whether acknowledgement of Federal support was indicated in publication/presentation.

Journal publications.

Jin, Z., Zhou, B., Gillespie, J., Gross, T., Barr, J., Simsek, S., Brueggeman, R., and Schwarz, P.
Production of deoxynivalenol (DON) and DON-3-glucoside during the malting of
Fusarium infected hard red spring wheat. Food Control 85: 6-10, 2018.

Status: Published

Acknowledgement of Federal Support: YES.

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

Other publications, conference papers and presentations.

Tang R. L., Jin Z., Gillespie J., Barr J., Gross T., Cummings J., Wiesma J., Bergstrom G.,
Brueggeman R., and Schwarz P. B. 2017. Growth of *Fusarium graminearum* and
production of deoxynivalenol during the malting of winter rye and triticale. US wheat and
barley scab initiative annual forum. Milwaukee, WI. December 2018.

Status: Poster Presented

Acknowledgement of Federal Support: YES.

Jin Z., Gillespie J., Barr J., Horsley R. D., Sorrels M., Wiersma J., Zwinger S., and Schwarz P.
B. 2017. Malting quality of Fusarium Head Blight Infected Rye (*Secale cereale*). In US
wheat and barley scab initiative annual forum. Milwaukee, WI. December 2018.

Status: Poster Presented

Acknowledgement of Federal Support: YES.

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Schwarz P. B. 2018. Science meets practice: A joint effort to fight against mycotoxins – Is it possible and what are the critical steps. In European Commission MycoKey Technological Workshop. Helsinki, Finland. May 2018.

Status: Panel Discussion.

Acknowledgement of Federal Support: YES.