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Project Title: Characterization of Novel QTL for FHB Resistance in Asian Wheat Cultivars.

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 measure to control the disease. However, resistance genes used in breeding programs worldwide are mainly from Sumai 3, exploring resistance genes from other sources will enhance genetic diversity of resistance genes and facilitate pyramiding of resistance genes from different sources. Our objectives in this proposal are to (i) characterize Type I FHB resistance in mapping population Wangshuibai/Wheaton; (ii) map novel quantitative trait loci (QTL) for Type II FHB resistance from Chokwang and Chinese Spring; (iii) elucidate the relationships between visual FHB rating and DON content and between Type I and Type II resistance. Three recombinant inbred populations from the crosses Wangshuibai/Wheaton, Chokwang/Clark and Chinese Spring/Annong8455 will be repeatedly evaluated for FHB resistance. Amplified fragment length polymorphism (AFLP), simple sequence repeat (SSR) and expressed sequence tag (EST) markers coupled with bulked segregant analysis (BSA) will be implemented for identification of novel QTL and fine mapping in the QTL regions. Some markers closely linked to the QTL will be optimized for application in marker-assisted selection or converted into breeder-friendly markers. DNA markers will be analyzed in automated DNA sequencers to improve resolution and throughput of marker analyses. The results will gain new knowledge on the inheritance of various types of FHB resistance and low DON content in the three important Asian FHB resistance sources, provide new markers for marker-assisted breeding, and diversify FHB resistance genes in breeding programs, which meets the FY05 research priorities: of mapping novel sources of resistance genes in wheat and genes conferring unique types of resistance (Type I & III), and develop user-friendly markers for MAS as proposed by USWBSI.