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(1 Page Limit)

Significant problems with Fusarium head blight have occurred in the northeastern portions of Montana and the Yellowstone River Basin. These epidemics were associated with years when Montana received more, late season rainfall than western North Dakota. These epidemics were sporadic and hard to predict. More recently, head blight has become a perennial problem for the irrigated acreage throughout the state. Montana, alone, has 150,000 acres of irrigated spring wheat with an annual production of 9.8 million bushels amounting to \$50 million annually. Most if not all of this acreage is impacted by this disease. Neighboring states in the northern intermountain region (Idaho, Washington, Oregon and Wyoming) have an additional 390,000 irrigated acres, all of which may be affected by FHB in the near future. In past years, our FHB evaluations of advanced breeding lines and FHB tolerant cultivars showed these materials displayed good tolerances when coupled with foliar applications. Unfortunately, these lines have several deficiencies, in particular severe lodging, ergot, and black chaff when grown under irrigation. In addition, current FHB tolerant varieties lack sawfly resistance, which is critical to the dryland production of the northeastern portions of Montana. The purpose of this proposal is to: **Develop hard red spring wheat cultivars suitable for irrigated production in the northern intermountain region, northwestern Great Plains and northeastern Montana.**

The primary objective of the spring wheat breeding effort is to develop FHB-resistant varieties suitable for production in high-yield, irrigated systems and dryland sawfly areas of eastern Montana. For this, we have used molecular markers to backcross the Sumai 3 QTL into two adapted backgrounds. The Sumai 3 QTL has the greatest and most consistent effect on FHB resistance. The first of the backgrounds used is 'Choteau', a solid-stemmed variety with resistance to the wheat stem sawfly that has performed very well in irrigated production. The other line has MTO249 as the recurrent parent. MTO249 is a sister line to our recent cultivar release 'Vida'. MTO249 has long green leaf duration similar to Vida, but is about 6 cm shorter under irrigation. Currently, we have identified approximately 40 homozygous F₂ individuals in backcross derivatives of Choteau and MTO249. F₃ seed is being increased in the greenhouse to provide seed for field testing in 2008. In addition to the field trials at the Schutter farm, we will grow increase rows under irrigation at our research farm in Bozeman. Selected lines will be advanced to the normal breeding trials in 2009, and also entered into regional FHB trials. The MSU program has benefited from the hospitality Schutter family in locating the FHB nursery in a production field that has been impacted by scab disease for five years. Naturally occurring inoculum from wheat residue and sprinkler irrigation have provided optimum disease expression and evaluation in two years of field trials. F₃ lines supplied by the breeding program, hill plots (10-15 seed per plot) in three replications for each of these lines and their homozygous negative sister lines will be established and compared with recurrent parents, as well as susceptible variety Hank, and FHB resistant varieties Kelby and Volt. For those field results that are ambiguous for FHB resistance, follow-up greenhouse trials will use single floret inoculations to determine resistance to spread within the wheat head. A FHB-resistant spring wheat variety with adaptation to irrigation production will be an effective tool for producers to manage scab disease on wheat.