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ARS Agreement #: *New*

Research Category: VDHR-SWW

Duration of Award: 1 Year

Project Title: Identifying Sources of FHB Resistance in Diverse Wheat Germplasm for the Southeast.

PROJECT 1 ABSTRACT

(1 Page Limit)

The goal of this project is to evaluate wheat sources of *Fusarium* head blight (FHB; i.e., scab) resistance to identify new FHB resistant varieties adapted to South Carolina and other states in the southeastern US. To meet this goal, two objectives are proposed:

- 1) conduct a coordinated field trial in Florence, SC to screen elite varieties, advanced breeding lines, and diverse germplasm for FHB resistance, and
- 2) implement greenhouse crossing to intercross lines that exhibit FHB resistance.

In compliment with the research priorities established by the VDHR-SWW Coordinated Project, an inoculated field nursery in Florence, SC will be conducted to evaluate FHB resistance across advanced and diverse lines. Specific phenotypes include FHB incidence rating (type I resistance), FHB severity rating (type II resistance), and percentage of *Fusarium*-damaged kernels (FDK, type III resistance). Plant material to be evaluated in the study includes commercial varieties, advanced breeding lines, and a small number of diverse lines with potential new QTL for FHB resistance.

Phenotypic data from SC will be distributed to the wheat breeding community as applicable. As no FHB field evaluations are currently performed in the state, information on both (1) stability of FHB resistance QTL in an additional production environment and (2) yield potential of advanced breeding lines with FHB resistance in SC will be beneficial. The primary output from objective 2 will be F₁ seed from targeted crosses that will be segregating for multiple FHB resistance QTL. Generated F₁ seed will be a valuable genetic resource to enable recurrent selection for FHB resistance from segregating population head-rows, development of three-way crosses, and production of double haploid populations. Seed will be maintained and made available to wheat breeders upon request. Subsequent recurrent selections will be planned post-project duration in multiple SC environments to work toward releasing adapted varieties with increased FHB resistance.

Host plant resistance remains the most economical and sustainable approach to control scab in wheat. This project aims to develop information and genetic resources and that will be useful to the breeding community to develop and release varieties with improved FHB resistance to increase grower profitability and allow more production of high-quality US soft red winter wheat for foods and feedstuffs.