PI: Herbert Ohm **PI's E-mail: hohm@purdue.edu**

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PROJECT 1 ABSTRACT
(1 Page Limit)

The objective of this research is to map novel Fusarium head blight (FHB) resistance QTL of major effect located on the long arm of chromosome $7el_2$, and identify DNA markers closely linked to the resistance gene(s). A new source of type II resistance against FHB was identified in a hexaploid wheat line that contains a chromosome from *Lophopyrum ponticum* (genome el_2) and its derived translocation lines. The resistance was localized on the long arm of chromosome $7el_2$. Understanding the genetic basis of this trait is prerequisite to utilizing this source of resistance in wheat breeding. One difficulty in studying the genetics of useful traits derived from wild relatives is that the respective wheat chromosome rarely recombines with the introgressed homoeologous alien chromosome. This project is designed to map the FHB resistance gene(s) in a population derived from a cross between two substitution lines. The two alien chromosomes, $7el_1$ and $7el_2$, have been shown to be homoeologous and have a high frequency of pairing. An F_2 population from a cross between line K2620 (FHB resistant) in which chromosome $7el_2$ replaced 7D of wheat cv. Thatcher, and line K11463 (FHB susceptible) in which $7el_1$ replaced 7D of Thatcher, will be available in spring 2004 for disease evaluation and DNA extraction. We are confident that we can phenotype single F_2 plants for this highly effective FHB resistance from $7el_2$ based on our experience in previous tests (Shen and Ohm, 2003). However, we intend to characterize certain F_3 families in fall 2004. We have identified two SSR markers and one CAPS marker on the long arm of chromosome 7 of Lophopyrum that are polymorphic between $7el_1$ and $7el_2$. We will also identify AFLP markers that are polymorphic between $7el_1$ and $7el_2$ to locate the FHB resistance of $7el_2$. DNA markers developed from this research will be useful in future research to reduce the length of the $7el_2$ chromosome segment on which this resistance is located using a ph1B deletion line and also to incorporate this FHB resistance into adapted wheat lines.