Project Summary

Project Title:	**Wheat Crop Improvement for FHB Resistance by Cytogenetics**	
Principal Investigator:	Dalhoe Koo	Kansas State University
Co-Investigator #1:	Bernd Friebe	Kansas State University

Project Summary

Overall project goal

The overall goal of this project is to identify and characterize the novel sources of resistance to FHB and reduced DON accumulation in wheat.

Project Objectives

1. Detection of alien introgressions in HSD2-32

HSD2-32 (2n=42) is FHB resistant and it is derived from the cross involving Ganmei8 (*Trielytrigia* 2n=56, AABBDDEE) and *Thinopyrum intermedium* (2n=42, JJJ^{s}J^{s}SS). However, the exact pedigree information of HSD2-32 is unavailable. GISH using total genomic DNA of *Thinopyrum elongatum* and/or *Th*. *intermedium* as probes and skim-seq analysis did not detected any *Thinopyrum* introgressions in HSD2-32. However, HSD2-32 had sizable regions in chromosome arms 2DL, 5BL, and 6AS which are not able to map to the wheat reference genome. This gives us a clue that HSD2-32 may have introgressions from other wheat relatives conferring FHB resistance which further needs cytological characterization of HSD2-32.

Expected outcome: Identification and characterization of novel sources of FHB resistance in HSD2-32.

2. Identification of genetic markers linked to FHB resistant loci in HSD2-32

Identification of genetic markers associated with FHB resistant loci in HSD2-32 line will be done using F_2 population derived from the cross between Chinese Spring wheat and 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: Genomic DNA of wild wheat relatives such as *Secale cereale* (RR), *Thinopyrum ponticum* (JJJJJJJ^{s}J^{s}J^{s}J^s), *Dassypyrum villosum* (VV), and *Pseudoroegneria spicata* (S^{t}S^t) will be used as probes to detect alien introgression in HSD2-32 by pachytene GISH.

Objective 2: Genotyping-by-sequencing (GBS) method will be used to genotype the F_2 population along with their parents (HSD2-32 and Chinese Spring wheat). Phenotyping of F_2 population will be done using point inoculation method following standard procedure.

Statement of Mutual Interest

The characterized HSD2-32 line along with the identified genetic marker linked with FHB resistance can be used to improve FHB resistance in the elite wheat varieties. The improved elite varieties will be made available to farmers in the US for increasing the wheat grain yield with reduced DON content.

Abbreviations

FHB	:	Fusarium Head Blight
DON	:	Deoxynivalenol
GISH	:	Genomic *in situ* hybridization
GBS	:	Genotyping-by-sequencing
F_2	:	Filial 2
DNA	:	deoxyribonucleic acid