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

Cover Page

Principle Investigator (PI):	Martin Chilvers
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Fiscal Year:	2020
USDA-ARS Agreement ID:	59-0206-0-138
USDA-ARS Agreement Title:	Managing Fusarium and DON for Small Grains in Michigan
FY20 USDA-ARS Award Amount:	$ 26,193
Recipient Organization:	Michigan State University Contract & Grant Administration Hannah Administration Building, Room 2 East Lansing, MI 48824-1046
DUNS Number:	193247145
EIN:	38-6005984
Recipient Identifying Number or Account Number:	RC111317
Project/Grant Reporting Period:	6/1/20 - 5/31/21
Reporting Period End Date:	5/31/2021

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
MGMT	Integrated Management of FHB and DON in Soft White Winter Wheat and Winter Barley in Michigan	$ 26,193
	FY20 Total ARS Award Amount	**$ 26,193**

Martin Chilvers

Aug-27-2021

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

Project 1: *Integrated Management of FHB and DON in Soft White Winter Wheat and Winter Barley in Michigan*

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

   1) *Develop integrated management strategies for FHB and mycotoxins that are robust to conditions experienced in production fields* and Goal;
   2) *Help develop and validate the next generation of management tools for FHB/DON control*".

   The research needs in the USWBSI Action plan addressed by the proposed research are: 1) Validate integrated strategies with the next generation of wheat varieties; 2) Evaluate the flexibility of fungicide application timing within the context of integrated management strategies; and 3) Enhance forecasting capabilities for FHB and continued development of FHB and DON models for wheat

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?

   Wheat and barley trials were conducted on two varieties each to determine optimal fungicide timing and fungicide efficacy for management of head scab. A second trial to examine fungicide efficacy was also conducted to compare products

   b) What were the significant results?

   Trial results informed decision making for optimal fungicide timing and fungicide choice

   c) List key outcomes or other achievements.

   We are still awaiting DON data, but early indications from trials have confirmed that it is essential to make fungicide applications at the correct timing for optimal head scab control. Once we have DON data we will also be in a position to reevaluate fungicide efficacy tables and the potential value of split or double applications in minimizing scab. Variety effect again clearly demonstrated the importance of using IPM practices in reducing scab including variety selection and appropriate fungicide, rate and timing.

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, we were fortunate to complete our field trials as outlined in the proposal. However, we are slightly delayed in grinding our own samples for submission for DON analysis

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

   Graduate students were involved in the project. Mikaela Breunig a PhD student in my lab attended scab conferences and recently participated in a panel discussion on mycotoxins at our national plant disease conference.

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

   Through field days, written communication and social media events. With COVID we have also provided many online learning opportunities during the season and off-season (winter) through wheat disease management presentations and discussion panels.

Training of Next Generation Scientists

Instructions: Please answer the following questions as it pertains to the FY20 award period (6/1/20 - 5/31/21). 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? One graduate student who worked on head scab primarily through support from the Michigan Wheat Program and partially through USWBSI did graduate in 2021

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? One graduate student who worked on head scab primarily through support from the Michigan Wheat Program and partially through USWBSI did graduate in 2021. That student is now working at Bayer Crops Sciences in St. Louis as a wheat pathologist

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 (6/1/20 - 5/31/21). 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
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 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 (6/1/20 - 5/31/21**) 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.

Breunig M., **Chilvers, M.I.** 2020 Baseline Sensitivity of *Fusarium graminearum* from Wheat, Corn, Dry Bean and Soybean to Pydiflumetofen in Michigan. Crop Protection 140 (2021) 105419 https://doi.org/10.1016/j.cropro.2020.105419
Status: Published
Acknowledgement of Federal Support:

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

Nothing to report.

Other publications, conference papers and presentations.

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). Fusarium head blight management coordinated project: Integrated management trials 2018-2020. In: *Proceedings of the 2020 National Fusarium Head*

Blight Forum. Online: December 7-11, 2020, pp. 38-43.
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). Fusarium head blight management coordinated project: Uniform fungicide trials 2018-2020. In: *Proceedings of the 2020 National Fusarium Head Blight Forum*. Online: December 7-11, 2020, pp. 44-48.
Status: Published
Acknowledgement of Federal Support: Yes