

Project Abstract

Project Title:	Spring Wheat Breeding for Scab Resistance in South Dakota	
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The overall goal of this research plan is to help ensure widespread adoption of highly productive and FHB resistant Hard Red Spring Wheat (HRSW) varieties in South Dakota and the region. The South Dakota State University HRSW breeding program contains an ongoing FHB resistance breeding component designed to develop and release resistant varieties. Continuing these operations will achieve the overall goal through addressing each of the three FY22 VDHR-SPR Research Priorities as objectives. These include; 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. Procedures and outcomes of Objective 1 will be variety surveys, screening potential and commercially available varieties, and participation with field days and other Extension activities to promote the use of resistant varieties. Procedures and outcomes of the second objective will include 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. Procedures and outcomes of the final objective include the primary means by which the SDSU-HRSW breeding program generates populations for selection as well as identifying 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, automated collection of Fusarium damaged kernel percentages, and a form of ‘speed breeding’. Approaches and data collected to accomplish objectives, and the overall goal, will be carried out yearly. Several HRSW varieties that possess good levels of FHB resistance are presently available. With time and constant promotional activities, their rate of usage should only expand. Continual operation of this program will not only increase the number of regionally adapted varieties that possess good levels of FHB resistance, but also elevate their agronomic performance and allow for undertaking efforts to promote use 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.