

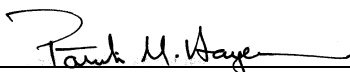
USDA-ARS
U.S. Wheat and Barley Scab Initiative
FY17 Final Performance Report
Due date: July 31, 2018

Cover Page

Principle Investigator (PI):	Patrick Hayes
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Fiscal Year:	2017
USDA-ARS Agreement ID:	59-0206-7-156
USDA-ARS Agreement Title:	Production of Double Haploid for FHB Resistance.
FY17 USDA-ARS Award Amount:	\$ 68,976
Recipient Organization:	Office for Sponsored Research and Award Administration Oregon State University A312 Kerr Administration Building Corvallis, OR 97331-2140
DUNS Number:	53599908
EIN:	61-1730890
Recipient Identifying Number or Account Number:	RO719A
Project/Grant Reporting Period:	8/1/17 - 7/31/18
Reporting Period End Date:	07/31/18

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
BAR-CP	Collaborative Doubled Haploid Production for FHB Resistance Breeding.	\$ 68,976
	FY17 Total ARS Award Amount	\$ 68,976


 Principal Investigator

July 26, 2018
 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: *Collaborative Doubled Haploid Production for FHB Resistance Breeding.*

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

Our overall project goal is to increase the efficiency with which researchers identify and deploy genes and QTLs that contribute to reduction in the losses caused by Fusarium head blight (FHB), especially quality discounts due to the accumulation of mycotoxins such as deoxynivalenol (DON). This can be achieved by developing doubled haploid germplasm from the F1s of cross combinations identified by collaborating breeders. Doubled haploids - being complete homozygotes - are immortal reference stocks that provide unequivocal genotyping and phenotyping data.

Our project objectives are to:

1. Receive F1 seed no later than August 1 if winter growth habit and no later than September 1 if facultative or spring habit - from the collaborating research group(s) identified by the review committee as having the greatest potential to have economic impact and to contribute to the fundamental body of knowledge.
2. Grow F1 donor plants.
3. Produce ~ 1,666 doubled haploid plantlets from the F1 donor plants.
4. Ship the doubled haploid plantlets to cooperators, who will raise them to seed - generating a total of ~1,000 doubled haploid plants.

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

- 1) **major activities:** Received seed of six F1s from Virginia Tech and four F1s from Cornell. Grew donor plants. Sampled anthers from donor plants. Regenerated embryos from microspores. Selected green plantlets. Growing DH plants in OSU greenhouses for Virginia Tech and sending green plantlets to Cornell.
- 2) **specific objectives:** Given average regeneration rates, we will exceed the projected milestone of 1,000 doubled haploids. We have undertaken an unbudgeted doubled haploid plant production role for Virginia Tech due to their greenhouses not being suitable for plant production during the summer months.
- 3) **significant results:** Met and exceeded goals and objectives.
- 4) **key outcomes or other achievements:** Met and exceeded goals and objectives.

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

An undergraduate student was trained in doubled haploid production. The Senior Faculty Research Assistant in charge of the project gained new insights into the challenges of germplasm specificity for doubled haploid production. The OSU team validated the model for genetic control of vernalization response. Participating breeders and geneticists developed additional appreciation for the complexity and potential of doubled haploid genetics.

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

Initial results were shared at the 2017 USWBSI conference. Participating breeders were continually updated with progress reports.

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Training of Next Generation Scientists

Instructions: Please answer the following questions as it pertains to the FY17 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 FY17 award period?**
NA
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 award period?**
NA
If yes, how many?

3. **Have any post docs who worked for you during the FY17 award period and were supported by funding from your USWBSI grant taken faculty positions with universities?**
NA
If yes, how many?

4. **Have any post docs who worked for you during the FY17 award period and were supported by funding from your USWBSI grant gone on to take positions with private ag-related companies or federal agencies?**
NA
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 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
A complete list of doubled haploids produced will be available when the plants set seed and are harvested. Cooperators will be responsible for phenotyping and genotyping. The pedigrees are as follows: Flavia/DH130910 Scala/DH130910 SY Typee/DH130910 DH130910/Wintmalt Secretariat//Quest/VA11B-130 Atahualpa/VA11B-130//Amaze 10 VA16M-81/Violetta Quest/VA11B-130//VA14B-59 Violetta//Thoroughbred/Flavia	BAR			

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 grant. Only include citations for publications submitted or presentations given during your award period (8/1/17 - 7/31/18). 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.

Journal publications.

NA

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

NA

Other publications, conference papers and presentations.

P. Hayes, T. Filichkin, L. Helgerson, S. Fisk, and J. Hernandez. 2017. Collaborative Doubled Haploid Breeding for Fusarium Head Blight Resistance in Barley. National Fusarium Head Blight Forum. Milwaukee, WI. December, 2 – 4, 2017.

Status: Abstract Published and Poster Presented

Acknowledgement of Federal Support: YES (poster), Yes (abstract)