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Project Title: Enhancing Resistance of Spring Wheat to FHB Using Alien Species.

PROJECT 2 ABSTRACT

(1 Page Limit)

Sources of partial resistance to Fusarium head blight (FHB) have been identified from common wheat accessions and utilized in wheat variety development, including the Chinese variety “Sumai 3” and its derivatives, Brazilian variety “Frontana”, Eastern European germplasm “Praag 8”, and US variety “Truman”. However, it remains urgent to find additional effective and diverse sources of resistance to manage this disease and minimize the economic losses due to the disease. Alien chromatin containing FHB resistance genes have been successfully incorporated into the wheat genome and conferred resistance in the wheat genetic backgrounds. We have identified and collected over 100 wheat-alien species derivatives with various levels of resistance to FHB. Some of them have been characterized for chromosome constitutions and have been utilized for alien FHB introgression and germplasm development by chromosome engineering. To date, twenty-five spring wheat germplasm lines with FHB resistance and various agronomic traits have been developed and provided to the wheat breeding programs for variety development. In addition, some of the wheat-alien species derivatives have been found to contain non-*fhb1* resistance QTL. We have been further characterizing these new non-*fhb1* resistance sources and incorporate novel sources of resistance into adapted spring wheat backgrounds. Here we propose in the next funding cycle (FY14-15) to: 1) Incorporate alien FHB resistance genes into adapted spring wheat genotypes and construct mapping populations; 2) Position the alien chromatin containing FHB resistance genes incorporated into the wheat genome and minimize linkage drag associated with resistance genes; 3) Pyramid alien and wheat FHB resistance genes; and 4) Develop FHB-resistant germplasm directly usable in spring wheat breeding. Ultimately, we anticipate developing elite spring wheat germplasm with FHB resistance and low DON accumulation from these resistance sources. Breeder-friendly germplasm lines with FHB/DON resistance will be immediately made available to the wheat breeding programs for variety development.