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Research Area: VDUN

Project Title: Uniform nursery for SRWW and evaluation of marker-assisted selection for scab resistance.

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PROJECT 1 ABSTRACT

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There is a significant need to evaluate marker-assisted selection (MAS) for FHB resistance in soft winter wheat (SWW), assess the genetics of resistance within SWW, and to couple these studies to relevant breeding populations. Uniform testing of advanced breeding lines for scab resistance is also imperative to ensure breeders have an accurate estimate of FHB resistance. Our objectives are:

1. Evaluate the effect of exotic QTL alleles for FHB resistance in SWW genetic backgrounds.
2. Evaluate MAS for FHB resistance QTL alleles from Freedom and Frontana
3. Evaluate selection for FHB resistance in crosses of moderately resistance SWW cultivars and tag QTLs.
4. Coordinate a uniform nursery for evaluating FHB reaction in SWW adapted to the northern US.

We propose to accomplish these objectives primarily by creating near isogenic lines in SWW genetic backgrounds for reported key quantitative trait loci (QTL, genes that control traits that are measured numerically) marker alleles from exotic and adapted germplasm. We propose a comprehensive approach, crossing and selecting the alleles in a range of relevant SWW genetic backgrounds. We will also use selection to study genetics and QTLs for FHB resistance in SWW. The objectives will provide a comparison of the value of various resistance alleles, the effect of combining alleles, will locate new QTLs, and tie the results into an ongoing variety development program.

The work relates to the USWBSI objectives of developing resistant cultivars and developing MAS systems for FHB resistance. We currently have little information on how MAS will work in SWW. The research in this proposal will be allow SWW breeders to evaluate the effectiveness of MAS in their populations, therefore maximizing return from this technology. The information will also lead to further exploitation of resistance from adapted SWW lines. During the course of the genetic studies, many adapted SWW lines will be generated and evaluated for FHB resistance. The lines are part of the OSU variety development program. The knowledge gain in the basic research will directly tie into the applied program that release cultivars to growers.