

**USDA-ARS/  
U.S. Wheat and Barley Scab Initiative  
FY16 Final Performance Report  
Due date: July 28, 2017**

**Cover Page**

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<b>Fiscal Year:</b>	2016
<b>USDA-ARS Agreement ID:</b>	59-0206-5-005
<b>USDA-ARS Agreement Title:</b>	Management of Spring and Winter Barley in the Mid-Atlantic for Scab.
<b>FY16 USDA-ARS Award Amount:</b>	\$ 21,817
<b>Recipient Organization:</b>	The Pennsylvania State University Research Accounting 227 W Beaver Ave, Ste 401 State College, PA 16801-4819
<b>DUNS Number:</b>	00-340-3953
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<b>Recipient Identifying Number or Account Number:</b>	404-49 (74TU)
<b>Project/Grant Reporting Period:</b>	6/1/16 - 5/31/17
<b>Reporting Period End Date:</b>	05/31/17

**USWBSI Individual Project(s)**

<b>USWBSI Research Category*</b>	<b>Project Title</b>	<b>ARS Award Amount</b>
MGMT	Management of Fusarium Head Blight on Barley in the Mid-Atlantic.	\$ 21,817
	<b>FY16 Total ARS Award Amount</b>	<b>\$ 21,817</b>


8/1/17  
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 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:** *Management of Fusarium Head Blight on Barley in the Mid-Atlantic.*

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

- 1) Develop integrated management strategies for FHB and mycotoxins that are robust to conditions experienced in production fields of wheat and barley.
- 2) Help develop and validate the next generation of management and mitigation tools for FHB and mycotoxin control.
- 3) Enhance communication and end user education/outreach.

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

**Objective:** Develop integrated management strategies for FHB and mycotoxins that are robust to conditions experienced in production fields of wheat and barley.

1) Major activities

Winter barley varieties well adapted to the mid-Atlantic region were tested at two Pennsylvania locations representing different grain management areas: Lancaster County, PA and Centre County, PA. Both susceptible and moderately FHB resistant varieties with favorable malting properties were used. Fungicide efficacy and timing were evaluated to determine best management practices for FHB control on malting barley in PA field conditions.

2) Specific objectives

- Determine yield and other quality impacts of variety selection combined with fungicide use.
- Determine impact of variety selection combined with fungicide use on DON levels.

3) Significant results

An initial screening of one replication of the study was conducted to determine if enough developed in the crop to necessitate testing all replications. This revealed moderate levels of DON and now all samples are in process for DON analysis.

4) Key outcomes or other achievements

This study is helping us to determine the relative importance of variety selection vs. fungicide application on malting barley grown in the mid-Atlantic. Having these data will aid us in advising growers on management to ensure a profitable and high quality product.

**Objective:** Help develop and validate the next generation of management and mitigation tools for FHB and mycotoxin control.

1) Major activities

In this study we are able to introduce new variables, like a post-heading fungicide timing, to determine its economic viability and DON-control efficacy. In Pennsylvania, and for specialty uses like malting, it is possible that multiple post-flag-leaf sprays may be warranted if proven effective for DON reduction. This work is helping to determine the most effective and cost-efficient fungicide approach.

2) Specific objectives

- Observe impacts of post-heading sprays on grain quality and DON in malting barley.
- Determine economic impact of a two-pass FHB management program.

3) Significant results

An initial screening of one replication of the study was conducted to determine if enough DON developed in the crop to necessitate testing all replications. This revealed moderate levels of DON and now all samples are in process for DON analysis.

4) Key outcomes or other achievements

The inclusion of a fungicide post-heading timing for various products is key to moving our management recommendations forward for malting barley. This relatively high-value crop may economically sustain a second application of a FHB –control product if this results in higher quality or yield.

**Objective:** Enhance communication and end user education/outreach.

1) Major activities

The studies conducted here served as educational backdrops for field days, crop walks and other educational events. In Spring of 2017, we hosted a Malting Barley Crop Walk at the Southeast Ag Research & Extension Center (the Lancaster County field site). During the 2017 “Farming for Success Field Day” at SEAREC, two sessions were also dedicated to managing FHB and other small grains diseases. Management for FHB in organic grains was the focus of a winter 2017 study circle conducted by the PI.

The research plots were also visited during many of the crop production events that take place at both research farms, and information generated from this project was shared during several winter crop production meetings. Specifically, audiences that have been receiving education as a direct result of this work include crop consultants and certified crop advisors, commercial applicators, current conventional and organic barley growers,

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potential barley growers, local maltsters, specialty millers, agricultural industry lenders and agricultural equipment dealers.

