

PI: Anderson, James

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

Project ID: FY07-AN-113

FY06 ARS Agreement #: 59-0790-4-091

Research Area: VDUN

Duration of Award: 1 Year

Project Title: Breeding Fusarium Head Blight Resistant Spring Wheat.

PROJECT 4 ABSTRACT

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The 2005 FHB epidemic in Minnesota revealed that even the best varieties available can experience economic levels of loss when disease-conducive environmental conditions exist. Wheat varieties with greater resistance to Fusarium head blight (FHB) are needed to reduce 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.
- 2) Characterize the level of FHB resistance of all wheat varieties grown in the region.

Crosses will be made among FHB resistance sources and regionally adapted germplasm. Approximately 1,800 breeding lines will be evaluated for FHB resistance in 2007. 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. Field screening of materials will be used to characterize levels of FHB resistance. At the St. Paul location, *F. graminearum* macroconidia will be applied by backpack sprayer at the rate of 60 ml of a 100,000 conidia ml⁻¹ per 2.4 m row. At the Crookston and Morris locations grain spawn inoculum is spread at the rate of 56 kg ha⁻¹ at the jointing stage and a second application one week later. All nurseries are misted periodically overnight to maintain high humidity environments. Visual assessment of FHB symptoms in the field will be done approximately 20 days after anthesis. A sample of 50+ spikes per row will be harvested, and after suitable cleaning of grain from 30 spikes (small spikes from tillers are discarded), the percentage of visually scabby grain will be estimated. DON content will be determined from a bulk of grain from all replications from of the most advanced nurseries.

We expect that one of the outcomes of this research will be wheat varieties that are FHB resistant and well adapted to Minnesota and the Red River Valley region of Minnesota, North Dakota, and South Dakota. Spring wheat germplasm with high levels of FHB resistance should also result and this material could be valuable resistance sources for many wheat breeding programs. Superior germplasm will be released as improved varieties, resistant germplasm, or made available upon request. The FHB reaction of named varieties will be published online and in extension publications.