PI: Bernd Friebe **PI's E-mail: friebe@k-state.edu**

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Research Category: **HWW-CP** **Duration of Award: 1 Year**

Project Title: New sources of Resistance to FHB and DON in Wheat.

PROJECT 1 ABSTRACT

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The overall goal of the proposed project is to use chromosome engineering to develop wheat-alien compensating translocation and recombinant lines with new sources of resistance to FHB and DON accumulation, develop genetic markers for the targeted alien chromosome segment to facilitate prebreeding into elite hard winter wheat germplasm and make it available for wheat improvement programs.

Project objectives:

1. Further evaluation of *Fhb3* (T7AL·7Lr#1S and T7AL·7Lr#1S-7AS) in greenhouse and field plots for FHB and DON.
2. Evaluate a new source of FHB resistance derived from *Elymus tsukushiensis* (T1AL·1AS-1E^{ts}#1S) in greenhouse and field plots for FHB incidence and DON accumulation and transfer to adapted Kansas winter wheat.

Currently, we are working with *Fhb3* resistance transferred from the tetraploid species *Leymus racemosus*, transferred to wheat in the form of a Robertsonian translocation (T7AL·7Lr#1S) and one proximal recombinant (rec124, T7AL·7Lr#1S-7AS). Both T7AL·7Lr#1S and T7AL·7Lr#1S-7AS, harboring *Fhb3* in an Overley background, were moderately resistant in greenhouse and field tests. T7AL·7Lr#1S and T7AL·7Lr#1S-7AS have been crossed twice with Fuller and homozygous introgression lines will be selected after selfing and will be evaluated for FHB incidence and DON accumulation.

A second, novel source of FHB resistance is derived from the hexaploid species *Elymus tsukushiensis*, and we have identified one compensating distal recombinant (T1AL·1AS-1E^{ts}#1S) and one noncompensating interstitial (TiWL·WS-1E^{ts}#1S-WS) recombinant involving a nonhomoeologous and rearranged wheat chromosome. The distal recombinant (T1AL·1AS-1E^{ts}#1S) is highly resistant to FHB after point inoculation in the greenhouse, and a homozygous resistant recombinant stock was released in 2013 as WGRC61. We are transferring the agronomically useful, compensating distal recombinant to an Everest background. Once homozygous recombinants in Everest background have been obtained, they will be evaluated for their FHB resistance and DON accumulation under field conditions.