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Project Title: Identify and Map Novel QTL for FHB Resistance Introduced into Durum Wheat.

PROJECT 1 ABSTRACT

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In the past years, great efforts have been devoted to introgress FHB resistance from tetraploid and hexaploid wheat accessions into adapted durum wheat cultivars. However, most of the QTL for FHB resistance existing in the introgression lines are not well characterized or validated. In this proposal, we plan to identify and map QTLs for FHB resistance in two durum wheat genotypes 10Ae564 and Joppa, which carry known and unknown sources of FHB resistance. 10Ae564 is a BC1F8 durum wheat line, derived from cross and backcross of the durum wheat cultivar Lebsock to PI 277012, a hexaploid wheat line with major FHB resistance QTL on 5A (Chu et al. 2012). Joppa is a newly released durum wheat cultivar with the least susceptibility to FHB and lowest DON accumulation in grains among durum wheat cultivars currently grown in ND. Our overall goal is to identify effective FHB resistance QTL and associated DNA markers, and eventually introgress them into the cultivated durum varieties as germplasm for breeding FHB resistant durum varieties. Therefore, the specific objectives of this proposal are to:

- *Develop a genetic linkage map using the mapping population derived from the cross between Joppa and 10Ae564;*
- *Phenotype FHB resistance and morphological traits of the mapping population from the Joppa/10Ae564 cross in two more seasons;*
- *Identify DNA markers linked to QTL for FHB resistance in Joppa and 10Ae564.*
- *Transfer and pyramid the FHB resistance QTL into adapted durum wheat cultivars.*

We will phenotype and genotype a mapping population consisting of 200 recombinant inbred lines (F2:7) derived from the cross between Joppa and 10Ae564. The mapping population will be genotyped with 90K SNP makers. Durum wheat germplasm with improved FHB resistance will be developed by marker assisted selection and gene pyramiding and provided to breeders (Dr. Elias and others) for developing FHB resistant varieties or germplasm. This research addresses the following research priority/objective of the DUR-CP for FY16-17: 1. Search for novel sources of resistance to FHB in durum wheat and its tetraploid relatives; 3. Incorporate FHB resistance QTL from tetraploid and hexaploid wheat accessions into adapted durum backgrounds and develop elite durum germplasm with the assistance of molecular markers in selection.