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(1 Page Limit)

Durum wheat (*Triticum turgidum* L. subsp. *durum*) is an important cereal crop in its unique pasta products for human consumption. Its production in the United States has been seriously threatened by scab or Fusarium head blight (FHB) since the mid 1990s. The overall goals of this project are to identify and characterize the FHB resistance genes in the primary gene pool of durum wheat and to develop FHB-resistant durum wheat germplasm adapted to the Northern Great Plains. In an effort to search for sources of FHB resistance for durum wheat breeding, we have conducted an extensive evaluation for the germplasm collections belonging to the cultivated tetraploid wheat subspecies other than durum wheat. Based on the evaluation of 376 accessions over three greenhouse seasons and two field locations in 2005, we identified 19 accessions belonging to *T. t. carthlicum* and *T. t. dicoccum* that consistently exhibited medium or high levels of resistance to FHB. Since the FHB resistance in *T. t. carthlicum* and *T. t. dicoccum* have not been utilized in durum wheat breeding and their genetic controls have not been reported in the literature, we propose this study with the following two objectives: 1.) Develop FHB-resistant durum wheat germplasm adapted to the Northern Great Plains by transferring the FHB resistance from *T. t. carthlicum* and *T. t. dicoccum* to the leading durum wheat cultivars in North Dakota (ND) using double haploid (DH) and backcross method; and 2.) Determine the novelty of the genes for FHB resistance in 19 *T. t. carthlicum* and *T. t. dicoccum* accessions. Currently, we have developed 327 DH lines from the crosses of five *T. t. carthlicum* accessions with three ND durum wheat cultivars (Lebsock, Mountrail, and Ben). In addition, we produced 559 BC₁F₁ seeds using Ben and Maier to backcross to F₁'s produced by crossing Ben with four *T. t. dicoccum* accessions and two *T. t. carthlicum* accessions. Our project goals within FY07 funding period include evaluation of the DH lines for FHB resistance for two seasons in the greenhouse and for one season in field nurseries at two locations, development of hybrids from crosses of the FHB-resistant DH lines with ND durum cultivars for a second-round of DH production, development of advanced (BC₁F₅) lines from backcrosses of durum cultivars to four *T. t. dicoccum* accessions and two *T. t. carthlicum* accessions, and marker haplotype analysis of 19 *T. t. carthlicum* and *T. t. dicoccum* accessions in comparison to all known and validated FHB QTL identified in wild emmer and common wheat.