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Research Area: VDUN **Duration of Award: 1 Year**

Project Title: A dryland inoculation screen for spring wheat reaction to Fusarium head blight.

PROJECT 2 ABSTRACT
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The UMN's small grains pathology lab has been investigating the use of dryland-inoculated (DI) nurseries to screen germplasm for reactions to Fusarium head blight (FHB) caused by *Fusarium graminearum*. In these initial dryland experiments, the disease levels observed reflected FHB severities and deoxynivalenol (DON) levels that are more commonly observed in grain from grower's fields. Dryland screening may help to mitigate some of the costs of conducting field screening experiments. We wish to further validate dryland screening and demonstrate this screening technique to a diverse range of FHB workers.

In earlier studies we found that DI screening of wheat provided good separation of resistant and susceptible check cultivars based on FHB severity and DON accumulation in harvested grain without the use of supplemental mist-irrigation. We have also studied the timing of inoculation and one and two inoculum applications on eight wheat genotypes selected on their range of FHB reaction, known from prior tests, finding that differentiation for reaction to FHB was feasible. There was an effect of timing of inoculation where late inoculations were significantly lower for disease severity and toxin accumulation. We thus concluded timing of inoculation under dyland conditions should be based on anthesis of each genotype with inoculation of a genotype being conducted no later than three days post-anthesis. We believe the success of these dryland nurseries is due to the use of macroconidial inoculum as our technique mitigates the impact of climatic conditions that affect ascospore development and release.

The objective of our proposal is to test the feasibility of conducting DI screening on a larger range of genotypes at two locations in Minnesota. We propose using the spring-wheat entries submitted to the Uniform Regional Scab Nursery (URSN). The URSN is screened at six locations under irrigation at a majority of the sites and would be ideal to compare to the techniques we propose to demonstrate the feasibility of dryland screening. The use of additional entries will validate the utility of dryland screening over a diverse range of genotypes. 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 (to be determined) and inoculations would be timed to correspond with anthesis for each entry. 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 thus distributed to other researchers.

This proposal meets the VDUN research area priority to develop, test and evaluate new methods to enhance breeding for FHB resistance.