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Project ID: 0405-DI-109

FY03 ARS Agreement #: 59-0790-9-031

Research Area: VDUN

Duration of Award: 1 Year

Project Title: A Dryland Inoculation Screen for Spring Wheat Reaction to Fusarium Head Blight.

PROJECT 3 ABSTRACT

(1 Page Limit)

The Small Grains Pathology program has conducted one year of screening wheat genotypes in the Uniform Regional Scab Nursery (URSN). The germplasm was screened for reaction to Fusarium head blight (FHB), caused by *Fusarium graminearum*, by inoculating plots that are not mist-irrigated. In 2003 dryland experiments were conducted at Barnesville and St. Paul, Minnesota. Plots were inoculated when genotypes were at anthesis, defined as when anthers were first seen extruding from the florets on any spikes within the plot. Plots were assessed for FHB disease severity, incidence, and index (severity x incidence), calculated and reported as percentages. Significant differences among wheat genotypes were detected at both locations for all three variables ($P < 0.001$). The FHB disease index at St. Paul ranged from 1 to 24 %. FHB disease index among the genotypes at Barnesville ranged from 2 to 58 %. The rank correlation of entries between the two locations for FHB disease index was high enough to make useful comparisons among the genotypes that were evaluated ($r = 0.64$, $P < 0.001$). The DON data are not yet available. Dryland screening of promising wheat genotypes seems feasible in Minnesota, and we feel an additional year of data will validate this technique, as a way of successfully screening wheat genotypes for reaction to FHB. We also wish to demonstrate the technique of dryland-inoculated FHB screening to researchers funded by the USWBSI.

The objective of our proposal is to validate the feasibility of conducting dryland-inoculation screening on a range of wheat genotypes at two locations in Minnesota for a second year. We again propose to use the spring-wheat entries submitted to the Uniform Regional Scab Nursery (URSN). The URSN is screened at many locations under irrigation and would be useful to compare to the techniques we propose with those used by other researchers. The use of additional entries for a second year will validate the utility of dryland screening over a more diverse range of genotypes and environments. Entries would be planted in a randomized complete block design with three replicates per entry per location. The experiment would be planted at two locations (St. Paul and Crookston, MN) and inoculations would be timed to correspond with anthesis. Entries would be assessed for FHB incidence (%), FHB severity (%), and DON accumulation (ppm) in harvested grain. Data are to be analyzed using SAS statistical software and presented in tabular form. Notes of other agronomic interest would also be provided. Data would be reported to the URSN coordinator, Dr. David Garvin, and to other FHB researchers. This proposal meets the VDUN research area priority to develop, test and evaluate new methods to enhance breeding for FHB resistance.