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Project Title: Mapping Novel FHB Resistance in Wheat Transferred from *Lophopyrum ponticum*.

PROJECT 1 ABSTRACT

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Fusarium head blight (FHB) is a devastating disease of winter wheat in Indiana and adjacent regions. Few FHB resistance genes with large effect have been identified in common wheat (*Triticum aestivum*). Novel resistance identified in wild species that are related to wheat must be transferred into wheat germplasm lines that are useful as parent lines to develop wheat cultivars with pyramided FHB resistance.

The objectives of this research are to: 1) map novel FHB resistance QTL of major effect located on the long arm of chromosome 7e1₂, 2) identify DNA markers closely linked to the resistance gene(s), and 3) develop advanced wheat lines with a shortened alien chromosome segment, but that retain the targeted FHB resistance.

A new source of type II resistance against FHB was identified in a hexaploid wheat line that contains a chromosome from *Lophopyrum ponticum* (genome e1₂) and its derived translocation lines. Initial gene mapping has been done in an F₂ population derived from a cross between K2620 and K11463, two 7e1/7D substitution lines in wheat cv. Thatcher genetic background containing, respectively, e1₂ (FHB-resistant) or e1₁ (FHB susceptible). One QTL, and possibly two closely linked QTLs, have been detected at the distal region of the long arm. This project is targeted to integrate more DNA markers in the potential QTL region to clarify the genetic components and the magnitude of effect of resistance in this source. Phenotypic data from both F₂ and F₃ (the effect of this QTL is significant, so phenotyping of F₂ and F₃ is reliable) will be used in the QTL analysis. Meanwhile we will develop wheat lines with shortened *Lophopyrum* chromosome segments by inducing homoeologous pairing via the *ph* mutant gene. The DNA markers identified in the mapping population will facilitate selection in the project to reduce the e1₂ segment carrying FHB resistance, and wheat lines resulting from this latter project will support/validate the mapping results.