

Project FY22-BA-015: Developing FHB Resistant Barley Cultivars for California

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

Evaluate and enhance Fusarium Head Blight (FHB) resistance in the University of California Davis (UCD) barley breeding population and develop new barley varieties with moderate resistance to FHB

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

What were the major activities?

- 1) **Screening:** conducted the fourth round of screening UCD barley materials for FHB resistance in Crookston, MN.
- 2) **Resistance Introduction:** Introduced FHB resistance traits from non-UCD materials into UCD barley breeding population
- 3) **Breeding Advancement:** Advanced the breeding population to enhance FHB resistance using bulked pedigree selection methods.

What were the significant results?

- 1) **UCD malting barley varieties**—including UC-Tahoe, UC-Capay, and UC-Butta12, showed moderate susceptibility to FHB based on five years of FHB screening. Identification and deployment of FHB resistance is necessary to increase the resilience of UCD barley.
- 2) **Seven UCD lines** exhibited consistent FHB resistance, with disease severity below 25% across at least 3 years of evaluation. Notably, lines B9K62 and DH160754 have been incorporated into breeding populations aimed at developing FHB-resistant barley cultivars.

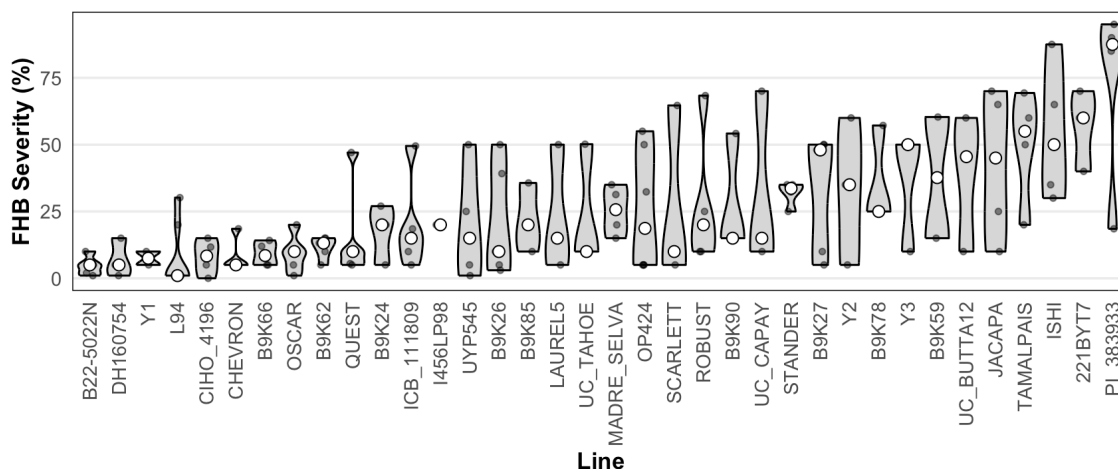


Figure 1. FHB severity of barley lines evaluated in at least three environments.

List key outcomes or other achievements.

- 1) After five years of FHB screening, we confirmed that the released UCD cultivars showed moderate susceptibility to FHB, and we have identified seven UCD lines with consistent and reliable FHB resistance.

- 2) FHB resistance has been introduced into the breeding populations, with ongoing selection and improvement efforts to develop enhanced resistant barley varieties.

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

NA

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

The FHB resistance and DON concentration data have been systematically managed and stored by the central database of the project.

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

- 1) **FHB screening:** Continue evaluating FHB resistance of new UCD barley breeding lines (100 plots) by collaborating with the University of Minnesota in this project.
- 2) **Genomics-Assisted Breeding:** Genotype the barley lines with FHB data and integrate genotypic and phenotypic data to enhance data-driven selection within breeding populations.
- 3) **Advance Breeding Populations:** Continue advancing the breeding populations with improved FHB resistance at UC Davis.