USDA-ARS
U.S. Wheat and Barley Scab Initiative
FY20 Annual Performance Progress Report
Due date: July 29, 2021

Cover Page

Principle Investigator (PI):	Darcy Telenko
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Fiscal Year:	2020
USDA-ARS Agreement ID:	59-0206-0-118
USDA-ARS Agreement Title:	Efficacy of a New Fungicide for FHB and DON Management in Indiana
FY20 USDA-ARS Award Amount:	$ 29,700
Recipient Organization:	Purdue University AG Spnsored Program Services 615 W. State Street West Lafauette, IN 47907
DUNS Number:	07-205-1394
EIN:	35-6002041
Recipient Identifying Number or Account Number:	17000687
Project/Grant Reporting Period:	5/1/20 - 4/30/21
Reporting Period End Date:	4/30/2021

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
MGMT	Efficacy of a New Fungicide for FHB and DON Management in Indiana	$ 29,700
	FY20 Total ARS Award Amount	**$ 29,700**

07/23/2021

Principal Investigator Date

* MGMT – FHB Management
FST – Food Safety & Toxicology
R- Research
S – Service (DON Testing Labs)
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

FY20 Annual Performance Progress Report
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Project 1: *Efficacy of a New Fungicide for FHB and DON Management in Indiana*

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

This research will serve as a location in the cooperative multi-state studies comparing the effects of integrated management (IM) and uniform fungicide (UFT) trials for FHB and DON control in wheat.

1) Evaluate the integrated effects of fungicide treatment and genetic resistance on FHB and DON in soft winter wheat, with emphasis on a new fungicide, Miravis Ace®.
2) Compare the efficacy of Miravis Ace when applied at early heading or at anthesis to that of standard anthesis application of Prosaro® or Caramba®.
3) Generate data to further quantify the economic benefit of FHB/DON management strategies.
4) Develop more robust "best-management practices" for FHB and DON.
5) Generate data to validate and advance the development of FHB and DON risk prediction models.

The proposed research was conducted at two sites in Indiana: 1) Purdue Agronomy Center for Research and Education (ACRE) in West Lafayette, Indiana; and 2) Southwest Purdue Agriculture Center (SWPAC), Vincennes, Indiana.

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?

Research trials were established in the fall of 2019 at both locations indicated above in Indiana, and fungicide treatments were applied in the spring of 2020. In all trials, FHB, DON, FDK, foliar disease severity, yield and test weight were collected.

b) What were the significant results?

In 2020, weather conditions were moderately favorable for Fusarium head blight (FHB). FHB was the most prominent disease in all four trials showing significantly higher FHB in the nontreated controls. In southwest Indiana, FHB index was reduced by all fungicide programs over the non-treated control. Caramba applied at Feekes 10.5.1, BAS 84000F applied at Feekes 10.5.1, and USF0115 applied at Feekes 10.5.1 resulted in the lowest FHB index, but was not significantly different from all other fungicide treatments or timings. The concentration of the mycotoxin deoxynivalenol (DON) was significantly reduced by all fungicide programs over the nontreated control, Caramba at 10.5.4 had the highest level of DON of the fungicide programs, but was not different from Miravis Ace applied at Feekes 10.3 or 10.5.4. The

percentage of FDK was significantly reduced by all fungicide programs over nontreated control. There were no significant differences between treatments for wheat yield.

In central Indiana, Miravis Ace applied at Feekes 10.3 and Miravis ACE applied at Feekes 10.5.1 fb Folicur at Feekes 10.5.3 resulted in the lowest FHB index, but was not significantly different from all other fungicide treatments or timings. The concentration of deoxynivalenol (DON) was significantly reduced over the nontreated control by all treatments, where Caramba applied at 10.5.1 had higher levels of DON than fungicide programs of Miravis Ace applied at 10.5.1, 10.5.3, and Miravis Ace at 10.5.1 followed by Prosaro or Caramba at 10.5.3. There were no differences in treatments from nontreated control for percent FDK and wheat yield.

c) List key outcomes or other achievements.

The results of these trials have shown that Miravis Ace is an effective fungicide for FHB management, additional new chemistries were evaluated for the first time which also have extremely promising results – continued evalution of these products will be necessary to address some of the many questions being asked by stakeholders about the effectiveness, application timing, effectiveness towards other diseases, and yield and cost benefits of this new fungicide.

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.

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

This project provided an opportunity to train plant pathology graduate students and undergraduates on plant disease identification and quantification, along with general field research trial establishment and data analysis.

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

The results were shared and combined with the multi-state data to summarize and publish in the Proceedings of the National Fusarium Head Blight Forum. They were also shared with Indiana wheat stakeholders via the annual Applied Research in Field Crop Pathology for Indiana Extension publication, 2020 and Plant Disease Management Reports. In addition, Dr. Telenko presented results to Indiana growers during winter Extension meetings.

Training of Next Generation Scientists

Instructions: Please answer the following questions as it pertains to the FY20 award period (5/1/20 - 4/30/21). 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 FY20 award period?**
   ☐Yes ☒No
   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 FY20 award period?**
   ☐Yes ☒No
   If yes, how many? Click to enter number here.

3. **Have any post docs who worked for you during the FY20 award period and were supported by funding from your USWBSI grant taken faculty positions with universities?**
   ☐Yes ☒No
   If yes, how many? Click to enter number here.

4. **Have any post docs who worked for you during the FY20 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
   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 FY20 award period (5/1/20 - 4/30/21). 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
Not applicable to this project.	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
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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 PR_Instructions for detailed more instructions for listing publications/presentations about your work that resulted from all of the projects included in the FY20 grant award. Only citations for publications published (submitted or accepted) or presentations presented during the **award period (5/1/20 - 4/30/21**) 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.

Telenko, D. E. P. 2021. Applied Research in Field Crop Pathology for Indiana 2020. BP-216-W. Purdue Extension.
Status: Published
Acknowledgement of Support: Yes

Da Silva, C. R., Ravellette, J. D., and Telenko, D. E. P. 2021. Fusarium head blight (FHB) uniform fungicide trial in southwestern Indiana, 2020. Plant Disease Management Reports. 15: CF172.
Status: Published
Acknowledgement of Support: No (not an option)

Telenko, D. E. P., Ravellette, J. D., and Shim, S. 2021. Fusarium head blight (FHB) uniform fungicide trial in central Indiana, 2020. Plant Disease Management Reports. 15: CF075.
Status: Published
Acknowledgement of Federal Support: No (not an option)

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., Langston, D.B., 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. Fusarium head blight management coordinated project: Integrated management trials 2018-2020. In S. Canty, A. Hoffstetter, H. Campbell, and R. Dill-Macky (Eds.), *Proceedings of the 2020 National Fusarium Head Blight Forum* (p. 38-43), Virtual; December 2020. University of Kentucky, Lexington, KY.
Status: Report Published and Poster Presented
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., Langston, D.B., 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. Fusarium head blight management coordinated project: Uniform fungicide trials 2018-2020. In S. Canty, A. Hoffstetter, H. Campbell, and R. Dill-Macky (Eds.), *Proceedings of the 2020 National Fusarium Head Blight Forum* (p. 44-48), Virtual; December 2020. University of Kentucky, Lexington, KY.
Status: Report Published and Poster Presented
Acknowledgement of Federal Support: Yes