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PROJECT 1 ABSTRACT
(1 Page Limit)

Fusarium head blight (FHB) significantly reduced yield and quality of wheat grain. Growing resistant cultivars is the most effective strategy to control the disease. However, hard winter wheat cultivars grown in the Great Plains are highly susceptible. Transferring major QTL into adopted hard winter wheat will minimize losses caused by FHB epidemics. In addition, exploring new QTLs for FHB resistance from US hard winter wheat native sources will enhance genetic diversity of resistance QTLs and facilitate pyramiding of those resistance QTLs to enhance the degree of cultivar resistance. Our objectives in this proposal are to 1) use marker-assisted backcross (MAB) to quickly deploy the FHB1 in HWW and create new cultivars or germplasm with acceptable FHB resistance and agronomic performance, 2) use MAB to pyramid QTLs from different sources of resistance in HWW, 3) identify new QTL/alleles in hard winter wheat Heyne and 2174 from southern Great Plains. Simple sequence repeat (SSR) and sequence tagged site (STS) markers will be used for MAB coupled with phenotypic selection in Tri-state FHB Nurseries to transfer resistance QTLs into elite hard winter wheat backgrounds. Single nucleotide polymorphism (SNP) and SSR markers will be used to map new QTL for FHB resistance, especially type I resistance, segregating in recombinant inbred lines (RIL) of Heyne/Trego, and 2174/Jagger mapping population. DNA markers will be analyzed in a high-throughput DNA sequencer. Repeated FHB evaluation of these mapping and breeding populations will be conducted in both greenhouse and Tri-state FHB Nurseries, which is a major component of the Coordinated Project. Breeders in the Coordinated Project will use the materials freely in their breeding crosses or select for new cultivars as they need. This objective uses MAB to speed up the breeding process as described in Goals #2 and #3 of VDHR Action Plan. New QTL identified from this project will be directly used to enhance resistance levels of HWW and also be released to public for use in other breeding programs through publications. Identification of new QTL and markers for effective sources of FHB resistance meets Goals #4 of VDHR Action Plan.