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

FY22 Performance Progress Report

Due date: July 26, 2023

Cover Page

USDA-ARS Agreement ID:	59-0206-2-104
USDA-ARS Agreement Title:	Management of Fusarium Head Blight (FHB) and DON in New England
Principle Investigator (PI):	Heather Darby
Institution:	University of Vermont and State Agricultural College
Institution UEI:	Z94KLERAG5V9
Fiscal Year:	2022
FY22 USDA-ARS Award Amount:	$27,942
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Period of Performance:	May 1, 2022 – April 30, 2026
Reporting Period End Date:	April 30, 2023

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
MGMT IM-CP	Integrated Management of FHB and DON in Barley in New England	$27,942
	FY22 Total ARS Award Amount	$27,942

I am submitting this report as an: ☒ Annual 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.

Heather Darby

Principal Investigator Signature — July 26, 2023 — 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 Barley in New England

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1. **What are the major goals and objectives of the research project?**
   Fusarium head blight (FHB) is currently the most significant disease impacting organic and conventional grain growers in New England, resulting in loss of yield, shriveled grain, and, most notably, mycotoxin contamination. New England farmers need more information on agronomic practices for preventing or controlling fusarium infection in order to produce high quality malting barley. This project evaluated integrated management strategies with the goal of minimizing the loss of yield and quality from FHB.

   The project objectives were:
   1. Evaluate spring and winter barley varieties in order to identify those that are suitable for malting and adapted to the Northeast.
   2. Evaluate the efficacy of using fungicides to control *Fusarium* head blight infection of spring malting barley.

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?

   Objective 1: Winter and spring malting barley variety trials were conducted in Alburgh, Vermont. A trial to evaluate 30 winter barley cultivars was established on September 18, 2022. These varieties were evaluated for yield, quality, and DON concentrations. The spring barley variety trial evaluating 15 varieties was established on April 14, 2023. The spring barley varieties were evaluated for yield, quality, and DON concentrations.

   Objective 2: A field experiment was established in Vermont on April 14, 2023 to investigate the effects of cultivar resistance, fungicide efficacy, application timing on FHB and DON infection in spring malting barley. The experimental design was a randomized complete block, with a split- plot arrangement of cultivar as the whole-plot and fungicide+timing treatments as the sub- plots. The fungicide treatments and rates are listed in Table 1. Fungicides were applied at heading for 4 to 6 days following the heading treatment. In 2023, fungicides were trialed individually and in combinations. The organic fungicide Champ ION was applied in two timing combinations: at heading and at both heading and post-heading. The six-row cultivar (Robust) was approximately a week ahead of the two-row cultivar (ND Genesis) resulting in separate applications of each treatment at the appropriate timing for each cultivar. Fungicides were applied in June.

Table 1. Plot treatments-fungicide application rates.

Treatments	Application rate
Control	Water
Caramba	14 fl oz ac^{-1} +.125% Induce ac^{-1}
ChampION	1.5 lbs ac^{-1}
Miravis Ace	13.7 fl oz ac^{-1} + .125% Induce ac^{-1}
Prosaro	6.5 fl oz ac^{-1} +.125% Induce ac^{-1}
Prosaro Pro	10.3 fl oz ac-1 +.125% Induce ac^{-1}
Sphaerex	7.3 fl oz ac^{-1} +.125% Induce ac^{-1}
Fusarium graminearum	100,000 spores/ml

b) What were the significant results?

The results are still being collected at the time of the report submission. The barley was harvested on July 20, 2023. Quality and DON analysis will be completed in the fall of 2023.

c) List key outcomes or other achievements.

The primary achievement is that a large number of farmer sand stakeholders attended the Crop and Soil Field Day and were able to learn about the Scab Initiative, disease identification and management.

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

None at this time

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

The UVM Annual Crop and Soil Field Day was held on July 26th, 2023. There were 204 attendees that were able to see the variety trials and fungicide trials. In addition, a barley intensive was held that included information on how barley is malted, quality requirements, and problematic diseases such as Fusarium head blight.

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 FY22 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 May 1, 2022 – April 30, 2023?

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

☒ No, I have nothing to report.

Journal publications as a result of FY22 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).

Books or other non-periodical, one-time publications as a result of FY22 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).

Other publications, conference papers and presentations as a result of FY22 award

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