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PROJECT 3 ABSTRACT
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Screening wheat lines for resistance to Fusarium head blight (FHB) is both time and resource-intensive, is confounded by environmental factors, and needs to be repeated over environments. Our research group is investigating DNA markers as a tool to augment the screening of germplasm for resistance to this disease. We are currently in the second year of funding by USWBSI to test the robustness of a major QTL on chromosome 3BS in multiple near-isogenic lines (NILs). Thus far, 45 NIL pairs, representing a range of genetic backgrounds, have been developed and tested. Based on the promise that this procedure has shown in assessing the effect of this QTL across genetic backgrounds, we plan to routinely use this same procedure to assess the breeding value of other major QTLs that are identified in our mapping populations.

As part of another USWBSI grant to map FHB QTL in the resistance sources Fujian 5114 and Wuhan 3, new putative QTL located have been located on chromosomes 5BL and 5AS, respectively. These QTL explain as much as 20 to 25% of the FHB resistance in greenhouse testing. Because these two resistance sources have been used as parents in our breeding program, we are poised to develop QTL-NILs for these QTLs.

The objectives of this research are to:

1. Develop near-isogenic lines of major QTLs identified in the resistance sources Fujian 5114 and Wuhan 3
2. Determine the effects of Fusarium head blight resistance QTL derived from Fujian 5114 and Wuhan 3 in multiple genetic backgrounds.

Our goal is to produce at least 20 pair of F_4 or F_5 derived NIL for each QTL. The QTL NILs will come from three sources: 1) RILs from the original mapping populations; 2) the 2002 U of M spring wheat breeding F_4 headrow nursery; and 3) the 2003 U of M spring wheat breeding F_4 headrow nursery.

All NIL pairs will be tested twice for FHB resistance under greenhouse conditions, beginning as soon as adequate seed of homozygous classes for the QTL-NIL are available. Each genotype will be represented by 20 to 30 inoculated spikes. These same materials will be tested for their FHB reaction in replicated field tests in inoculated, misted nurseries at Crookston and St. Paul in 2003.