

USDA-ARS
U.S. Wheat and Barley Scab Initiative
FY17 Final Performance Report – NCE for FY18
Due date: July 12, 2019

Cover Page

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| Principle Investigator (PI): | Mark VanGessel |
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| Phone: | 302-856-7303 |
| Fiscal Year: | 2017 (NCE for FY18) |
| USDA-ARS Agreement ID: | 59-0206-4-036 |
| USDA-ARS Agreement Title: | USWBSI Integrated Management of FHB on Delaware Wheat. |
| FY17 USDA-ARS Award Amount: | \$ 18,929 |
| Recipient Organization: | University of Delaware 210 Hüllihen Hall Newark, DE 19716-7501 |
| DUNS Number: | 59007500 |
| EIN: | 51-6000297 |
| Recipient Identifying Number or Account Number: | AGEX35212215000 |
| Project/Grant Reporting Period: | 6/1/18 - 5/31/19 |
| Reporting Period End Date: | 05/31/19 |

USWBSI Individual Project(s)

| USWBSI Research Category* | Project Title | ARS Award Amount |
|----------------------------------|--|-------------------------|
| MGMT | Integrated Management of FHB and DON in SRWW in Delaware. | \$ 15,664 |
| MGMT | Evaluation of Commercial Wheat and Barley Cultivars for FHB Reaction in DE/MD. | \$ 3,265 |
| | FY17 Total ARS Award Amount | \$ 18,929 |

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

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Project 1: *Integrated Management of FHB and DON in SRWW in Delaware.*

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

To determine if sequential applications of labeled fungicides for FHB result in a reduction in FHB and DON that results in an economic return.

To determine if the efficacy of timing of fungicide application may be influenced by rate of application.

2. What was accomplished under these goals? *Address items 1-4) below for each goal or objective.*

NOTE: Although a no cost extension of the agreement was granted, the principal investigator was never given access to the funds internally, and so no additional work was done on this project during this reporting period.

From FY17 Report:

- 1) major activities Two field trials were conducted, one in 2015/6 and 2016/17 at the University of Delaware research and education center located at Georgetown, DE. Experiments were inoculated with FHB infested grain spawn and data on treatment effects on FHB index, DON, yield, and test weight were determined and statistically analyzed. Data were shared with producers and the agronomic industry through the Weekly crop update newsletter, the Delaware Applied Research Book, Middletown and Georgetown Small Grains Field days, and Delaware Ag. Week presentations.
- 2) specific objectives: To determine if fungicide rate may influence the efficacy of applications at different timings. To determine if the application of additional FHB recommended fungicides after initial anthesis applications result in improved and economic reduction of FHB and DON.
- 3) significant results: Studies indicated that all treatments, timings, and rates resulted in significant reduction of FHB and DON compared to untreated controls. Caramba applied at 17 oz / A resulted in the greatest numerical reduction of FHB and DON, but this difference was not statistically significant. No significant impact of rate and application timing (anthesis vs anthesis+ 3 days) was noted. These results indicate that increasing the rates of Provaro or Caramba may not improve FHB management, regardless of application timing.
- 4) key outcomes or other achievements. In the variety x multipass study, the moderately resistant variety Jamestown yields were lower than Shirley, but FHB and DON levels were also lower, indicating reduced overall yield potential for this variety. All fungicide treatments resulted in significant yield increases compared to the untreated checks for Jamestown, but no differences between treatments were noted. For Shirley, Proline followed by Folicur resulted in the greatest yields. All treatments reduced FHB index in

(Form – FPR17-18)

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Shirley compared to untreated controls, but no differences were detected in Jamestown. No differences in DON reduction were noted in these studies. Thus, based on our data, although some yield benefit may be realized with multiple pass programs, no improvement in DON and FHB reduction was noted relative to standard anthesis treatments.

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

From FY2017 Report:

I used these studies to train two undergraduate assistants on field research, chemical applications, data recording and analysis.

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

From FY2017 Report:

Data were shared in the UD Applied Research Books in 2016 and 2017, online through the Weekly Crop Update and Field Crop Disease Management Blog, at Middletown and Georgetown small grains field days in 2016 and 2017, the Eddie Mercer Small Grains Day in 2016, Delaware Ag Week in 2016, Maryland Crop Improvement Association meeting in 2016, and Maryland Small Grain Utilization Board meeting in 2016.

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Project 2: *Evaluation of Commercial Wheat and Barley Cultivars for FHB Reaction in DE/MD.*

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

To evaluate soon to be released and currently available soft red winter wheat varieties available to producers in the DelMarVa for FHB and DON reaction using a misted nursery.

2. What was accomplished under these goals? *Address items 1-4) below for each goal or objective.*

NOTE: Although a no cost extension of the agreement was granted, the principal investigator was never given access to the funds internally, and so no additional work was done on this project during this reporting period.

From FY2017 Report:

- 1) major activities Two misted nurseries were set up and evaluated
- 2) specific objectives Identify recommended MR SRWW wheat varieties for use in DelMarVa
- 3) significant results The misted nursery identified numerous varieties that are either soon to be released or were released but did not have FHB ratings that provided DON resistance levels similar to the MR check, OAKES in 2017 and Jamestown in 2016.
- 4) key outcomes or other achievements Data were shared with producers, which allowed industry to promote FHB resistant varieties in 2016 and 2017.

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

From FY2017 Report

Three undergraduates learned basics of field research, experimental design, data collection, and data analysis.

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

From FY2017 Report:

SCABSMART, the UMD small grains website, Weekly Crop Update, Factsheets on selection of MR varieties for minimizing DON available from UD, and Eddie Mercer field days in 2016 and 2017.

Training of Next Generation Scientists

Instructions: Please answer the following questions as it pertains to the FY17-NCE period. 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 FY17-NCE period? No**

If yes, how many?

2. **Did any graduate students in your research program supported by funding from your USWBSI grant earn their Ph.D. degree during the FY17-NCE period? No**

If yes, how many?

3. **Have any post docs who worked for you during the FY17-NCE 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 FY17-NCE 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 FY17-NCE 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 |
|----------------------------|-------------|--|------------------------|------------------|
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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 FY17-FPR_Instructions for detailed instructions for listing publications/presentations about your work that resulted from all of the projects included in the FY17-NCE grant period. Only include citations for publications submitted or presentations given during your award period (6/1/18 - 5/31/19). If you did not have any publications or presentations, state ‘Nothing to Report’ directly above the Journal publications section.

NOTE: Directly below each reference/citation, you must indicate the Status (i.e. published, submitted, etc.) and whether acknowledgement of Federal support was indicated in publication/presentation. See example below for a poster presented at the FHB Forum:

Conley, E.J., and J.A. Anderson. 2017. Accuracy of Genome-Wide Prediction for Fusarium Head Blight Associated Traits in a Spring Wheat Breeding Program. In: Proceedings of the XXIV International Plant & Animal Genome Conference, San Diego, CA.

Status: Abstract Published and Poster Presented

Acknowledgement of Federal Support: YES (poster), NO (abstract)

Nothing to report.

Journal publications.

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

Other publications, conference papers and presentations.