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Research Area: VDUN

Duration of Award: 1 Year

Project Title: Developing and Screening Wheat Germplasm with Resistance to Scab.

PROJECT 1 ABSTRACT

(1 Page Limit)

Scab is a devastating disease that has recently increased in severity on wheat grown in the U.S. mid-Atlantic. Scab or head blight is caused by fungi of the genus *Fusarium*. Scab reduces grain yield, decreases grain quality, and produces toxins that are a potential health threat when the infected wheat is used for food. The overall **goal** of this project is to enhance the resistance to scab and other diseases of new wheat cultivars in the mid-Atlantic region. The **first objective** of this project is to rapidly develop soft red winter wheat germplasm and cultivars adapted to the mid-Atlantic region with increased resistance to scab from exotic sources. This objective will be accomplished by employing backcrossing as well as pyramiding scab resistance in 3-way crosses. Molecular marker assisted selection will be utilized to accelerate and improve the efficiency of selection (genotyping will be carried out at the USDA genotyping center at Raleigh, NC). The BC2 (backcross two) F1 generation of McCormick and a stripe and leaf rust line (GA96229-3A41) will be screened with markers linked to known QTLs associated with scab resistance. Native alleles of resistance to scab exist in current soft red winter wheat cultivars, therefore screening of advanced lines of breeding programs may allow identification of lines with tolerance to scab. The **second objective** of this project is to screen elite lines in the Maryland breeding program for resistance to scab. This is a practical way to identify potential cultivars with tolerance to scab before their release. The **third objective** is to evaluate the Uniform Northern and Uniform Southern Winter Wheat Scab Screening nurseries. Screening nurseries will be established in Salisbury, MD, with artificial inoculation and misting during the 2006-2007 wheat growing season to accomplish the second and third objective. These nurseries will be evaluated in the spring of 2007 for scab incidence, severity, index, scabby seed, toxin (DON), and seed weight. The proposed research is relevant to the U.S. Wheat and Barley Scab Initiative because publicly available cultivars will be developed and released from this project with enhanced resistance to scab for the mid-Atlantic region of the U.S and we will participate in the multi-location validation of FHB resistance by growing the appropriate uniform FHB screening nurseries. These are some of the stated FY07 priorities of the U.S. Wheat and Barley Scab Initiative Variety Development and Uniform Nurseries research area.