

**PI: Glover, Karl D.****PI's E-mail: [Karl.Glover@sdstate.edu](mailto:Karl.Glover@sdstate.edu)****Project ID: FY06-GL-011****FY05 ARS Agreement #: 59-0790-4-121****Research Area: VDUN****Duration of Award: 1 Year****Project Title: Spring Wheat Breeding for Scab Resistance in South Dakota.****PROJECT 1 ABSTRACT**

(1 Page Limit)

Within the past decade, severe scab epiphytotics have been incited by *Fusarium graminearum* on wheat, (*Triticum aestivum* L.) durum, and barley (*Hordeum vulgare* L.) in most regions of the United States where growing conditions remain warm and humid during the flowering and grain fill periods. Yearly economic losses to growers caused by this disease have approached or surpassed \$500 million on several occasions since 1993. Efforts of the spring wheat breeding program at South Dakota State University to help alleviate local and regional losses from scab have proven worthwhile. Several advanced breeding lines and varieties have been created that have elevated levels of scab resistance and yield potential. These materials have been developed as the result of a germplasm screening component within our program that has allowed for identification and selection of the most resistant material. One field and two greenhouse screening cycles are carried out each year within our program. Approximately 150 F<sub>2</sub> populations are screened for scab resistance in each fall greenhouse cycle. Lines are derived from within populations and further screened in the spring greenhouse and summer field nursery cycles. Approximately 9,000 hills can be tested in our greenhouse each year. A larger number of plots can be accommodated in our mist-irrigated field nursery. 'Granger' and 'Briggs' are recently released spring wheat varieties that possess elevated scab resistance, yield potential and quality characteristics. There are currently two experimental lines within our breeding program that hold great promise for release as varieties in 2006 and 2007. Each of these lines are significantly more resistant to scab than both Granger and Briggs. Several years ago, a concerted effort was made by the small grains pathology group at South Dakota State University to identify unique sources of scab resistance. Many of these putative resistance sources have since been used as parents in our population development efforts. Resultant progenies are at various stages within our program. New research projects have been undertaken within the program. For example, we are working with colleagues at North Dakota State University to empirically gauge the progress in scab resistance breeding that has been achieved over time. We are also backcrossing the 'Sumai 3' derived 3BS scab resistance QTL into several experimental breeding lines and one recently released spring wheat variety developed by this program. This work will be aided with Marker Assisted Selection carried out at the USDA small grains genotyping center in Fargo, North Dakota. With these populations, a Master's level research assistant will perform the duties required to make this germplasm enhancement effort successful.