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PROJECT 2 ABSTRACT
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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 plant breeding and variety development**), 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 on plant breeding and variety development and also part of the germplasm introduction and enhancement efforts**). The specific objectives in our conventional breeding and 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 using our lines which have better FHB tolerance, C) using a modified bulk breeding or backcrossing method to advance the germplasm to elite line status, and D) 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 given to our Foundations Seed Division for initial increase in 2004, and possible release in two years. If released, it will most likely be co-released by South Dakota State University as it performs well in both states. Other lines with better FHB tolerance that are under increase for possible release include: NE01481, NE01533, NE01603, NE02495, NE02548, and NE02588. In a preliminary nursery there are 12 lines of 288 that involve Goldfield or a Purdue derived line that have been reported to have good FHB tolerance. The twelve lines vary in end-use quality from very good to marginal and have good agronomic characteristics. These lines will be tested in our greenhouse and field screen in the 2004-2005 season and be sent to the Genotyping Center for molecular marker analysis using markers identified by Dr. H. Ohm and colleagues (Xbarc200 and Xgwm210 on 2BS; the major QTL, accounting for 29% of the variation, and other QTLs near Xwmc149 or Xgwm344).

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 and to identify elite hard winter wheat lines with FHB tolerance (i.e. adapted lines which have superior performance in the hard winter wheat growing region). The RGON includes publicly and privately developed germplasm (about 30 lines from every active breeding program in the region), so this nursery is the key focal point for accessing and evaluating germplasm. 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.