FY20 USWBSI Project Abstract

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PROJECT 1 ABSTRACT

(1 Page Limit)

The South Dakota State University Hard Red Spring Wheat (HRSW) breeding program contains an ongoing FHB resistance breeding component with the overall goal of mitigating losses to HRSW growers and end-users. Continual operation of this program component will be accomplished through implementation of the following USWBSI-VDHR Research Priorities as objectives; 1) Increase and document acreage seeded to varieties with improved FHB resistance to increase grain yield and grain quality and reduce DON in the US grain supply, 2) Increase efficiency of coordinated project breeding programs to develop and release FHB resistant varieties, and 3) Implement new breeding technologies and germplasm to further enhance short term and long term improvement of FHB resistance and to efficiently introgress effective resistance genes into breeding germplasm. Objective 1 will be addressed through variety surveys, screening potential varieties, commercially available varieties, and participation with field days and other Extension activities, all on a yearly basis, to promote the use of the most resistant varieties. Several HRSW varieties that possess good levels of FHB resistance are presently available. With time and constant promotional activities, their usage should only expand. The second objective will be accomplished through screening Uniform Regional Scab Nursery entries, and materials provided by other researchers, germplasm sharing, and making resistance data publicly available each year on the T3 database. These activities are largely aimed at maximizing phenotypic resistance data of germplasm used for variety release and parental selection decisions, which is beneficial to all program participants. The final objective is the primary means by which the SDSU-HRSW breeding program is able to generate breeding populations for selecting resistant lines as potential varieties as well as selecting the most useful parental lines for creating new populations. These tasks will be carried out through extensive phenotypic screening of populations and breeding lines in addition to marker assisted selection. Approximately 50% of parental lines used to generate new populations each year contain the Fhb1 resistance QTL, and consequently, nearly half of all new populations will be genetically fixed for this resistance source. By implementing the USWBSI-VDHR Research Priorities, FHB resistance levels of germplasm generated from within this and other programs should steadily increase. Likewise, efforts will be undertaken to promote sowing of only the most resistant HRSW cultivars. Taken together, the proposed activities should help stakeholders, such as growers and end-users, to be less prone to losses incurred by FHB epidemics.