USDA-ARS | U.S. Wheat and Barley Scab Initiative

FY21 Performance Progress Report

Due date: July 26, 2022

Cover Page

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Fiscal Year:	2021
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:	$27,756
Recipient Organization:	Michigan State University Dept. of Plant, Soil and Microbial Sciences. Center for Integrated Plant Systems, 578 Wilson, Rm. 104 East Lansing, MI 48824
DUNS Number:	193247145
EIN:	38-6005984
Recipient Identifying Number or Account Number, if any:	RC111317
Project/Grant Period:	6/1/21 - 5/31/23
Reporting Period End Date:	5/31/2022

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
MGMT-IM	Integrated Management of FHB and DON in Soft White Winter Wheat and Winter Barley in Michigan	$27,756
	FY21 Total ARS Award Amount	$27,756

I am submitting this report as an: ☒ Annual Report ☐ Final Report

I certify to the best of my knowledge and belief that this report is correct and complete for performance of activities for the purposes set forth in the award documents.

Martin Chilvers _____ ___ Jun-23-2022 _____

Principal Investigator Signature Date Report Submitted

* BAR-CP – Barley Coordinated Project
DUR-CP – Durum Coordinated Project
EC-HQ – Executive Committee-Headquarters
FST-R – Food Safety & Toxicology (Research)
FST-S – Food Safety & Toxicology (Service)
GDER – Gene Discovery & Engineering Resistance
HWW-CP – Hard Winter Wheat Coordinated Project
MGMT – FHB Management
MGMT-IM – FHB Management – Integrated Management Coordinated Project
PBG – Pathogen Biology & Genetics
TSCI – Transformational Science
VDHR – Variety Development & Uniform Nurseries
NWW –Northern Soft Winter Wheat Region
SPR – Spring 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

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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.
2) 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

The Objectives of this FHB Management Coordinated Project (MGMT_CP) are to:

1) Evaluate the integrated effects of fungicide treatment and genetic resistance on FHB and DON in all major grain classes, with emphasis on a new fungicides, Miravis® Ace, and Sphaerex
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®, and Miravis Ace followed by a second head scab fungicide product, and test the new head scab fungicide product Sphaerex
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; and
5) Generate data to validate and advance the development of FHB and DON risk prediction models.

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. These results were translated into the small grains fungicide efficacy chart, and results were presented to famers and agribusiness.

c) List key outcomes or other achievements.

The data clearly demonstrated the importance of using IPM practices in reducing scab including variety selection and appropriate fungicide, rate and timing.

3. What opportunities for training and professional development has the project provided?
All graduate students from my program were involved in the project, through the assistance with head scab rating. In addition, Dr. Mikaela Breunig who graduated from my program this last year and who was a PhD student in my lab attended scab conferences and recently participated in a panel discussion on mycotoxins at our national plant disease conference.

4. How have the results been disseminated to communities of interest?
Through field days, virtual breakfasts, NCERA-184 wheat disease and Great Lake wheat workers meetings, written extension articles, social media postings, phone calls from producers and agribusiness.

Publications, Conference Papers, and Presentations

Please include a listing of all your publications/presentations about your FHB work that were a result of funding from your FY21 grant award. Only citations for publications published (submitted or accepted) or presentations presented during the **award period** should be included.

Did you publish/submit or present anything during this award period?

☒ Yes, I've included the citation reference in listing(s) below.

☐ No, I have nothing to report.

Journal publications as a result of FY21 grant award

List peer-reviewed articles or papers appearing in scientific, technical, or professional journals. Include any peer-reviewed publication in the periodically published proceedings of a scientific society, a conference, or the like.

Identify for each publication: Author(s); title; journal; volume: year; page numbers; status of publication (published [include DOI#]; accepted, awaiting publication; submitted, under review; other); acknowledgement of federal support (yes/no).

1. Breunig, M., Nagelkirk, M., Byrne, A., Wilbur, J. Steinke, K., Chilvers, M.I. *Accepted Mar 16, 2022*. Meta-analysis of yield response to applications of fungicides made at different crop growth stages in Michigan winter wheat. Plant Health Progress. Federal support not acknowledged. Primary support came from the Michigan Wheat Program. However, data sets used would have included trials supported by USWBSI.

Books or other non-periodical, one-time publications as a result of FY21 grant award

Report any book, monograph, dissertation, abstract, or the like published as or in a separate publication, rather than a periodical or series. Include any significant publication in the proceedings of a one-time conference or in the report of a one-time study, commission, or the like.

Identify for each one-time publication: Author(s); title; editor; title of collection, if applicable; bibliographic information; year; type of publication (book, thesis or dissertation, other); status of publication (published; accepted, awaiting publication; submitted, under review; other); acknowledgement of federal support (yes/no).

None

Other publications, conference papers and presentations as a result of FY21 grant award

Identify any other publications, conference papers and/or presentations not reported above. Specify the status of the publication.

MSUE Virtual breakfast. Wheat disease management and fungicide use. May 12, 2022. 130 live participants https://www.canr.msu.edu/videos/managing-head-scab-and-foliar-wheat-diseases

MSUE Virtual breakfast. Questions on: Wheat disease management and fungicide use. Apr 28, 2022. 120 live participants

Fungicide considerations in wheat for 2022. Chilvers, M.I. and Steinke, K. Apr 15, 2022.Wheat Wisdom – Michigan Wheat Program.

Issues with Fusarium head blight of wheat? 2021 MSU Extension – News for Ag

Great Lakes EXPO pest panel discussion. Diseases of sweet corn, corn, dry bean, wheat and soybean. Grand Rapids, MI Dec 9, 2021. 100 participants

Wheat disease management. Virtual wheat field day. Jun 9, 2021. 138 participants