PI: Baenziger, Stephen **PI's E-mail: pbaenziger1@unl.edu**

Project ID: FY06-BA-035 **FY05 ARS Agreement #: 59-0790-4-092**

Research Area: **VDUN** **Duration of Award: 1 Year**

Project Title: To Enhance Variety Development of Scab Resistant Hard Winter Wheat Varieties.

PROJECT 1 ABSTRACT

(1 Page Limit)

The long-term goals of this project are to: 1. develop elite winter wheat cultivars that are resistant to Fusarium head blight (FHB, scab) using conventional breeding (**part of the Scab Initiative's effort on Variety Development and Uniform Nurseries program)**, and 2. to screen experimental lines in hard winter wheat regional nurseries to identify the level of FHB resistance within the existing elite winter germplasm of the Great Plains (**part of the Scab Initiative's effort in the Variety Development and Uniform Nurseries program is to be able to provide growers with accurate ratings on the FHB tolerance of current varieties, and also part of the Host Genetics and Resources efforts)**. The specific objectives in our varietal developments effort are: A) collect FHB resistant germplasm, B) incorporate the resistant germplasm (including transgenic sources) into hard winter wheat germplasm (white and red) by crossing, C) using a modified bulk breeding or backcrossing method to advance the germplasm to elite line status, D) work cooperatively with winter wheat breeding and plant pathology programs in Kansas State and South Dakota State Universities to insure broad testing and tolerance in our FHB tolerant lines, and E) in cooperation with the USDA Genotyping Center at Manhattan, KS identify progeny lines with known FHB QTLs. To date we are in various stages of increasing lines with superior FHB tolerance, the most notable of which is NE01643, which will be under large-scale increase by our Foundations Seed Division for release in 2006. If released, it will most likely be co-released by South Dakota State University as it performs well in both states. Other lines that are under increase are: NE01604, NI02425, and NE02584.

In the 2005-2006 season, we will plant 95 out of 755 F_2 bulks and 44 out of 706 F_3 bulks that were deliberately made for enhanced FHB tolerance. Ninety-eight headrows from populations that included FHB tolerant parents were harvested in 2005 for planting in our observation nursery. Seven lines were advanced to first multilocation unreplicated trial. Thanks to Dr. Guihau Bai, we know as least three of the lines have QTLs from Goldfield. Finally four potential FHB tolerant lines were advanced to the first multilocation, replicated test.

The specific objective of our screening experimental lines in hard winter wheat regional nurseries is to determine the level of FHB tolerance of all lines in the Regional Germplasm Observation Nursery (RGON). This nursery includes virtually every elite line developed in the public or private sector. We hope to find elite lines in the hard winter wheat background that can be used as parents in crosses with lines containing major FHB tolerance genes and to be able to provide growers with accurate information on FHB tolerance of released varieties.