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PROJECT 1 ABSTRACT
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PI 254188 is one of the emmer wheat (*Triticum turgidum* L. subsp. *dicoccum*) accessions which showed a high level of FHB resistance in multiple years of greenhouse and field evaluations. Using this material as FHB resistant donor, Dr. Steven Xu at USDA-ARS has already generated some introgression durum wheat lines with a good level of FHB resistance by crosses and backcrosses to North Dakota durum wheat cultivars. However, the number and chromosome locations of the QTL responsible for the FHB resistance in PI 254188 are still not known. In this proposal, we aim to identify, map, and deploy QTLs for FHB resistance in PI 254188. Therefore, the specific objectives are:

- Develop a mapping population with recombinant inbred lines (RILs) derived from the cross between Divide and PI 254188;
- Phenotype FHB resistance and morphological traits of the mapping population from the Divide/PI 254188 cross in greenhouse and field;
- Construct a genetic linkage map of the population using 90k-SNP chips;
- Identify DNA markers linked to QTL for FHB resistance in PI 254188;
- Transfer and pyramid the FHB resistance QTL into adapted durum wheat cultivars.

We have developed a mapping population with 200 RILs derived from the Divide/PI 254188 cross by single seed descent, and will genotype this population with the wheat 90K-SNP chips for construction of a molecular linkage map. In the meantime, we will evaluate the population for FHB reactions in greenhouse and in field nurseries. The genotype and phenotype data will be used to identify QTL for FHB resistance in the population. Eventually, we will transfer the QTL into adapted durum cultivars by crosses and backcrosses in combination with marker-assisted selection. Identification of DNA markers associated with the FHB resistance QTL will accelerate the development of FHB resistant wheat varieties by marker assisted selection and gene pyramiding. Durum wheat germplasm with improved FHB resistance will be generated through the introgression process and provided to breeders (Dr. Elias and others) for developing FHB resistant varieties or germplasm.