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PROJECT 2 ABSTRACT

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The two major challenges for alien introgression are the low recombination frequency between wheat and alien chromosomes due to the presence of the *Ph* gene that prohibits homoeologous chromosomes from pairing in wheat and the linkage drag associated with the alien chromatin integrated into wheat genomes. The specific objectives of this proposed project are:

1) Introgress alien FHB resistance genes into adapted spring wheat genotypes;
2) Characterize chromosome constitutions of alien introgression lines with FHB resistance and reduce linkage drag associated with alien chromatin if necessary;
3) Pyramid resistance genes from different sources;
4) Evaluate FHB resistance of the advanced introgression lines under field conditions.

We will use the Ph^I (*Ph* inhibitor gene) line and/or *ph* mutant to induce homoeologous pairing and recombination between wheat and alien chromosomes. Unwanted alien chromatin can also be further eliminated to reduce linkage drag through this approach. Another challenge specific for alien introgression of FHB resistance genes is the evaluation and selection of introgression materials with FHB resistance. We will screen materials at early generations under greenhouse environments and verify resistance of the introgression lines selected under field conditions. Also we will submit the resistant lines for DON testing. Introgression of alien FHB resistance genes into adapted spring backgrounds can enhance and diversify resistance of wheat to FHB. Breeder-friendly alien introgression lines with FHB/DON resistance will be immediately made available to the breeding programs.