

PI: Anderson, James

PI's E-mail: ander319@umn.edu

Project ID: FY06-AN-092

FY05 ARS Agreement #: 59-0790-4-091

Research Area: VDUN

Duration of Award: 1 Year

Project Title: Breeding Fusarium Head Blight Resistant Spring Wheat.

PROJECT 3 ABSTRACT

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Wheat varieties with greater resistance to Fusarium head blight (FHB) would make a substantial contribution to reducing the losses from this devastating disease. These objectives of this proposal are:

1) Develop Fusarium head blight resistant wheat germplasm and varieties adapted for commercial production in Minnesota and the surrounding region and characterize the level of FHB resistance of all wheat varieties grown in the region.

2) Determine the effect of chromosome 5AS, 5BL, and 3BSc FHB QTLs on grain yield and quality, resistance to other diseases, and other agronomic characteristics using near-isogenic line pairs.

Crosses will be made between and among FHB resistance sources and regionally adapted germplasm. Field screening of materials in one to three inoculated, misted FHB nurseries will be used to characterize levels of FHB resistance. Approximately 2,000 breeding lines will be evaluated in as many as three inoculated, misted field nurseries. In addition, we will evaluate the Uniform Regional Scab Nursery for Spring Wheat Parents and Uniform Regional Nursery (variety candidates) for FHB reaction at two locations. Superior germplasm will be released as improved varieties, resistant germplasm, or made available upon request.

Although numerous QTLs for FHB resistance have been documented, few have been carefully studied to determine if they cause a linkage drag (e.g. lower grain yield) or adversely affect resistance to other diseases or grain quality. As part of USWBSI-funded research, we developed and characterized near-isogenic line pairs for FHB QTLs on chromosomes 5AS, 5BL, and 3BSc. Seven NIL pairs will be tested in field nurseries in 2006 for comparison of grain yield, resistance to leaf and stem rust, grain quality, agronomic characteristics, and other diseases.