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PROJECT 2 ABSTRACT

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Novel resistance genes are the foundation for breeding wheat cultivars with better FHB resistance. Abura is one of the newly identified FHB resistance sources showing some promise. Abura is a Brazilian landrace. Multi-year evaluation at SDSU has revealed that Abura has stable low FHB index and moderate fusarium damaged kernels. Molecular analyses have shown that Abura is distant from Sumai 3. Our goal of this project is to genetically verify the novelty of FHB resistance in Abura. Our hypothesis is that landrace Abura contains multiple novel major FHB resistance QTLs. Based on this hypothesis, we further assume that these major QTLs are different from those in Sumai 3. We will test our hypotheses by genetically analyzing the segregation of the major QTLs involved while revealing their number, linkage group and nature. We will reach our goal by analyzing the segregating populations involving Abura, Sumai 3 and Y1193-6 (a superior FHB-susceptible Tibetan landrace). As the first steps toward our goal, we are creating three segregating populations: one from the cross between Abura and Y1193-6 and one from the crosses of Abura/Sumai 3/Y1193-6. The first population will be used to estimate and analyze major FHB resistance QTLs in Abura. The second population will be used to verify the difference in major FHB resistance between Abura and Sumai 3. Two hundred single seed-derived recombinant inbred lines will be made for each population. The RI lines will be phenotyped for FHB index and fusarium damaged kernels in replicated trials in both greenhouse and field. Major FHB resistance QTLs will be identified by statistically analyzing the segregating data. Results from the Abura/Y1193-6 population will be compared with the Abura/Sumai 3/Y1193-6 population. Our objectives for the FY2005 will be: 1) continue our efforts in creating recombinant inbred line populations and 2) conduct preliminary analysis in $F_{2:3}$ generation. 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 loss of the FHB resistance in use. Genetic information about the newly identified FHB resistance is very helpful for breeders in their decision-making. Genetically analysis of the newly identified FHB resistance will be enable us to confirm the novelty of the FHB resistance, to find out the number of major resistance QTLs and their genomic locations, and to understand their inheritance and performance. 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 Germplasm Introduction and Enhancement research area: "Classical genetic analysis and characterization of newly identified and/or acquired sources of resistance".