0203-BR-097 Improving Specialty Spring Wheat Germplasm for Resistance to Fusarium Head Blight.

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PROJECT ABSTRACT
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Specialty wheat varieties are promising alternatives to the red spring wheat varieties traditionally grown in the Northern Plains region of the U.S. However, no significant level of genetic resistance to *Fusarium* Head Blight (FHB) exists in this germplasm. The overall goals of this project are to accelerate the development of FHB resistant specialty wheat germplasm for the Northern Plains and to transfer various sources of resistance to adapted specialty spring wheats. These goals are addressed by sourcing resistance from North Dakota red spring wheat lines with a 'Sumai 3' Type II resistance, 'Frontana' with a Type IV resistance, and *Triticum dicoccoides* with an accession identified as having Type II resistance. The North Dakota 'Sumai-3'-derived lines and 'Frontana' have been crossed to specialty spring wheat germplasm with advantageous quality traits. A chromosome 3A substitution from the resistant *Triticum dicoccoides* accession has been used to produce synthetic hexaploids, which are serving as "germplasm bridges" to introgress this new source of FHB resistance into hexaploid wheat. Marker *Xgwm2* identified a major QTL for FHB resistance on chromosome 3A of this *Triticum dicoccoides* accession, and it promises to be useful in following resistance as it is incorporated into specialty wheat germplasm from crosses with synthetic hexaploids. Adapted F_1 hybrids with the 'Sumai 3' source of resistance and 'Frontana' hybrids have been pollinated with maize. Using this technique, production and selection of double-haploid lines is underway to rapidly develop resistance in adapted germplasm. In association with the transfer of Type IV resistance, the chromosome location of genes responsible for the resistance in 'Frontana' is being determined by conducting a backcross reciprocal monosomic analysis using a set of 'Chris' monosomics. Synthetics are being inoculated and evaluated for resistance in the 2002 greenhouse, and double-haploid lines are being evaluated for FHB resistance in 2002 mist-irrigated screening nurseries in Fargo and Langdon, ND. Synthetics exhibiting resistance in the greenhouse and double-haploid lines exhibiting field-level resistance and satisfactory agronomic performance will be made available to all geneticists identifying resistance gene loci and breeders developing specialty wheat varieties.