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PROJECT 1 ABSTRACT
(1 Page Limit)

Novel resistance genes are the foundation for breeding wheat cultivars with better FHB resistance. Through the efforts of the US Wheat and Barley Scab Initiative (USWBSI), hundreds of wheat accessions and related species have been systematically screened for new FHB resistance sources. Tokai 66 is one of the newly identified FHB resistance sources showing some promise. Multi-year evaluation at SDSU has revealed that Tokai 66 has stable low FHB index and low fusarium damaged kernels. Molecular marker studies have found Tokai 66 distant from Sumai 3 both for four out of the five SSR markers near the *Qfhs.ndsu-3BS* QTL and for the genetic background. It is highly possible that Tokai 66 has multiple novel FHB resistance QTLs. The goal of this project is to confirm the novelty of the FHB resistance in Tokai 66 while developing SSR markers for the confirmed novel resistance QTLs. We are approaching our goal by genetically analyzing the FHB resistance of Tokai 66 with the aid of SSR markers to determine the number of FHB resistant QTLs that it may have, and compare these QTLs to their homologues in Sumai 3. This project was funded for FY2004 and is progressing on schedule. So far, the cross has been made and the creation of a 200-line recombinant inbred population) is in progress. Eighty SSR primer sets were surveyed for polymorphism. We have identified 53 polymorphic alleles with at least one per chromosome arm. SSR assay of F_2s will be done with these SSR markers by the end of this year. Therefore, our objectives for the FY2005 will be: 1). Continue our efforts in creating mapping populations between Tokai 66 and Y1193-6; 2) Complete preliminary SSR analysis of the F_2 populations; and 3) Screening the parents for more polymorphic SSR markers. Identifying the novelty of the newly selected FHB resistance sources is needed to avoid unnecessary efforts of incorporating duplicated FHB resistance genes into varieties. Broadening our FHB resistance sources will not only strengthen our ability to control FHB epidemics but also reduce risk of the potential disaster caused by a sudden lose of Sumai 3 derived FHB resistance. Genetically analysis and mapping of FHB resistance QTLs are the technical route we are taking. We will be able to confirm the novelty of the FHB resistance of Tokai 66, to find out the number of major resistance QTLs and their genomic locations, and to develop SSR markers for the identified major resistance QTLs. Therefore, this project will help realize the USWBSI's goal of "To develop as quickly as possible effective control measures that minimize the threat of Fusarium head blight (scab) to the producers, processors, and consumers of wheat and barley" through achieving the following goals set for the Biotechnology research area: "Map new and/or novel sources of resistance genes in wheat and barley germplasms." and the following USWBSI's goal set for the Germplasm Introduction and Enhancement research area: "Classical genetic analysis and characterization of newly identified and/or acquired sources of resistance."