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PROJECT 1 ABSTRACT
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The overall goal of this project is to accelerate development of soft white and red winter wheat cultivars adapted to Michigan with improved resistance to Fusarium head blight (FHB) and deoxynivalenol (vomitoxin, VOM, DON). FHB has been an annual problem in Michigan for more than a decade. Some varieties have a modest level of resistance, however, the majority of wheat varieties grown in Michigan are susceptible to FHB. Most soft white wheat produced in the Eastern U.S. is grown in Michigan. White wheat has been found to have higher levels of FHB susceptibility and higher DON accumulation than red wheat making the development of FHB-resistant soft white wheat a priority for the MSU wheat breeding program.

Michigan State University has been actively involved in breeding for FHB resistance for over a decade. Chinese sources of FHB resistance has been strongly emphasized, but, yield trials have shown that the breeding lines produced are poor yielding. Marker Assisted Selection (MAS) for Chinese sources of resistance is being used to enrich populations from 3-way crosses, and identify advanced inbreeding lines with FHB resistance QTL. Native sources of resistance are present in breeding populations and may lend to the development of higher yielding lines with adequate FHB resistance. Some native sources of resistance have been used in crosses in the past, and we will create additional crosses with native sources of resistance, and work to combine both native and Chinese sources of resistance.

A brief overview of our plan of work is as follows: Crosses will be made between elite high yielding germplasm and FHB resistant germplasm. Marker Assisted Selection of known Quantitative Trait Loci (QTL) for resistance will be conducted in collaboration with the USDA/ARS Regional Small Grains Genotyping Lab (RSGGL, Raleigh, NC), and selections will be made based on these marker data. FHB phenotyping will be conducted in an inoculated and misted field nursery. Post-harvest assessment of DON will be conducted on selected lines/nurseries. Through these methods we expect to increase the FHB resistance in MSU's breeding lines, and develop commercial cultivars with both FHB resistance and high yield.