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Project Title: Rapid Development of Specialty Spring Wheat Cultivars with FHB Resistance.

PROJECT 2 ABSTRACT
(1 Page Limit)

Specialty wheat cultivars are promising alternatives to the red spring wheat cultivars traditionally grown in the Northern Plains region of the U.S. Because of this promise, the most recent U.S. Farm Bill includes an incentive plan to encourage growers to produce white spring wheat and there is renewed interest in the development of white spring wheat cultivars for specialty bread, tortilla, and noodle end-use markets. However, no significant level of genetic resistance to Fusarium Head Blight (FHB) exists in specialty spring wheat germplasm or white spring wheat cultivars. The overall goal of this project is to accelerate the development of FHB resistant specialty wheat germplasm and cultivars for the Northern Plains. Specialty white seeded spring wheats, red spring wheats with high grain protein, and spring wheats with waxy starch characteristics have been hybridized to 'Alsen', a North Dakota adapted red spring wheat with type II FHB resistance. Doubled-haploid (DH) lines have been developed from these crosses to rapidly incorporate FHB resistance into adapted specialty spring wheat germplasm and to rapidly develop resistant specialty wheat cultivars. At least one white wheat DH line has exhibited intermediate resistance to FHB in two years of field tests, and it also has some resistance to the wheat stem sawfly. DH lines will continue to be developed and evaluated for FHB resistance with the intent to release germplasm and cultivars combining unique end-use quality traits with FHB resistance. To incorporate another source of resistance into specialty spring wheats, backcross reciprocal monosomic lines are being produced from crosses between 'Frontana' and 'Chris' spring wheat monosomic lines. These lines are in the process of being produced and will be compared and evaluated to determine which chromosome or chromosomes carry a major gene or genes for FHB resistance in Frontana. The critical chromosome lines expressing resistance will be hybridized to backcross-derived lines of Alsen, which are being developed to pyramid different sources of FHB resistance from *Triticum dicoccoides* and the hexaploid wheat, 'CM-82036'. The release of specialty spring wheat germplasm lines and cultivars with different sources of resistance will be accelerated by using an off-season breeding nursery in New Zealand, by producing doubled-haploid lines, and by testing for unique flour swelling and noodle end-use traits. Resistant cultivars will be made available to spring wheat producers seeking an alternative to red spring wheat and needing FHB resistance. Resistant germplasm with diverse sources of resistance will be made available to breeders for developing durable FHB resistance.