

Project FY22-GD-001: A Centralized Wheat Transformation and Gene Editing Facility for the FHB Community

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

The major goal of this project was to maintain a wheat plant transformation facility for U.S. Wheat and Barley Scab Initiative. The main objective was to generate transgenic and/or gene – edited plants and provide T₁ generation seed stocks to funded Initiative research projects.

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

What were the major activities?

The transformation facility has setup protocols to provide transformation services year-round. Cultivars are planted weekly or biweekly to ensure constant supply of immature embryos used as targets for genetic transformations. On a weekly basis several experiments are simultaneously going. After transformation the cultures go through the transformation selection, plant regeneration process, followed by molecular confirmation genetic transformation. Approximately five-six months after initiating transformation seeds representing the T₁ generation were and will be harvested and mailed to PIs under the appropriate APHIS movement permit.

What were the significant results?

Transgenic/gene edited events were supplied for eight plasmid constructions to Guihua Bai's program, three construction to Jyoti Shah's program, 7 constructions to Nidhi Rawat's program and one construction to Guixia Hao's program. Wheat cultivars used were Bobwhite, RB07, Fielder, Forefront, Chinese Spring, and Rollag. During the funding period a total of 311 bombardments were performed, generating 2077 plants.

List key outcomes or other achievements.

The generation of wheat transgenic lines for collaborators and providing them with seeds representing T₁ generation.

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

This project, in part, has provided tissue culture and transformation of wheat cultures training for two PhD students (Giovanna Moreira and Luiza Adami).

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

Individuals providing vectors were updated periodically of progress on their requests and at the annual NFHBF and GDER mid-year meetings.

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

Some of the experiments listed in the accomplishments above are still in the regeneration process which will result in additional lines recovered. Additional bombardments for the coming cycle are also anticipated.