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

Cover Page

Principle Investigator (PI):	Christina Cowger
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Phone:	919-513-7388
Fiscal Year:	2020
USDA-ARS Agreement ID:	N/A
USDA-ARS Agreement Title:	Improvement and Adoption of FHB Management Techniques
FY20 USDA-ARS Award Amount:	$ 23,025
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 Miravis Ace for FHB and DON reduction in Winter Barley	$ 23,025
	FY20 Total ARS Award Amount	**$ 23,025**

Christina Cowger

7/21/21

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: *Efficacy of Miravis Ace for FHB and DON reduction in Winter Barley*

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

   The objective is to better understand profitability of integrating cultivar resistance and fungicide applications for scab reduction in Mid-Atlantic winter barley crops.

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?**

   In 2017-18, 2018-19, and 2019-20, we conducted the first three years of a multi-year integrated management experiment using three winter barley cultivars with different levels of resistance to FHB: Violetta (MR), Thoroughbred (MR/MS), and Flavia (S). Inoculation was with Fusarium-infected corn spawn applied in three batches at one-week intervals. We used the six standard CP-IM fungicide treatments for Objective 1, plus four additional fungicide treatments, and all standard data were collected.

   The treatments are allowing comparisons of the efficacy of Miravis Ace to that of Prosaro® and Caramba®, and comparisons of three fungicide timings (spikes half emerged, spikes just fully emerged, and 6 days after spikes fully emerged). These treatments also allow estimation of the mean benefits of fungicide application, cultivar resistance, and the combination of the two in terms of yield, test weight, and DON reduction.

   b) **What were the significant results?**
   We collected data on visual symptoms, DON, test weight, and yield.

   c) **List key outcomes or other achievements.**
   The experiment has so far shown that Miravis Ace is as effective as Prosaro or Caramba when applied at early full heading or 6 days later. However, efficacy of all three products was lower when applied at 50% barley spike emergence. This is one of the only replicated field experiments with winter barley to provide definitive information on fungicide choice and timing as well as barley resistance.

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?**

The project has helped train two technicians in management of FHB field experiments, including inoculum production and application, establishment of effective mist irrigation programs, disease assessment techniques, and sample processing for test weight and DON analysis.

A new graduate student has begun working in our project on FHB.

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

We have presented the results at field days in North Carolina which draw hundreds of growers and crop consultants and county agents; presented a poster at the Joint Crops meeting which draws hundreds of farmers and crop advisors from the Mid-Atlantic region; and published a peer-reviewed article in *Plant Disease*.

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
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
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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
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.

Z.J. Winn, R. Acharya, J. Lyerly, G. Brown-Guesdira, 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/NFHBF20Proceedings.pdf.
Status: Abstract Published and Poster Presented
Acknowledgement of Federal Support: YES (Abstract and Poster)

Jane Marian Luis, Sin Joe Ng, Gary Bergstrom, Kaitlyn Bissonnette, Kira Bowen, Carl Bradley, Emmanuel Byamukama, Martin Chilvers, Alyssa Collins, Christina Cowger, Heather Darby, Erick DeWolf, Ruth Dill-Macky, Paul Esker, Andrew Friskop, Nathan Kleczewski3 ,

Alyssa Koehler, David B. Langston, Laurence Madden, Juliet Marshall, Hillary Mehl, Wanderson Moraes, Martin Nagelkirk, Nidhi Rawat, Damon Smith, Darcy Telenko, Stephen Wegulo, Heather Young-Kelly and Pierce A Paul. 2020. FUSARIUM HEAD BLIGHT MANAGEMENT COORDINATED PROJECT: INTEGRATED MANAGEMENT TRIALS 2018-2020. In S. Canty, 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/NFHBF20Proceedings.pdf.

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