

USDA-ARS
U.S. Wheat and Barley Scab Initiative
FY19 Performance Report
Due date: July 24, 2020

Cover Page

Principle Investigator (PI):	Alyssa Collins
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Fiscal Year:	2019
USDA-ARS Agreement ID:	59-0206-9-122
USDA-ARS Agreement Title:	Reducing Scab and Vomitoxin in Malting Barley in the Mid-Atlantic
FY19 USDA-ARS Award Amount:	\$ 15,822
Recipient Organization:	The Pennsylvania State University Research Accounting 227 W Beaver Ave, Ste 401 State College, PA 16801-4819
DUNS Number:	00-340-3953
EIN:	24-6000376
Recipient Identifying Number or Account Number:	204828
Project/Grant Reporting Period:	6/1/19 - 5/31/20
Reporting Period End Date:	5/31/2020

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
MGMT	Reducing Scab and Vomitoxin in Malting Barley in the Mid-Atlantic	\$ 15,822
FY19 Total ARS Award Amount		\$ 15,822

Principal Investigator

7/24/20

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

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Project 1: *Reducing Scab and Vomitoxin in Malting Barley in the Mid-Atlantic*

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

The objectives of this project are to:

1. Determine the efficacy of a new fungicide for malting barley disease management
2. Understand optimal fungicide application timing for barley disease management
3. Evaluate the interaction of available chemistries, application timings, and genetic resistance
4. Educate growers and processors on best management practices for production of high quality malting barley

2. What was accomplished under these goals or objectives? *(For each major goal/objective, address items a-b) below.)*

a) What were the major activities?

Malting barley integrated management trials were established in two production regions of Pennsylvania (the Penn State Southeast Agricultural Research & Extension Center in the south and Russell E. Larson Agricultural Research Center in the central region).

In support of objective (1), the novel fungicide product, Miravis Ace®, was a focus of treatment design. The efficacy of this newer product was compared to a current industry standard, Prostar®, which has been among the products recommended for scab control by the USWBSI for several years. For objectives (2 & 3), we evaluated Miravis Ace at two concentrations, two application timings, and on three mid-Atlantic adapted malting barley varieties ranging susceptible to moderately FHB resistant.

Objective (4) has been supported by our work as part of the Penn State Agronomy Extension Team in delivering education focused on quality malting barley production for growers as well as maltsters and brewers/distillers.

b) What were the significant results?

The trials at both locations were successfully planted and recently harvested. Due to Penn State laboratory closures in response to COVID-19 state-wide shutdowns, we were unable to produce and apply inoculum to the plots at each location. Natural inoculum has not been limiting in previous years, and we anticipate some level of infection was achieved.

Samples have been pre-processed and limited control treatment samples will now be sent to the NDSU Barley DON laboratory to determine if enough DON developed at each site to warrant DON analysis of every plot. This is to avoid occupying more laboratory capacity than is needed at this time of limited resources. If sufficient DON is found in control samples, the remainder will be shipped for analysis.

c) List key outcomes or other achievements.

- Successful establishment of multiple field trials.
- Successful contribution of data from Pennsylvania in the national database on integrated management of FHB.
- Proactive extension programming on FHB and important risk factors and management geared specifically toward improving malting barley quality in the mid-Atlantic.

3. Was this research impacted by the COVID-19 pandemic (i.e. university shutdowns, reduced or lack of support personnel, etc.)? If yes, please explain how this research was impacted or is continuing to be impacted.

Because of restricted access to lab spaces on campus, the inoculum that was planned for application at both sites was not able to be produced. This, paired with a dry heading and ripening period, may mean that we were not able to achieve the level of disease pressure to allow for a meaningful test of the chemistries, timings, and varieties in 2020.

In addition, a planned in-person small grains field day focused on specialty grains including barley for malting, was cancelled this year due to the pandemic.

Impacts may continue as a result of limited access to lab and field spaces since policies regarding these are fluid. Reduced staffing may also introduce some delays with sample and data processing.

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

Two undergraduate student interns have participated in establishment of the research plots as well as evaluation and harvesting. At least one of these students is planning a career as an agriculture educator.

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

For the period 2019-2020, PI Collins presented FHB-related information in seven meetings to 315 participants in Pennsylvania and the eastern region. This included a series of craft beverage workshops led by members of the Penn State Field and Forage Crops Team in which growers, crop consultants, maltsters, brewers, and distillers were engaged to discuss ways to improve the market supply chain. These workshops facilitated interactions among all members of the industry and generated new knowledge among participants regarding ways to produce a better feedstock and ways to work with farmers that respect the challenges of growing barley in the mid-Atlantic. Collins and Extension colleagues were also invited to

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present at the 2020 Philadelphia Grain and Malt Symposium for approximately 70 farmers, maltsters, millers, brewers, distillers, bakers, chefs, distributors, retailers, and consumers (see publications).