2) Specific objectives

- Raise awareness of the management challenges and opportunities of producing malting barley in the mid-Atlantic.
- Increase community understanding of FHB and toxin reduction approaches in malting barley.

3) Significant results

Events: This work was featured at the Philadelphia Grain and Malt Symposium in Winter 2017 and will be discussed at the upcoming Mid Atlantic Brewers Symposium.

Several regional media outlets featured the FHB barley work at Penn State in spring of 2017:

“Field Day Tracks Small Grain Pests”

[http://www.lancasterfarming.com/farming/field\\_crops/field-day-tracks-small-grain-pests/article\\_8635efad-2e9b-56de-938d-3bea63c3b632.html](http://www.lancasterfarming.com/farming/field_crops/field-day-tracks-small-grain-pests/article_8635efad-2e9b-56de-938d-3bea63c3b632.html)

“Head Scab & Marketing are the Main Topics at Landisville Field Day”

[http://www.lancasterfarming.com/news/main\\_edition/head-scab-marketing-are-the-main-topics-at-landisville-field/article\\_d461cbd7-9b65-5582-8087-97227756579a.html](http://www.lancasterfarming.com/news/main_edition/head-scab-marketing-are-the-main-topics-at-landisville-field/article_d461cbd7-9b65-5582-8087-97227756579a.html)

“Malting barley research at Penn State aims to support craft beer industry”

<http://news.psu.edu/story/472799/2017/06/22/research/malting-barley-research-penn-state-aims-support-craft-beer-industry>

<http://www.farmanddairy.com/news/penn-state-conducts-malting-barley-research/428597.html>

“Penn State researchers aim to aid locally sourced beer”

[http://www.pennlive.com/news/2017/07/penn\\_state\\_researchers\\_aim\\_to.html#incart\\_river\\_home](http://www.pennlive.com/news/2017/07/penn_state_researchers_aim_to.html#incart_river_home)

“Penn State explains almost everything you need to know about malting barley in Pennsylvania”

<https://www.craftbrewingbusiness.com/news/penn-state-explains-almost-everything-you-need-know-malting-barley-pennsylvania/>

“Malting Barley in Pennsylvania” A production factsheet

<http://extension.psu.edu/plants/crops/grains/small/production/malting-barley>

4) Key outcomes or other achievements

In 2016 and 2017, we achieved a significant increase in awareness of malting barley quality issues among growers, users, and the larger mid Atlantic community. The events held which featured malting barley management topics were attended by over 500 people. The articles and events detailed above stimulated further communication from barley growers in PA, NY and MD. The PIs continued to engage with new contacts for several weeks as a result of these media features.

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

Funding from this project has allowed the PI to attend the National FHB Forum. Attendance at this conference has increased our understanding of the biology of the fungus, successful management approaches in other regions and stimulated ideas on possible approaches for the mid-Atlantic. This knowledge has been critical in developing extension and outreach programming for the mid-Atlantic region.

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

This project has served as a focus point for discussions and training on increasing the quality of malting barley in the mid-Atlantic. Those who have benefited from these trainings have included not just growers, but many more who work with growers to produce a healthy crop. As a result, extension educators, crop consultants, custom applicators, ag chemical industry representatives, maltsters and buyers are all becoming more conversant in the needs of both the producer and the end-user of malting barley in the mid-Atlantic. Through web article and fact sheet dissemination, we have also reached thousands more in the region and across the country with this information.

Further, we are gaining a greater awareness among diverse and non-traditional audiences of the local malting industry and malting barley as a crop as a result of coverage in the popular media. This will aid our growers and maltsters as consumers come to understand the complexities of malting barley production, and ideally they will become more willing to pay a premium price for a quality local end product.

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## **Training of Next Generation Scientists**

**Instructions:** Please answer the following questions as it pertains to the FY16 award 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 FY16 award 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 FY16 award period?**  
No  
**If yes, how many?**
- 3. Have any post docs who worked for you during the FY16 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 FY16 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 FY16 award period. All columns must be completed for each listed germplasm/cultivar. Use the key below the table for Grain Class abbreviations. *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

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 FY16-FPR\_Instructions for detailed instructions for listing publications/presentations about your work that resulted from all of the projects included in the FY16 grant. Only include citations for publications submitted or presentations given during your award period (6/1/16 - 5/31/17). If you did not have any publications or presentations, state 'Nothing to Report' directly above the Journal publications section.

### **Journal publications.**

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

### **Other publications, conference papers and presentations.**

Roth, G. W., A. Kirt, and A.A. Collins, 2016. Agronomy Facts 77 Malting Barley in Pennsylvania. © The Pennsylvania State University 2016.

Status: Published

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