

Project Abstract

Project Title:	Breed FHB resistant cultivars via doubled haploid and marker-assisted backcrossing	
USWBSI Project ID:	FY24-HW-001	
Principal Investigator:	Shuyu Liu	Texas A&M Agrilife Research, Department of Soil and Crop Sciences

By checking this box, I confirm this can be used as my project abstract for public reference.

Project Summary

Overall project goal(s): Develop Fusarium Head Blight (FHB) resistant germplasm and cultivars, and transfer major resistance genes into adapted hard winter wheat.

Project Objectives: 1) Pyramid multiple major FHB resistance genes through marker-assisted backcrossing: Expect to obtain at least 10 BCnF1 or F1 populations from the collaborators selected based on gene linked markers or parents. 2) Develop doubled haploid lines (DHLs) using established DH system in the Texas A&M AgriLife research-Amarillo with an aim to obtain 100 DHLs from each of the 10 crosses. 3) Identify the resistant DHLs through marker assisted selection (MAS). Expect to provide resistant and pure DHLs to breeders.

Approaches: We will integrate MAS into the DH development process to effectively introgress both major and minor FHB resistance genes/QTL into locally adapted cultivars. Breeders will provide their preferred crosses with major genes (Fhb1, Fhb6, Fhb7) and/or minor genes/QTL in the genetic background of adapted cultivars. DHLs will be produced from F1 or BCnF1 seeds. The PI has established and integrated DH procedures with the TAMU wheat breeding and genetics research programs. More than 3,500 DHLs have been developed in the past few years using established procedures and customized facilities for wheat-maize pollination, haploid seed dissection, embryo rescue and culturing, and chromosome doubling.

Statement of Mutual Interest: The DHLs with various combinations of major FHB resistance genes/QTL will be confirmed using diagnostic Kompetitive allele specific PCR (KASP) markers and will be evaluated by collaborators for field FHB resistance and yield trials. Resistant lines will be available for wheat breeders and geneticists to utilize in their breeding or research pipelines. Farmers could obtain released cultivars 3 to 4 years earlier using the DH system as compared to the traditional breeding process.

