USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY19 Final Performance Progress Report
Due date: August 31, 2021

Cover Page

Principle Investigator (PI):	Paul Esker
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Fiscal Year:	2019
USDA-ARS Agreement ID:	59-0206-8-210
USDA-ARS Agreement Title:	Integrated Management of Fusarium Head Blight in Wheat in Pennsylvania
FY19 USDA-ARS Award Amount:	$ 24,945
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:	000203336
Project/Grant Reporting Period:	7/1/19 - 6/30/21
Reporting Period End Date:	6/30/2021

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
MGMT	Integrated Management of Fusarium Head Blight in Wheat in Pennsylvania	$ 24,945
	FY19 Total ARS Award Amount	**$ 24,945**

Paul Esker

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Date: 2021.08.29 14:31:18 -04'00'

Principal Investigator Date

* MGMT – FHB Management
FST – Food Safety & Toxicology
R – Research
S – Service (DON Testing Lab)
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: *Integrated Management of Fusarium Head Blight in Wheat in Pennsylvania*

1. **What are the major goals and objectives of the research project?**
   The goals of this project were to (1) develop integrated management strategies for FHB and mycotoxins that are robust to conditions experienced in production fields of wheat and barley; (2) help develop and validate the next generation of management and mitigation tools for FHB and mycotoxin control; and (3) enhance communication and end user education/outreach.

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

   a) What were the major activities?
   Two integrated management trials were established at the Russell E. Larson Agricultural Research Center (RELARC) and the Southeast Agricultural Research and Extension (SEAREC). These are in Centre/Huntington Counties and Lancaster County, respectively. Trials were established following the recommended protocols, except for dropping the inoculation step for reasons of COVID-19 (explained further in the COVID-19 section). One uniform fungicide trial was established at RELARC, as COVID-19 impacted the ability to maintain a second location.

   Information from the trials, along with previous trials were incorporated into various talks about Fusarium head blight management. Also, several articles were written for *Field Crop News* from Penn State Extension and shared via Twitter to help guide stakeholders through the decision-making process during flowering periods.

   b) What were the significant results?
   Trial data from the integrated management trials suggested that fungicide treatments were effective for reducing the impact of FHB from natural infection. FHB incidence was reduced by 40-70%. Despite FHB severity being low, there was still a reduction with the application of fungicide made around flowering. Yield was higher in plots which received a flowering application of fungicides. We also noted that there was an increase in wheat leaf rust, which contributed to observed yield differences. Data were also contributed to the national coordinated project database.

   c) List key outcomes or other achievements.
   A major outcome was just being able to complete the 2019-2020 trials given the timing of the trials in relation to the start of the COVID-19 pandemic. Data were valuable from the trials since they were from naturally infected fields only. Another major accomplishment was the ability to use summary information from 2018-2019 and 2019-2020 trials for a recorded talk, which was used at seven meetings and 400 participants during Winter 2020. This was a surprising result given the pandemic and the uncertainty in how our extension programming would be delivered.

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

This project was impact for the 2019-2020 growing season by COVID-19. Specifically, the University was shut for normal operations starting from March 2020. The impact modified our field research program. Specifically, we had to drop the idea of inoculating plots given the lack of staff support being able to access the laboratory. We also had to modify our data collection given limited staff being available to work in the field. Given staffing issues, we also were unable to run a uniform fungicide trial at the SEAREC location.

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

Nothing to report

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

Results were disseminated through one in-person talk with 75 participants and three virtual talks with 276 participants/engagements. Furthermore, five *Field Crop News* (Penn State Extension) articles were written focused on Fusarium scab blight and our research efforts. The Field Crop News is digitally shared with over 10,000 persons. Articles published are often then picked up by other farm print media, further extending their reach.

Training of Next Generation Scientists

Instructions: Please answer the following questions as it pertains to the **FY19 award period (7/1/19 - 6/30/21)**. 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?**
   ☐Yes ☒No ☐ Not Applicable
   If yes, how many? Click to enter number here.

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?**
   ☐Yes ☒No ☐ Not Applicable
   If yes, how many? Click to enter number here.

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?**
   ☐Yes ☒No ☐ Not Applicable
   If yes, how many? Click to enter number here.

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?**
   ☐Yes ☒No ☐ Not Applicable
   If yes, how many? Click to enter number here.

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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 (7/1/19 - 6/30/21)**. 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	FHB Rating (0-9)	Year Released
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year

NOTE: List the associated release notice or publication under the appropriate sub-section in the 'Publications' section of the FPR.

Publications, Conference Papers, and Presentations

Instructions: Refer to the 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 (7/1/19 - 6/30/21**) 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:

Z.J. Winn, R. Acharya, J. Lyerly, G. Brown-Guedira, C. Cowger, C. Griffey, J. Fitzgerald, R.E. Mason and J.P. Murphy. 2020. "Mapping of Fusarium Head Blight Resistance in NC13-20076 Soft Red Winter Wheat." In: S. Canty, A. Hoffstetter, and R. Dill-Macky (Eds.), *Proceedings of the 2020 National Fusarium Head Blight Forum (*p. 12.), Virtual; December 7-11. Online: https://scabusa.org/pdfs/NFHBF20_Proceedings.pdf.
Status: Abstract Published and Poster Presented
Acknowledgement of Federal Support: YES (Abstract and Poster)

Journal publications.

Nothing to report

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

Nothing to report

Other publications, conference papers and presentations.

J.M. Luis, P. Esker, et al., (29 authors). 2020. Fusarium head blight management coordinated project: Uniform fungicide trials 2018-2020. p. 44. In: Canty, S., A. Hoffstetter, and R. Dill-Macky (eds.), Proceedings of the 2020 National Fusarium Head Blight Forum (p.44). Virtual; December 7-11. Online: https://scabusa.org/pdfs/NFHBF20_Proceedings.pdf.
Status: Published
Acknowledgement of Federal Support: Yes

J.M. Luis, P. Esker, et al., (29 authors). 2020. Fusarium head blight management coordinated project: Integrated management trials 2018-2020. In: Canty, S., A. Hoffstetter, and R. Dill-Macky (eds.), Proceedings of the 2020 National Fusarium Head Blight Forum (p.38). Virtual; December 7-11. Online: https://scabusa.org/pdfs/NFHBF20_Proceedings.pdf.
Status: Published
Acknowledgement of Federal Support: Yes

P.D. Esker, 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

A. Collins, and **P.D. Esker**. 2020. Preparing for Fusarium head scab on small grains. Field Crop News – Penn State Extension. https://extension.psu.edu/preparing-for-fusarium-head-scab-on-small-grains.
Status: Published
Acknowledgement of Federal Support: No

P.D. Esker, A. Collins, and A. Murillo-Williams. 2020. Scouting small grains diseases for improved fungicide decision making. Field Crop News – Penn State Extension. https://extension.psu.edu/scouting-small-grains-diseases-for-improved-fungicide-decision-making.
Status: Published
Acknowledgement of Federal Support: No

A.A. Collins, P. Esker, and A. Murillo-Williams. 2019. Scouting and quantifying Fusarium head blight in small grains. Field Crop News - Penn State Extension. https://extension.psu.edu/scouting-and-quantifying-fusarium-head-blight-in-small-grains.
Status: Published
Acknowledgement of Federal Support: No

A. Murillo-Williams, P. Esker, A.A. Collins, and K. Borrelli. 2019. USDA NASS to survey Pennsylvania small grain producers. Field Crop News - Penn State Extension. https://extension.psu.edu/usda-nass-to-survey-pennsylvania-small-grain-producers.
Status: Published
Acknowledgement of Federal Support: No