

USDA-ARS
U.S. Wheat and Barley Scab Initiative
FY19 Performance Report
Due date: July 24, 2020

Cover Page

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Fiscal Year:	2019
USDA-ARS Agreement ID:	59-0206-6-008
USDA-ARS Agreement Title:	Integrated Strategies for Improved Management of FHB and DON in Soft Red Winter Wheat in Alabama
FY19 USDA-ARS Award Amount:	\$ 20,362
Recipient Organization:	Auburn University Contracts and Grants Accounting Department (CGA) 208 M. White Smith Hall Auburn, AL 36849
DUNS Number:	066470972
EIN:	63-6000724
Recipient Identifying Number or Account Number:	361848-304504-2002
Project/Grant Reporting Period:	5/23/19 - 5/22/20
Reporting Period End Date:	5/22/2020

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
MGMT	Integrated Strategies for Improved Management of FHB and DON in Soft Red Winter Wheat	\$ 20,362
FY19 Total ARS Award Amount		\$ 20,362

Kira L. Bowen

6 July 2020

Principal Investigator

Date

* MGMT – FHB Management
 FST – Food Safety & Toxicology
 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 Strategies for Improved Management of FHB and DON in Soft Red Winter Wheat*

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

The objectives of this project were to: 1) evaluate the integrated effects of fungicide and genetic resistance on Fusarium head blight (FHB) and deoxynivalenol (DON) in soft red winter wheat grown in AL; and 2) evaluate the efficacy of Miravis Ace, applied at different times, to standard Prosaro and Caramba treatments for FHB and DON management. Data collected from these studies will contribute to national efforts for improved FHB and DON management by: 3) quantifying the economic benefits, 4) developing more robust “*best-management practices*” guidelines, and 5) validating and advancing risk prediction models.

2. What was accomplished under these goals or objectives? (For each major goal/objective, address items a-b) below.)

a) What were the major activities?

1. Field studies were done at three sites during 2019 (June harvest, yield, FHB index, FDK determination through summer): Prattville (central AL; 32.425, -86.446), Tallassee (east central AL; 32.499, -85.891), and Belle Mina (north AL; 34.69, -86.887). A field study had been planned for Gulf Coast (south AL), but due to excessive rain near planting, the stand failed and site was abandoned.
2. Field studies were initiated at three sites in Nov.-Dec 2019: Fairhope (south AL; 30.5442, -87.882), Tallassee (east central AL; 32.499, -85.891), and Belle Mina (north AL; 34.69, -86.887). Fungicide applications made in March-April 2020. Disease assessed in April 2020.

b) What were the significant results?

1. In 2019, fungicide treatments did not result in significant differences in scab or yield at any site. However, 1000-k weights from plots treated with Prosaro followed by tebuconazole and Prosaro alone were greater than from non-treated controls at Prattville. At Belle Mina, Miravis Ace at both FS 10.5 and 10.5.1 had higher test weights than the non-treated controls.
2. In 2019, the cultivar Pioneer 26R59 was substantially later to flower at Tallassee than Jamestown, Pioneer 26R94 or SS 5550. This likely was the cause of its lower yield compared to Pioneer 26R94 and SS 5550, and its lower test weights compared to the other three cultivars.
3. All diseases were low at all sites. However, samples from non-treated plots from Belle Mina and Tallassee were analyzed for DON content and 7/11 samples tested had detectable levels of DON.

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- c) List key outcomes or other achievements.
Nothing to report.

3. Was this research impacted by the COVID-19 pandemic (i.e. university shutdowns, reduced or lack of support personnel, etc.)? If yes, please explain how this research was impacted or is continuing to be impacted.

Yes. University implemented the need to get permission to travel and rejected my first request. This delayed site visits beyond appropriate disease rating times. In addition, the graduate student that was helping on project disappeared. While I did manage to rate wheat for disease and collect samples for FHB index assessment at Gulf Coast (and saw very little of any disease), I did not get to other sites.

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

Trained two graduate students to recognize and rate diseases of wheat, including rating for FHB index.

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

A “Plant Disease Management” report-like summary of results is shared with superintendents of research centers where work was done. They will share that with local Extension personnel. In addition, research results were presented to growers at the annual “Commodity Organization Meeting of AL Farmers Federation” (ALFA), as well as to the ALFA Wheat Feed and Grain Committee.

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Training of Next Generation Scientists

Instructions: Please answer the following questions as it pertains to the FY19 award period (5/23/19 - 5/22/20). 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.

If yes, how many? 1. M.S. work was working not on wheat or barley, but student helped on my scab project.

- 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?**

No.

