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PROJECT 1 ABSTRACT

(1 Page Limit)

Managing FHB disease remains a big challenge in durum wheat (*Triticum turgidum* L. ssp. durum) due to the lack of an effective resistance source. Partial resistance has been identified in the tetraploid relatives of durum, including wild emmer wheat (*T. turgidum* L. ssp. *dicoccoides*), Persian wheat (*T. turgidum* L. ssp. *carthlicum*), and cultivated emmer wheat (*T. turgidum* L. ssp. *dicoccum*) and a few durum accessions. However, these sources of resistance have not provided enough defense for durum against FHB. It is still an urgent need to explore and incorporate other sources of resistance into durum. Multiple sources of resistance to FHB have been identified in common wheat (*T. aestivum* L.) and wild relatives of wheat. Alien FHB resistance genes have been incorporated into the common wheat genome by chromosome engineering. They are potential sources of resistance to FHB for durum. In addition, we have observed that FHB resistance QTL exhibit less effectiveness of resistance in durum than hexaploid wheat. D-genome chromosomes of hexaploid wheat seem to play a role in the expression of FHB resistance genes in wheat. Apparently, FHB resistance genes have a more complex inheritance in durum than common wheat. Here we propose to continue introgression of FHB resistance from common wheat to durum for germplasm development and to determine the effect of D-genome chromosomes on FHB resistance in durum. The specific objectives of this proposed project are to: 1) Incorporate FHB resistance QTL from hexaploid wheat into adapted durum backgrounds for germplasm development; 2) Characterize inheritance of hexaploid-derived FHB resistance genes in durum backgrounds and the role of D-genome chromosomes in FHB resistance; and 3) Validate the molecular markers tagging the resistance QTL in the durum germplasm. We anticipate developing durum germplasm with FHB resistance derived from common wheat and enhancing knowledge of FHB resistance in durum through this research. The breeder-friendly durum germplasm with enhanced FHB resistance and reduced DON accumulation will be utilized immediately in the development of superior durum cultivars.