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PROJECT 1 ABSTRACT

(1 Page Limit)

To facilitate the exchange of useful sources of resistance against Fusarium Head Blight (FHB) throughout the world, the International Maize and Wheat Improvement Centre (CIMMYT) has recently established two spring wheat nurseries to evaluate the performance of elite cultivars and germplasm contributed from the wheat breeding programs in 14 different countries including the U.S.. These entries will be planted at CIMMYT for seed increase as well as for evaluation of FHB symptoms based on Fusarium damaged kernels (FDK) and DON accumulation. To better understand the resistance sources submitted to CIMMYT, these entries will also be subjected to DNA marker genotyping using the tagged DNA markers that were found closely associated with the resistance QTLs previously identified. FHB resistance has a complex inheritance. Major QTLs associated with FHB resistance have been identified in a few resistance sources, such as Sumai 3, Frontana, Wuhan 1, and *T. dicoccoides*. To date, the resistance QTLs of Sumai 3 origin on chromosomes 3BS (*Fhb1*) and 5AS have been validated in different genetic backgrounds and in various environments. The diagnostic markers for *Fhb1* have been developed and implemented in the spring wheat breeding programs in the Northern Plains region using marker-assisted selection. In this study, altogether 18 DNA markers associated with *Fhb1* of Sumai 3 and other putative resistance QTLs derived from Frontana, Chinese lines CJ9306 and Wuhan 1, and *T. dicoccoides* will be used to investigate the haplotype diversity around the chromosome regions carrying the resistance QTLs among the entries tested and distributed through CIMMYT. The new and novel resistance sources identified based on both the phenotype data and DNA marker data will provide the U.S. spring wheat breeders with an access to the international elite germplasm collections.