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Project Title: Evaluating and Validating FHB Host Resistance Genes Pyramided in Spring Wheat.

PROJECT 1 ABSTRACT

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Fusarium head blight (FHB), caused by *Gibberella zeae* Schwein. (Petch) (anamorph: *Fusarium graminearum* Schwabe), is a devastating disease in small grains (McMullen et al., 1997). Gene pyramiding (combining the resistance genes) is considered one of the most effective strategies to achieve durable resistance to FHB. Current wheat breeding programs for FHB focus mainly on type II resistance, which limits pathogen spread but may not be sufficiently durable. Despite that, few studies have been conducted to address the effects of type I resistance and combination of both types of resistance to FHB. To combine type I with type II resistance, a population of 113 F₉-derived recombinant-inbred lines (RILs) was developed from a three-way cross of wheat genotypes Frontana/W9207//2*Alsen using a single seed descent method. In our preliminary experiments, several RILs showed more resistance (reduced disease severity and low DON content) than the resistant parents. These enhanced resistant RILs be evaluated and validated for FHB resistance to achieve the goal of this research project.

The specific objectives of this project are to (i) assess the resistance spectrum of the pyramided lines using mixture of 3-ADON, 15-ADON and NIV producers of *G. zeae* in the greenhouse, and (ii) characterize selected resistant RILs with known simple sequence repeat (SSR) markers, which are associated with types I and II resistance