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Project Title: Combining Resistance Sources to Produce FHB Resistant Specialty Spring Wheat Varieties.

PROJECT 1 ABSTRACT

(1 Page Limit)

In the US spring wheat (*Triticum aestivum* L.) region, Fusarium head blight (FHB) causes significant grain yield losses and losses due to the accumulation of fungal mycotoxins, such as deoxynivalenol (DON). Hard white spring wheat and specialty low-amylose starch genotypes resistant to FHB are needed by regional producers to remain competitive in domestic and international markets. We propose screening the 2008 Uniform Hard White Spring Wheat Nursery for resistance to FHB at several ND locations. This nursery will include experimental hard white spring wheat lines and specialty low-amylose spring wheat line entries from around the region. A successful wheat breeding approach to reduce DON accumulation has been to combine different sources of host FHB resistance into a single genotype. To increase the efficiency of developing FHB resistant specialty spring wheat varieties, we will collaborate with the USDA-ARS Genotyping Lab to identify advanced hard white and specialty spring wheat breeding lines with both the Sumai 3 and *Triticum dicoccoides* sources of FHB resistance. Yield trial nurseries including lines with both sources of FHB resistance will be evaluated for desirable agronomic traits, and lines exhibiting acceptable agronomic performance will be considered for release as germplasm. Efficient introgression of effective FHB genes for resistance into specialty wheat germplasm requires a better knowledge of how type I or type II resistance mechanisms function in the host plant. To evaluate the function of types I and type II resistance genes, we will use previously developed reciprocal backcross monosomic lines developed by hybridizing FHB resistant spring wheat 'Frontana' to a set of 'Chris' spring wheat monosomics, which are susceptible to FHB. Greenhouse evaluations will be conducted 7, 14, and 21 d after point and spray inoculation of spikes. After harvest, the number of visually diseased kernels will be assessed, and the DON content of seed from inoculated spikes will be determined. We will collaborate with the USDA-ARS to separate diseased from sound kernels and assess FHB kernel damage using NIR technology. Research results will be communicated through the use of electronic online publications and the publication of Uniform Regional Scab Nursery results. Germplasm releases will be described in journal publications, which will include data on agronomic performance and resistance to FHB. Results will also be communicated as oral or poster presentations made at annual professional meetings and at grower field days.