

Project FY22-DU-009: Developing FHB Resistant Winter Durum to Increase Crop Diversity in US Great Plains

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

The major goal of our project is to develop winter durum varieties and germplasm. The specific objectives are to 1) Evaluate winter durum germplasm and lines in preliminary observation trials for FHB resistance and advance superior lines for variety development; (2) introgress FHB resistance into elite winter durum adapted to the US Great Plains.

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

What were the major activities?

In the second year of the project, 29 winter durum breeding lines were evaluated in the field FHB nursery. More than 40 new crosses were developed among elite lines in 2023-24 and populations were advanced to the next generation. Of these 25 crosses involved FHB resistance sources 10Ae564, 15En279, 15En88 (spring durum). More than 104 durum breeding lines were evaluated in an early observation trial (EOT) and 20 new winter durum lines were advanced to Preliminary Yield Trials (PYT) and 6 to Advanced Yield Trials (AYT) for 2024.

What were the significant results?

2023 was a severe drought year in South Dakota, so establishment and winter durum stand were below average, however, the evaluations in FHB nursery showed high incidence (ranging from 50% to 100%) and the disease severity ranged from 10% to 56%. The FDK in the samples ranged from 35-100% and DON ranging from 5 to 20 ppm suggesting that durum is highly susceptible to FHB and therefore development of resistant varieties is essential for the success of winter durum.

Twenty new winter durum lines were advanced to Preliminary Yield Trials (PYT) and 6 to Advanced Yield Trials (AYT) in 2024 and are being evaluated in three locations.

List key outcomes or other achievements.

In the second year of the project, 20 new winter durum lines were advanced to Preliminary Yield Trials (PYT) and 6 to Advanced Yield Trials (AYT).

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

A postdoc is partially (~10%) supported through this grant. Research was presented at the National American Plant Phenotyping Network, Plant Science Symposium at UNL.

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

The results from this project were shared through field days and social media.

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

We will continue to 1) Evaluate winter durum lines in preliminary and advanced trials for FHB resistance and advance superior lines for variety development; (2) introgress FHB resistance into elite winter durum adapted to the US Great Plains.