

Project Abstract

Project Title:	Developing FHB-resistant Hard Red Winter Wheat for Texas and the S. Great Plains	
Principal Investigator:	Amir Ibrahim	Texas A&M University
Co-Investigator:	Jackie Rudd	Texas A&M University
Co-Investigator:	Shuyu Liu	Texas A&M University

Texas is a large Hard Red Winter Wheat (HRW) growing state, where five million acres of HRW have been planted annually over the past 5 years. In 2015 and 2019, Texas Panhandle reported *Fusarium* Head Blight (FHB) likely due to an increase in corn acres in the wheat rotation. Texas A&M began an FHB breeding program in 2019, and our efforts are expanding. A mist-irrigated FHB evaluation nursery was successfully established at the main campus for evaluating incidence and disease severity. We have specifically evaluated the Southern Regional Germplasm Nursery (SRPN), Northern Regional Germplasm Nursery (NRPN), the Southern Scab Nursery in addition to Texas advanced yield trials. Another nursery was used at Dumas, TX during the 2020-21 wheat growing season. Both nurseries had heavy scab infection.

The *Overall Project Goals* of this proposal is to use traditional breeding techniques and marker-assisted selection (MAS) to develop FHB-resistant HRW cultivars adapted to Texas and the Southern Great Plains. *Project Specific Objectives* are to 1) develop, screen, and release HRW that combine superior yield and end-use quality with tagged or native FHB resistance, 2) use MAS to complement traditional breeding methods and improve gain from selection, and 3) enter promising FHB-resistant lines into regional nurseries to facilitate development of resistant cultivars. *Expected Outcomes*: New FHB-resistant HRW cultivars with high yield, tolerance to other stresses, and superior quality will provide effective means of resistance not only in Texas but in other areas of the central and southern Great Plains where TAM wheat is adapted and where FHB levels require adequate host plant resistance. *Approaches*: Will focus on testing recent releases and most advanced breeding lines in the Regional Hard Winter Wheat FHB nurseries and establishing FHB screening nurseries in Texas. Advanced lines represented by the Texas Elite Trial (TXE), UVT, Southern Regional Performance Nursery (SRPN), and Northern Regional Performance Nursery (NRPN) will be evaluated in a misted, inoculated nursery at College Station, TX and a pivot-irrigated nursery planted into heavy corn residue in the Texas Panhandle. We will also expand testing to include screening of doubled-haploid lines from populations with known tagged and native FHB resistance as well as lines derived from early generations with known FHB resistance. *Statement of Mutual Interest*: This work will benefit HWW growers in Texas and other growing areas in the Southern great Plains through the development of FHB-resistant cultivars that have better yield and lower DON content.