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Project Title: Introgression of FHB Resistance from Hexaploid, Diploid, and Intergeneric Hybrids into Soft Red Winter Wheat.

PROJECT 1 ABSTRACT

(1 Page Limit)

Because the best known sources of resistance to Fusarium head blight (FHB) are characterized as 'partial' rather than 'complete', it is logical to try to pyramid resistance alleles from an array of cultivated wheats and their relatives to develop a higher level of resistance. The goal of this research is to introgress potentially novel sources of Fusarium head blight (FHB) resistance into southeastern adapted soft red winter wheat lines. FHB resistant donor parents include: 1) hexaploid wheat lines with novel haplotypes at loci known to control FHB resistance, 2) winter-type accessions of the Sando intergeneric hybrid germplasm collection, 3) NC triticale breeding lines, and 4) an A genome diploid *T. monococcum* accession. Previous funding has resulted in the development of BC_1F_1 seed from crosses between 19 hexaploids identified as having novel haplotypes at loci known to control FHB resistance, and the susceptible NC99-13022. In addition crosses and backcrosses have been obtained involving 22 accessions from the Sando intergeneric (*Triticum aestivum* and *Lophopyrum elongatum*) collection and the same recurrent parent. We have begun screening BC_2F_3 lines from crosses of North Carolina adapted soft red winter wheat with a moderately resistant *T. monococcum sp. monococcum* accession with putative FHB resistance and similar generation lines from crosses involving three NC triticale breeding lines with FHB resistance. During the 2005-06 and 2006-07 seasons the materials in 1) and 2) above will undergo another round of backcrossing and Type II evaluation in the greenhouse. BC_2F_3 and BC_2F_4 generation lines in 3) and 4) above will undergo both greenhouse and field evaluations to identify homogeneous lines with superior FHB resistance in comparisons with their recurrent parents. This objective of this research is related to the HGB research area goal of assembling all useful host plant resistance genes in parent stocks of sufficient adaptation to be useful in cultivar development. Pre-breeding activities outlined in this proposal are essential if new sources of resistance are to be widely utilized in cultivar development.