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

Project Title: Enhancing the FHB Resistance of Varieties and Reducing Mycotoxins in the Grain of South Dakota Winter Wheat.

PROJECT 1 ABSTRACT

(1 Page Limit)

South Dakota winter wheat production is threatened by Fusarium head blight (FHB) [caused by *Fusarium graminearum* Schwabe [teleomorph *Gibberella zeae* (Schwein) Petch] each year. State losses due to FHB have been estimated at as much as 20 million dollars in a single year. Our objectives are to 1) develop FHB resistant winter wheat varieties for South Dakota and surrounding regions, and 2) determine the physical and chemical properties of wheat bran that reduce or limit the accumulation of mycotoxins in the grain. The *Fhb1* source of resistance will be transferred to adapted South Dakota winter wheat germplasm, and existing 'Wesley' hard red winter wheat backcross lines with *Fhb1* will be evaluated for resistance to FHB and grain yield at several South Dakota locations. Highly resistant Wesley *Fhb1* lines will be hybridized with adapted South Dakota winter wheat parents, and progeny will be evaluated for resistance. As lines are advanced through various yield trial nurseries, they will also be tested and evaluated for resistance in an inoculated, mist-irrigated nursery. To enrich early segregating populations for resistance, harvested F3 and F4 seed will be passed through a fractionating aspirator. Populations will be evaluated for percent of *Fusarium* damaged kernels (FDK), and those with the highest % FDK will be discarded. A graduate student study is comparing physical and chemical properties of near-isogenic lines (NILs) of white and red winter wheat. These NILs were selected and are being used to examine potential bran differences and identify the impact of any genetic differences on the accumulation of deoxynivalenol (DON) in the bran. Data on FHB resistant varieties will be made available to regional producers and end-use stakeholders through field day oral presentations, county extension presentations on varieties, and SDSU Crop Performance Test publications. Additionally, varieties and the data supporting their described resistance to FHB will be reported on ScabSmart, in producer trade magazines, and in professional scientific journals as part of the variety registration process.