

Project FY22-BA-019: Collaborative Barley Doubled Haploid Production

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

Our major goal was to continue to assist researchers in increasing the efficiency with which they identify and deploy genes and QTLs that contribute to reduction in the losses caused by Fusarium head blight (FHB). We sought to achieve this goal by developing doubled haploid (DH) germplasm from the F1s of cross combinations identified by collaborating breeders. DH's are complete homozygotes that provide unequivocal genotyping and phenotyping data.

Our project objectives were to:

1. Produce ~ 2,000 green plantlets (GP) from the F1 donor plants with the expectation of producing ~ 1,000 fertile doubled haploid (DH) plants.
2. Produce seed from the DH and ship seed to cooperators.

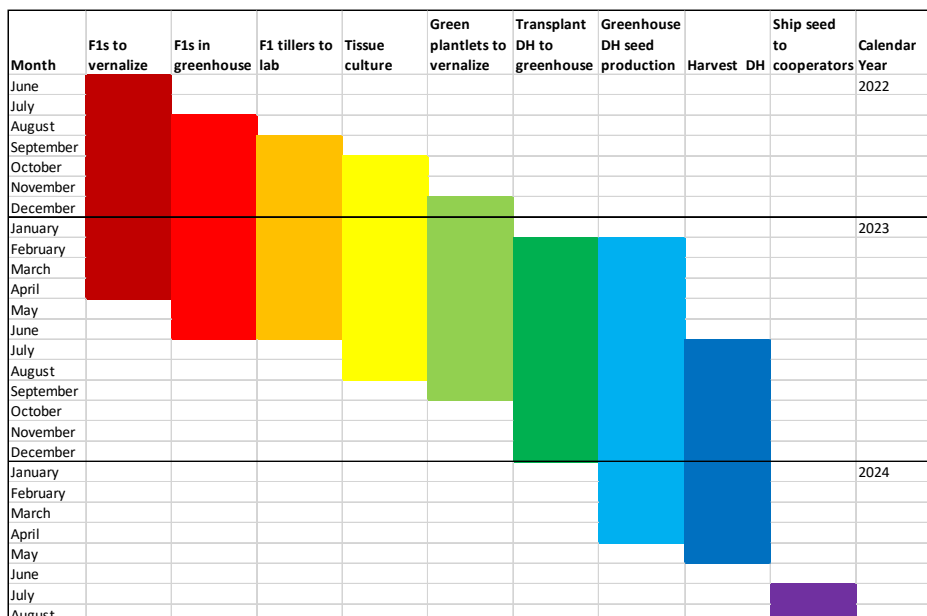
Our plan to accomplish goals was:

1. Receive F1 seed no later than June 1 from the collaborating research group(s) identified by the CP Steering Committee (CPSC) 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 ~ 2,000 GPs from the F1 donor plants.
4. Produce ~ 1,000 DHs from the GPs.

2. What was accomplished under these goals or objectives? (For each major goal/objective, address these three items below.)

What were the major activities?

Our doubled haploid production cycle is not synchronous with the report timeframe. Therefore, we report numbers of DHs from the 2022-2023 production year and numbers of GPs for the 2023-2024 production year. The following graph shows the chronology of the 2022-2023 production year – doubled haploids will be shipped to cooperators in the summer of 2024.



What were the significant results?

2022-23 PRODUCTION YEAR:

Project completed in 2024. Number of doubled haploids produced per cross.

ID	Program	Pedigree	Doubled Haploids
E1	Cornell	Lightning/Buck	76
E2	Cornell	DH131055/Purple Prince	209
E3	Ohio State	MOB2112-Alexis-028/DH0214-056	309
E4	Minnesota	2ND32529/S2M187	153
E5	UC Davis	DH160733/UC Tahoe	258
Total			1,005

2023-24 PRODUCTION YEAR:

Crosses received. Lab and greenhouse work continued. The DH production is ongoing in 2024. Number of green plantlets per cross produced to date during funding period.

ID	Program	Pedigree	Green Plantlets
H1	UC Davis	UC Capay/M351//UC Alameda	25
H2	Minnesota	S2M184/2MS20 3227-003	102
H3	Ohio State	RIL02FL-029/GHRIL02TIFF-107	334
H4	Virginia Tech	Avalon/VA21HFHB-19DH0301	1,017
H5	Nebraska-Lincoln	NB19422/2ND38809//NB20439	195
Total			1,673

List key outcomes or other achievements.

For the 2022-2023 production year we exceeded the goal of 200 DH for three out of five crosses and met the 1,000 total DH goal. Cross “E1” has a 6-row parent and cross “E4” has spring growth habit, both are known to be less responsive to anther culture which is reflected in the reduced amount of DH produced.

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

Professional expertise enhanced. Travis Nickols was hired and trained to manage the DH tissue culture lab.

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

DH seed will be delivered to cooperators. Discussion at the 2024 Barley Improvement Conference has led to a deeper understanding between collaborators providing F1 seed and the OSU DH lab.

5. What do you plan to do during the next reporting period to accomplish the goals and objectives?

Continue expanding channels of communication and endeavoring to increase efficiency.