

Project Abstract

Project Title:	Mapping and mobilization of FHB resistance derived from <i>Aegilops tauschii</i>	
USWBSI Project ID:	FY24-HW-007	
Principal Investigator:	Allan Fritz	Kansas State University

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Project Summary

The objectives are to 1) to verify FHB resistance from *Aegilops tauschii* is expressed in common wheat; 2) Map resistance to discrete chromosomal regions; 3) Develop KASP assays as breeder-friendly markers; 4) Initiate crossing and selection in elite backgrounds to facilitate rapid deployment of novel loci. BC1F5 derived recombinant inbred lines (RILs) are currently available from crosses using KanMark as the recurrent parent and FHB-resistant *Ae. tauschii* accessions TA 1599, TA 1691, TA 2477 and TA 2478. These accessions were chosen as they were the most resistant accessions identified in previous research. The populations will be planted in an augmented design in an inoculated FHB nursery in Manhattan, KS and will be evaluated for PSS, FDK, AUDPC and DON. The project will generate two years of field data. Parental materials have at least 5X sequence coverage. Low pass sequencing approaches will be used to genotype the RILs. Genotype data will be used in conjunction with phenotype data to perform standard interval mapping, composite interval mapping and multiple QTL mapping analyses. Alignment of regions with significant SNPs will lead to the development of KASP markers, which will be tested on the populations with elite material to assess the utility of the markers. We will invite any breeding program in the HWW region who wishes to participate to send an elite line that will be crossed with the most resistant RILs from each population. BC1F2 populations will be developed and screened with markers and/or selected in the inoculated FHB nursery. Selected BC1F3 seed will be returned to the respective breeding programs. This work will be initiated, but not completed in the funding window of this project. Field evaluations will be conducted in the 2024 and 2025 growing seasons and DON samples will be submitted. Libraries will be sequenced in early 2024. The second year yield trial will be planted in October of 2024. On the first year data will be performed in the fourth quarter of 2024. The second field season will mimic the first. The most resistant lines from each population will be selected based on the 2024 field data and parental lines will be solicited in the summer of 2024 to initiate crossing and backcrossing that will be completed in the Spring of 2025 and BC1F1 plants will be grown in the growth chamber to generate BC1F2 materials to be planted in the inoculated nursery in the Fall of 2025. KASP marker development will occur in the Fall of 2025.