If yes, how many?

- 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?**

No.

If yes, how many?

- 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?**

No.

If yes, how many?

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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. 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 (S, MS, MR, R, where R represents your most resistant check)	FHB Rating (0-9)	Year Released
N/A				

Add rows if needed.

NOTE: List the associated release notice or publication under the appropriate sub-section in the 'Publications' section of the FPR.

Abbreviations for Grain Classes

- Barley - BAR
- Durum - DUR
- Hard Red Winter - HRW
- Hard White Winter - HWW
- Hard Red Spring - HRS
- Soft Red Winter - SRW
- Soft White Winter - SWW

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Publications, Conference Papers, and Presentations

Instructions: Refer to the FY19-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 (5/23/19 - 5/22/20)** 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.

Journal publications.

Ghimire, B., A. Martinez, A. Glenn, M. Mergoum, K.L. Bowen, and J. W. Buck. 2019. A preliminary investigation into the genetic diversity of *Fusarium species* causing Fusarium head blight in Georgia and Alabama. *Phytopathology* 109:S2.166.

Status: Poster presented and abstract published.

Acknowledgement of Federal Support: Not on abstract. Unknown about poster.

Salgado, J. D., G. C. Bergstrom, C. A. Bradley, K. L. Bowen, E. Byamukama, and 18 others. 2019. Effects of two-treatment fungicide programs on grain yield and quality of Fusarium head blight-affected Wheat. *Phytopathology* 109:S2.65.

Status: Poster presented and abstract published.

Acknowledgement of Federal Support: Not on abstract. Unknown about poster.

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

Other publications, conference papers and presentations.

Bowen, K.L. 2019. “Fusarium head blight management in Alabama.” In: S. Canty, A. Hoffstetter, H. Campbell and R. Dill-Macky (Eds.), *Proceedings of the 2019 National Fusarium Head Blight Forum* (p. 3), Milwaukee, WI; December 8-10. University of Kentucky, Lexington, KY.

Status: Poster presented and abstract published.

Acknowledgement of Federal Support: Yes on both.

Bhimire, B., M. Mergoum, A.E. Glenn, K.L. Bowen, J. Youmans, S. Sapkota, A.D. Martinez, and J.W. Buck. 2019. “Understanding the genetic diversity of *Fusarium species* causing Fusarium head blight (FHB) of wheat in Georgia.” In: S. Canty, A. Hoffstetter, H. Campbell

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and R. Dill-Macky (Eds.), *Proceedings of the 2019 National Fusarium Head Blight Forum* (p. 67), Milwaukee, WI; December 8-10. University of Kentucky, Lexington, KY.

Status: Poster presented and abstract published.

Acknowledgement of Federal Support: No, on either.

Paul, P.A., S. J. Ng, G. Bergstrom, K. Bissonnette, K. Bowen, C. Bradley, E. Byamukama, M. Chilvers, A. Collins, C. Cowger, H. Darby, E. DeWolf, R. Dill-Macky, P. Esker, A. Friskop, N. Kleczewski, A. Koehler, L. Madden, J. Marshall, H. Mehl, W. Moraes, M. Nagelkirk, N. Rawat, D. Smith, D. Telenko, S. Wegulo, and H. Young-Kelly. 2019. "Fusarium head blight management coordinated project: integrated management trials 2018-2019." In: S. Canty, A. Hoffstetter, H. Campbell and R. Dill-Macky (Eds.), *Proceedings of the 2019 National Fusarium Head Blight Forum* (p. 19), Milwaukee, WI; December 8-10. University of Kentucky, Lexington, KY.

Status: Poster presented and paper published.

Acknowledgement of Federal Support: YES on both.

Paul, P.A., S. J. Ng, G. Bergstrom, K. Bissonnette, K. Bowen, C. Bradley, E. Byamukama, M. Chilvers, A. Collins, C. Cowger, H. Darby, E. DeWolf, R. Dill-Macky, P. Esker, A. Friskop, N. Kleczewski, A. Koehler, L. Madden, J. Marshall, H. Mehl, W. Moraes, M. Nagelkirk, N. Rawat, D. Smith, D. Telenko, S. Wegulo, and H. Young-Kelly. 2019. "Fusarium head blight management coordinated project: uniform fungicide trials 2018-2019." In: S. Canty, A. Hoffstetter, H. Campbell and R. Dill-Macky (Eds.), *Proceedings of the 2019 National Fusarium Head Blight Forum* (p. 20), Milwaukee, WI; December 8-10. University of Kentucky, Lexington, KY.

Status: Poster presented and paper published.

Acknowledgement of Federal Support: Yes on both.