USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY19 Final Performance Progress Report
Due date: September 30, 2021

Cover Page

Principle Investigator (PI):	Kyle Imhoff
Institution:	Pennsylvania State University
E-mail:	kai5024@psu.edu
Phone:	814-865-8732
Fiscal Year:	2019
USDA-ARS Agreement ID:	59-0206-6-016
USDA-ARS Agreement Title:	Continued Deployment of Prediction Models for Fusarium Head Blight
FY19 USDA-ARS Award Amount:	$ 33,607
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:	424-18 (74UY)
Project/Grant Reporting Period:	6/8/19 - 6/7/21
Reporting Period End Date:	6/7/2021

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
MGMT	Continued Deployment of Prediction Models for Fusarium Head Blight	$ 33,607
	FY19 Total ARS Award Amount	**$ 33,607**

Kyle Imhoff

9/30/21

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

FY19 Final Performance Progress Report
PI: Imhoff, Kyle
USDA-ARS Agreement #: 59-0206-6-016
Reporting Period: 6/8/19 - 6/7/21

Project 1: *Continued Deployment of Prediction Models for Fusarium Head Blight*

1. **What are the major goals and objectives of the research project?**
   We are addressing the risk of scab development during the critical flowering stage when the growers can ameliorate the risk with treatment. This project leverages various atmospheric data networks, including the finest scale and most accurate gridded observational data set (URMA and RTMA), gridded weather model data and a host of regression based epidemiological models on a user-friendly graphic interface to assist growers in decision making in protecting their fields from scab. Using hourly reports of temperature and moisture from finely gridded data, each day the risk is assessed anew with the most recent observations and is available by mid-morning.

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?**
   A successful daily prediction using various scab risk models have been run throughout the wheat growing seasons (June 2019- August 2019; June 2020-Aug; 2020; Mar 2021-Current) from winter wheat in the southern Plains to late spring wheat in the Dakotas. Additional expert commentary is included from plant pathologists in most states to augment the utility of the interface. The tools are accessible on mobile devised due to upgraded mobile-friendly interface and risk in non-growing regions is being masked to prevent misinterpretation of the risk tool.

   b) **What were the significant results?**
      i. Continued deployment of the disease prediction models in 30 states including the support of the state commentary tools, FHB Alerts and the web-page information explaining the models.
      I. Successfully transitioned tool to a new framework that is both desktop and mobile friendly.
      II. Growers utilized the interface and modeling technique to assist crucial decisions about the risk of disease growth in their particularly locality or region. When any breaks in data stream or interface occurred, we received immediate response.

   c) **List key outcomes or other achievements.**
   The user interface for Fusarium Head Blight risk assessment was upgraded to a new user experience that was more mobile-friendly with a background interface that streamlined data processing. At the launch of the 2021 season (Mar 2021), continued improvement of the tool was ongoing with improvements to expert commentary submission and display along with new graphing/plotting functionality at different grid points.

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.**

   No significant impacts outside of more delayed progress due to technical issues related to remote work (VPN disconnections, network availability outside of office, etc.).

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?**

   The target audience of growers and extension personnel that advise grower consortiums receive information through the web interface. Experts provide commentary within the interface that report status of the wheat/barley crops as well as an assessment of disease risk. The interface is located at: http://www.wheatscab.psu.edu/.

Training of Next Generation Scientists

Instructions: Please answer the following questions as it pertains to the **FY19 award period (6/8/19 - 6/7/21)**. 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.

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 (6/8/19 - 6/7/21)**. 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
Not Applicable	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.

FY19 Final Performance Progress Report
PI: Imhoff, Kyle
USDA-ARS Agreement #: 59-0206-6-016
Reporting Period: 6/8/19 - 6/7/21

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 (6/8/19 - 6/7/21**) 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:

> Winn, Z.J., Acharya, R., Lyerly, J., Brown-Guedira, G., Cowger, C., Griffey, C., Fitzgerald, J., Mason R.E., and Murphy, J.P. (2020, Dec 7-11). Mapping of Fusarium Head Blight Resistance in NC13-20076 Soft Red Winter Wheat (p. 12). In: Canty, S., Hoffstetter, A. and Dill-Macky, R. (Eds.), *Proceedings of the 2020 National Fusarium Head Blight Forum*. 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.

Kelly, H. 2021. Wheat Disease Update and Fungicide Considerations. News article on blog news.utcrops.com published April 21, 2021. https://news.utcrops.com/2021/04/wheat-disease-update-and-fungicide-considerations-2/
Status: published blog/newsletter article
Acknowledgement of Federal Support: Yes

Luis, J.M., Ng, S.J., Bergstrom, G., Bissonnette, K., Bowen, K., Bradley, C., Byamukama, E., Chilvers, M., Collins, A., Cowger, C., Darby, H., DeWolf, E., Dill-Macky, R., Esker, P., Friskop, A., Kleczewski, N., Koehler, A., Madden, L., Marshall, J., Mehl, H., Moraes, W., Nagelkirk, M., Rawat, N., Smith, D., Telenko, D., Wegulo, S., Young-Kelly, H., and Paul, P.A. (2020, Dec. 7-11). Fusarium head blight management coordinated project:

Integrated management trials 2018-2020 (pp. 38-43). In: Canty, S., Hoffstetter, A. and Dill-Macky, R. (Eds.), Proceedings of the 2020 National Fusarium Head Blight Forum. https://scabusa.org/pdfs/NFHBF20_Proceedings.pdf.

Status: Published
Acknowledgement of Federal Support: Yes

Luis, J.M., Ng, S.J., Bergstrom, G., Bissonnette, K., Bowen, K., Bradley, C., Byamukama, E., Chilvers, M., Collins, A., Cowger, C., Darby, H., DeWolf, E., Dill-Macky, R., Esker, P., Friskop, A., Kleczewski, N., Koehler, A., Madden, L., Marshall, J., Mehl, H., Moraes, W., Nagelkirk, M., Rawat, N., Smith, D., Telenko, D., Wegulo, S., Young-Kelly, H., and Paul, P.A. (2020, Dec. 7-11). Fusarium head blight management coordinated project: Uniform fungicide trials 2018-2020 (pp. 44-48). In: Canty, S., Hoffstetter, A. and Dill-Macky, R. (Eds.), Proceedings of the 2020 National Fusarium Head Blight Forum. https://scabusa.org/pdfs/NFHBF20_Proceedings.pdf.

Status: Published
Acknowledgement of Federal Support: Yes

Kaur, N., Mehl, H. L., Langston, D., Thomason, W., and Griffey, C. (2020, Dec. 7-11). Integrated Management of Fusarium Head Blight (FHB) and DON in Wheat in Virginia with an Emphasis on New Fungicide, Miravis Ace (p. 36.). In: S. Canty, A. Hoffstetter, and R. Dill-Macky (Eds.), *Proceedings of the 2020 National Fusarium Head Blight Forum*, https://scabusa.org/pdfs/NFHBF20_Proceedings.pdf.

Status: Abstract Published and Poster Presented
Acknowledgement of Federal Support: YES (Abstract and Poster)

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. “mpact of Prediction Tools for Fusarium Head Blight in the US, 2009-2019 (p. 12.). 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.

Status: Abstract Published and Poster Presented
Acknowledgement of Federal Support: YES (Abstract and Poster)