USDA-ARS
U.S. Wheat and Barley Scab Initiative
FY20 Annual Performance Progress Report
Due date: August 31, 2021

Cover Page

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Project 1: *Integrated Management of Fusarium Head Blight and DON in Virginia Small Grains*

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

The specific objectives correspond to those of the FHB Management Coordinate Project which are to: 1) evaluate the integrated effects of fungicide treatment and genetic resistance on FHB and DON, with emphasis on a new fungicide, Miravis Ace®; and 2) compare the efficacy of Miravis Ace when applied at heading or at anthesis to that of standard anthesis application of Prosaro® or Caramba®.

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?

Four field trials (2 wheat and 2 barley) were conducted in southeast Virginia in 2020 utilizing the protocols outlined in the FHB Management Coordinated Project. One wheat trial included four varieties varying in FHB/DON resistance (Shirley, Hilliard, Liberty 5658 and Agrimaxx 463) and the second trial focused on application timings of the new fungicide Miravis Ace for control of FHB/DON in susceptible variety Shirley. Of the two barley trial, one evaluated the effect of fungicide across four barley varieties (Flavia, Violette, VA16M-81 and VA16M-84) and the other barley trial evaluated fungicide and fungicide timing on the susceptible variety 'Thoroughbred'. Inoculation occurred after the Feekes 10.5.1 fungicide treatment on wheat and after the Feekes 10.5 fungicide treatment on barley. Foliar disease and FHB severity were evaluated in early-mid May. Conditions were relatively favorable for FHB infection and DON development in some but not all trials. The trials were harvested in June, and yield, test weight, and *Fusarium* damaged kernels (FDK) were assessed. Grain samples were submitted to the Virginia Tech DON testing lab, and DON concentrations were determined for samples from all trials.

b) What were the significant results?

In the wheat fungicide x variety trial, DON was significantly reduced by Miravis Ace and Miravis Ace + tebuconazole treatments in 'Shirley' compared to untreated plots. In 'Hilliard', only Miravis Ace applied at Feeks 10.5.1 significantly reduced DON compared to the untreated. All fungicide treatments reduced DON compared to untreated plots in 'Liberty'. DON levels were low in the wheat variety 'Agrimaxx 463' with no observed benefit of fungicide treatments. In the barley fungicide x variety trial, DON reduction was observed in Miravis Ace applied at Feekes 10.3, 10.5 and when Miravis Ace was applied in a tank mix with tebuconazole at Feeks 10.5 with tebuconazole applied alone 4-6 days later compared to untreated plots. In 'VA168M-81', only Miravis Ace applied alone at Feekes 10.5 and in combination with

tebuconazole at Feekes 10.5 and 4 -6 days later reduced DON below the untreated plots. All fungicide treatments reduced DON below untreated plots in 'VA168M-84'. DON levels were low in the barley variety 'Violetta' with no observed benefit of fungicide treatments.

c) List key outcomes or other achievements.

The key outcome of this project was that continued efficacy data for the Miravis Ace was generated. The Miravis Ace generally reduced DON levels regardless of timing in both barley and wheat trials. In addition, Miravis Ace was more consistent in reducing DON levels and FHB than Prosaro. This is an important result for making recommendations to wheat producers for economical and effective management of FHB and DON.

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?

A PhD student, Navjot Kaur, assisted with this project. She conducted all disease ratings and helped to analyze and summarize data.

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

Results were presented at crop production meetings and crop consultant in-service trainings, and recommendations are being used by producers.

Training of Next Generation Scientists

Instructions: Please answer the following questions as it pertains to the FY20 award period (6/6/20 - 6/5/21). 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? 1

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 FY20 award period (6/6/20 - 6/5/21). 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
N/A	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
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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 (6/6/20 - 6/5/21**) 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)