

PI: Mergoum, Mohamed

PI's E-mail: Mohamed.Mergoum@ndsu.edu

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Project Title: Screening Newly Introduced Spring Wheat Germplasm for Novel Sources of Resistance to Scab.

PROJECT 2 ABSTRACT

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Wheat breeding programs in the region have been working hard to produce better wheat cultivars for the growers and end users in the US and international export markets. Previous studies have summarized the Fusarium head blight (FHB) sources of resistance in very few genotypes including Sumai 3, Ning 7840, Frontana, Nobeokabouza, 2375, Ernie, and Freedom. So far, Sumai3 is probably, one the most used germplasm for FHB resistance worldwide. In the spring areas, most of the recently released cultivars posse the genes from this source. Genetic diversity is a major component of a successful breeding program. Hence, novel sources of resistance to FHB are needed today more than ever. The search for sources of resistance is essential to insure the development of FHB resistant spring cultivars.

The overall goal of this project is to enhance the resistance to FHB in the spring wheat cultivars. Specific objectives include:

- 1) the identification of novel FHB sources of resistance that can be incorporated into adapted spring wheat germplasm, and
- 2) preliminary characterization of these novel FHB sources of resistance under spring wheat growing conditions.

About 220 new genotypes along with the mostly resistant cultivars or genotypes will be included in this project. The germplasm includes 186 genotypes developed by CIMMYT using the funds from the USWBSI to introgress novel FHB sources of resistance into the US wheat germplasm and 36 genotypes received from East Europe. The screening will be continued in 2009 under field conditions.

The field screening will be conducted at Prosper, ND using the Scab nursery. Ten kernels from each entry will be planted in a single one-foot long ("hill") plot in an RCBD with two replicates. Two to three weeks prior to flowering, corn colonized with *F. graminearum* (grain spawn) will be spread by hand onto the ground to create an artificial epidemic. The nursery is equipped with a misting system to keep humidity at the optimum level for disease development. Disease rating will be recorded based on maturity and disease development. Data will be collected on FHB incidence and severity, tombstone kernels, test weight, and DON.

The greenhouse screening will be conducted in the fall of 2009 and will include only genotypes that showed good levels of FHB resistance in the field tests. Entries will be grown in raised soil beds, 8 to 10 seed per 20 cm row in a RCBD with two replicates. Isolates of *F. graminearum* will be used for spike inoculation using the single spikelet method. A droplet of spore suspension containing a conidiospore concentration of 50,000/ml will be placed into a single spikelet near the middle of each spike at anthesis. Plants will be misted periodically to maintain the proper relative humidity for disease development. Disease severity will be recorded 2 to 3 wk post-inoculation. Resistant spikes/plants will be harvested individually for further evaluations and seed increases.