Project Abstract

Project Title:	New Sources of Resistance to FHB and DON in Wheat	
USWBSI Project ID:	FY24-HW-008	
Principal Investigator:	Dalhoe Koo	Kansas State University
Co-Investigator(s) include Institution:	Rajendran Sathishraj	Kansas State University

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

Project Summary

Overall project goal(s)
Identification and characterization of new source of FHB resistance

Project Objectives
1. Screening of unique germplasms
Only a few FHB resistant sources are available for developing FHB resistant elite cultivars. The present research is aimed at identifying and characterizing novel sources of FHB resistance from 68 wheat-alien addition/translocation lines and 5 wheat amphiploids along with their 12 amphiploid progeny. These are unique germplasms available in Wheat Genetics Resource Center (WGRC) from which novel biotic stress tolerant genes can be mined.
Expected Outcomes: Identification and characterization of novel sources of FHB resistance.

2. Identification of genetic markers linked to FHB resistant loci in HSD2-32
To identify FHB resistant locus in HSD2-32 we have developed F_2 population by crossing Chinese Spring (CS) and HSD2-32. This F_2 population was genotyped by GBS and phenotyped for FHB resistance by point inoculation. QTL mapping utilizing the genotyping and phenotyping data identified the putative genomic region around 628-633 Mb in chromosome 2D conferring FHB resistance in HSD2-32. This putative QTL was validated in the F3 population using KASP genotyping and we will continue validating this QTL in multiple genetic background. We continue developing the recombinant inbreed lines (RILs) of CS x HSD2-32 for mapping of FHB resistant loci in HSD2-32. We also generated $BC1F_2$ population from CS x HSD2-32 which will be carry forward to develop advanced backcross population for mapping of FHB resistant loci in HSD2-32.
Expected outcome: The identified genetic markers enables the transfer of FHB resistance from HSD2-32 line to elite winter wheat cultivars.

Approaches
Objective 1: Screening of diverse germplasm for Type II FHB resistance will be done by point inoculation under greenhouse conditions.

Objective 2: The genome sequencing of HSD2-32 was done recently in this project and the same will be used to identify SNPs for designing KASP markers for KASP assay. The F_3 and $BC1F_2$ population of CS x HSD2-32 will be carry forward to next generation by single seed descent method under greenhouse condition.

Statement of Mutual Interest
The proposed research on basic germplasm development is fully integrated with the breeders of the HWWCP. Project results will be discussed and shared with all PIs at the annual spring meeting. Parental donor germplasms for including in the breeding program will be shared with regional breeders and others based on individual requests. HWW germplasm with well-documented resistance to FHB and DON will be registered and released for wider distribution according to WGRC germplasm release protocols.