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Project Title: Fine Mapping of Qfhs.ndsu-3AS in Durum Wheat.

PROJECT 1 ABSTRACT
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Fusarium head blight (FHB) has been a major threat to the production of wheat and barley in the United States. Limited sources of partial resistance to FHB have been identified in common wheat. However, no FHB resistance has been found in durum wheat. Screening of wild tetraploid wheat (*Triticum dicoccoides*) accessions for FHB resistance has identified an accession carrying resistance gene(s) to FHB, which holds promise for the development of durum wheat cultivars resistant to FHB. Recombinant inbred chromosome lines (RICLs) are the ideal materials for mapping and cloning of genes. Using *T. durum* cv. 'Langdon'-*T. dicoccoides* chromosome 3A recombinant inbred chromosome lines, we have identified *Qfhs.ndsu-3AS*, a major quantitative trait locus (QTL) that explains 55% of the genetic variance for FHB resistance. To date, a genetic map of chromosome 3A with 30 molecular markers spanning a map distance of 168.6 cM has been developed. We will generate more molecular markers to saturate the QTL region. In the meantime, we will screen a large mapping population (>4,000 individuals) to identify more chromosomal recombinants in the QTL region. This will allow for construction of a fine map of this QTL region and placement of the QTL in a smaller chromosomal interval. Comparative analysis of the *Qfhs.ndsu-3AS* and the FHB resistance QTL on 3BS indicated that they are not homoeologous loci. Accomplishment of this project will drive us closer to reaching the long term goal - cloning of the FHB resistance gene(s). The specific objectives of this project are to:

1. **Generate more chromosomal recombinants within the *Qfhs.ndsu-3AS* segment**
2. **Construct a high resolution map of the *Qfhs.ndsu-3AS* region**

The results obtained from this project will be invaluable in understanding the molecular mechanism of resistance to FHB, and possible isolation of the gene(s) underlying this QTL. Gene(s) that are identified can then be used in collaboration with other researchers to generate transgenic barley and wheat and evaluate its efficacy in conferring resistance to FHB. Additionally, understanding the basic molecular mechanisms involved in resistance to FHB will help devise schemes for developing more resistant lines and cultivars.