

PI: Sunish Sehgal

PI's E-mail: Sunish.Sehgal@sdstate.edu

Project ID: FY16-HW-006

ARS Agreement #: 59-0206-4-004

Research Category: HWW-CP

Duration of Award: 1 Year

Project Title: Winter Wheat Breeding for Scab Resistance in South Dakota.

PROJECT 1 ABSTRACT

(1 Page Limit)

South Dakota is the primary state in the US Great Plains hard winter wheat region that is threatened by Fusarium head blight (FHB), a destructive disease with losses to the tune of 20 million dollars in some years. Developing resistant varieties is one of the most effective ways of limiting the loss due to scab. Our goal is to develop and release FHB-resistant hard red and white winter wheat varieties with superior agronomic performance and end-use quality characteristics, and excellent winter hardiness. Our objectives are to (1) Develop FHB resistant winter wheat varieties for South Dakota and surrounding regions. (2) Marker assisted introgression of *Fhb1* and combining it with native sources of resistance in advanced South Dakota breeding lines. The *Fhb1* source of resistance has been transferred to 'Wesley' hard red winter wheat, adapted to South Dakota winter and is being used in several crosses in SDSU breeding program and some lines from this material are in early yield trials (EYT). Further *Fhb1* will be combined with native resistance from Lyman, Overland, Everest, and Emerson. 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 will mobilize and combine known sources of resistance in South Dakota backgrounds. 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.