USDA-ARS
U.S. Wheat and Barley Scab Initiative
FY20 Annual Performance Progress Report
Due date: July 29, 2021

Cover Page

Principle Investigator (PI):	Jorge Dubcovsky
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Fiscal Year:	2020
USDA-ARS Agreement ID:	59-0206-0-171
USDA-ARS Agreement Title:	Preparing Barley for FHB in California
FY20 USDA-ARS Award Amount:	$ 38,774
Recipient Organization:	The Regents of the University of California Office of Research Sponsored Programs 1850 Research Park Drive Suite 300 University of California Davis, CA 95618-6153
DUNS Number:	04-712-0084
EIN:	94-6036494
Recipient Identifying Number or Account Number:	25D22
Project/Grant Reporting Period:	5/15/20 - 5/14/21
Reporting Period End Date:	5/14/2021

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
BAR-CP	Preparing Barley for FHB in California	$ 38,774
	FY20 Total ARS Award Amount	**$ 38,774**

2021 07 28

Principal Investigator Date

* MGMT – FHB Management
FST – Food Safety & Toxicology
R- Research
S – Service (DON Testing Labs)
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: *Preparing Barley for FHB in California*

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

   The project goals are to characterize variation in resistance to FHB in the University of California-Davis barley germplasm, to identify any novel sources of resistance, and to develop FHB-resistant barley germplasm adapted to California growing conditions.

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?**

   One hundred lines from the barley breeding program were previously screened in an inoculated nursery (three replications) in MN in collaboration with Dr. Ruth Dill-Macky. Based on the severity(%) and DON(ppm) data, we removed highly susceptible lines and replaced them with lines of unknown resistance for a second screening nursery. Unfortunately, Dr. Dill-Macky was unable to put in a screening nursery in the spring of 2020 due to the pandemic. However, Dr. Steffenson was able to include one rep of these lines in a screening nursery in the spring of 2021.

   Twenty populations have been developed with parents that include elite lines and lines that show the greatest resistance or are known to be more resistant based on previous USWBSI. This material is now at the F_3 stage and will be evaluated and selected for adaptation to California in the field for the 2021-2022 growing season. A DH population is also being developed by OSU.

   b) **What were the significant results?**

   The two most significant results to date are the knowledge of FHB resistance and susceptibility within our breeding material, which has previously been unknown, and the identification of a FHB resistant lines with promising characteristics for future release. We were able to identify lines with more potential resistance based on this initial screening and to initiate a FHB resistance program at UCD. One of our elite AMBA approved malting lines (B9k62) showed low FHB severity (13%) and DON (15 ppm) and we are planning to release it in 2022. This variety will be the first FHB resistant malting barley variety in California and we plan to name it UC-Gallagher in recognition to the late barely breeder from CA, who set the foundation of our malting barley program.

c) List key outcomes or other achievements.

Key outcomes include the imminent release of a two-row AMBA approved malting line showing low FHB susceptibility and the development of several populations with at least one parent of low FHB susceptibility.

3. Was this research impacted by the COVID-19 pandemic (i.e. university shutdowns and/or restrictions, reduced or lack of support personnel, etc.)? If yes, please explain how this research was impacted or is continuing to be impacted.

Yes, this research was very much impacted by the pandemic. Dr. Dill Macky was not able to plants the second year screening nursery (spring 2020). Fortunately, Dr. Steffenson was able to plant a subset of this nursery for during the spring 2021 season that will provide valuable information. Also genotyping efforts were put on hold due to the closure of laboratories and family obligations for the researcher (two small kids' not attending school).

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

Students and researchers were trained in genotyping techniques.

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

Nothing to Report

Training of Next Generation Scientists

Instructions: Please answer the following questions as it pertains to the FY20 award period (5/15/20 - 5/14/21). 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 FY20 award period?**
   ☐Yes ☒No
   If yes, how many? Click to enter number here.

2. **Did any graduate students in your research program supported by funding from your USWBSI grant earn their Ph.D. degree during the FY20 award period?**
   ☐Yes ☒No
   If yes, how many? Click to enter number here.

3. **Have any post docs who worked for you during the FY20 award period and were supported by funding from your USWBSI grant taken faculty positions with universities?**
   ☐Yes ☒No
   If yes, how many? Click to enter number here.

4. **Have any post docs who worked for you during the FY20 award period and were supported by funding from your USWBSI grant gone on to take positions with private ag-related companies or federal agencies?**
   ☐Yes ☒No
   If yes, how many? Click to enter number here.

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 FY20 award period (5/15/20 - 5/14/21). 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	FHB Rating (0-9)	Year Released
N/A	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year
Click here to enter text.	Select Grain Class	Select what represents your most resistant check	Enter as text 0-9 rating	Select Year

NOTE: List the associated release notice or publication under the appropriate sub-section in the 'Publications' section of the FPR.

Publications, Conference Papers, and Presentations

Instructions: Refer to the PR_Instructions for detailed more instructions for listing publications/presentations about your work that resulted from all of the projects included in the FY20 grant award. Only citations for publications published (submitted or accepted) or presentations presented during the **award period (5/15/20 - 5/14/21**) should be included. If you did not publish/submit or present anything, state 'Nothing to Report' directly above the Journal publications section.

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

Z.J. Winn, R. Acharya, J. Lyerly, G. Brown-Guedira, C. Cowger, C. Griffey, J. Fitzgerald, R.E. Mason and J.P. Murphy. 2020. "Mapping of Fusarium Head Blight Resistance in NC13-20076 Soft Red Winter Wheat." In: S. Canty, A. Hoffstetter, and R. Dill-Macky (Eds.), *Proceedings of the 2020 National Fusarium Head Blight Forum (*p. 12.), Virtual; December 7-11. Online: https://scabusa.org/pdfs/NFHBF20_Proceedings.pdf.
Status: Abstract Published and Poster Presented
Acknowledgement of Federal Support: YES (Abstract and Poster)

Journal publications.

Nothing to report.

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

Nothing to report.

Other publications, conference papers and presentations.

Nothing to report.