Collins wrote three updates for the Fusarium Head Blight Prediction Center and contributed to the annual USWBSI-produced national scab summary article. Additionally, Co-PIs wrote an article for our Field Crop News publication for the Field and Forage Crops Team of Penn State Extension (see publications).

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Training of Next Generation Scientists

Instructions: Please answer the following questions as it pertains to the FY19 award period (6/1/19 - 5/31/20). 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 FY19 award period?** no

If yes, how many?

2. **Did any graduate students in your research program supported by funding from your USWBSI grant earn their Ph.D. degree during the FY19 award period?** no

If yes, how many?

3. **Have any post docs who worked for you during the FY19 award period and were supported by funding from your USWBSI grant taken faculty positions with universities?** no

If yes, how many?

4. **Have any post docs who worked for you during the FY19 award period and were supported by funding from your USWBSI grant gone on to take positions with private ag-related companies or federal agencies?** no

If yes, how many?

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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 FY19 award period. All columns must be completed for each listed germplasm/cultivar. Use the key below the table for Grain Class abbreviations.

NOTE: 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 FY19-FPR_Instructions for detailed more instructions for listing publications/presentations about your work that resulted from all of the projects included in the FY19 grant award. Only citations for publications published (submitted or accepted) or presentations presented during the **award period (6/1/19 - 5/31/20)** should be included. If you did not publish/submit or present anything, state ‘Nothing to Report’ directly above the Journal publications section.

NOTE: Directly below each citation, you **must** indicate the Status (i.e. published, submitted, etc.) and whether acknowledgement of Federal support was indicated in the publication/presentation. See example below for a poster presentation with an abstract:

De Wolf, E., D. Shah, P. Paul, L. Madden, S. Crawford, D. Hane, S. Canty, R. Dill-Macky, D. Van Sanford, K. Imhoff and D. Miller. 2019. “Impact of Prediction Tools for Fusarium Head Blight in the US, 2009-2019.” In: S. Canty, A. Hoffstetter, H. Campbell and R. Dill-Macky (Eds.), *Proceedings of the 2019 National Fusarium Head Blight Forum*, Milwaukee, WI; December 8-10. University of Kentucky, Lexington, KY. p. 12.
Status: Abstract Published and Poster Presented
Acknowledgement of Federal Support: YES (Abstract and Poster)

Journal publications.

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

Other publications, conference papers and presentations.

Collins, A., K. Borrelli, A. Murillo-Williams. 2020. “What Farmers Want You to Know.” Philadelphia Grain and Malt Symposium. Philadelphia, PA; March 2.

Status: Presentation delivered

Acknowledgement of Federal Support: YES

Collins, A., and P.D. Esker. 2020. Preparing to manage barley diseases. Field Crop News – Penn State Extension. <https://extension.psu.edu/preparing-to-manage-barley-disease>.

Duffeck, M., A.Y. Bandara, D.K. Weerasooriya, T.S. McFeaters, A.A. Collins, E.M. Del Ponte, and P.D. Esker. 2019. “Comparative aggressiveness of *Fusarium graminearum* isolates causing Fusarium head blight in Pennsylvania.” In S. Canty, A. Hoffstetter, H. Campbell

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and R. Dill-Mackey (Eds.), *Proceedings of the 2019 National Fusarium Head Blight Forum* (p. 65), Milwaukee, WI; December 8-10. University of Kentucky, Lexington, KY.

Status: Abstract Published and Poster Presented

Acknowledgement of Federal Support: YES

Duffeck, M., T.S. McFeaters, A.Y. Bandara, D.K. Weerasooriya, E.M. Del Ponte, and P.D.

Esker. 2019. "Sensitivity of *Fusarium graminearum* isolates causing wheat scab in Pennsylvania to triazole fungicides." In S. Canty, A. Hoffstetter, H. Campbell and R. Dill-Mackey (Eds.), *Proceedings of the 2019 National Fusarium Head Blight Forum* (p. 13), Milwaukee, WI; December 8-10. University of Kentucky, Lexington, KY.

Status: Abstract Published and Poster Presented

Acknowledgement of Federal Support: YES

Duffeck, M., A.Y. Bandara, D.K. Weerasooriya, E.M. Del Ponte, and P. Esker. 2019. Impact of crop rotation on genetic diversity of Fusarium isolates causing Fusarium head blight in Pennsylvania. *Phytopathology* S2.31.

Status: Abstract Published and Poster Presented

Acknowledgement of Federal Support: YES

Esker, P.D., A. Murillo-Williams, A. Collins, K. Borrelli, M. Antle, and M. Duffeck. 2020.

Multifaceted approaches to management Fusarium head blight in small grains in PA. *Field Crop News – Penn State Extension*. <https://extension.psu.edu/multifaceted-approaches-to-managing-fusarium-head-blight-in-small-grains-in-pa>.

Status: Published

Acknowledgement of Federal Support: YES