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The HLP mutation confers enhanced resistance to leafrust in different wheat genetic backgrounds

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ABSTRACT

In several plant species, lesionmimic mutants simulate the disease resistance response in the absence of pathogens. Interestingly, some of these mutants confer broad spectrum resistance to diverse pathogens. We previously demonstrated that the HLP (hypersensitivelike phenotype) mutant of bread wheat (*Triticum aestivum* L.) exhibited spontaneous hypersensitive response (HR) in the absence of any pathogen input. However, when HLP plants showing HR phenotype were challenged with leafrust (*Puccinia triticina*) they were more resistant than plants of the motherline of comparable developmental stage that did not show spontaneous HR, suggesting that the HLP mutation may confer enhanced resistance to the fungus. In this paper we validate the aforementioned finding in several wheat genetic backgrounds. Two way crosses were performed among the HLP mutant and eight wheat commercial stocks, and third backcross progenies with and without spontaneous HR were challenged with leafrust to investigate the response to the fungus. Backcrosses to cv. Sinvalocho M.A., the mother line, and cv. Purplestraw, highly susceptible to leafrust attack, were used as controls. Third backcross progenies of cvs. Sinvalocho M.A., Purplestraw, Buck Guarani and Pro INTA Imperial bearing spontaneous HR phenotype were more resistant to the fungal pathogen than third backcross progenies that did not carry the HLP mutation. Other four wheat stocks were as healthy as the HLP mutant. As expected, backcross to the motherline demonstrated that the HLP mutation conferred an additional resistance to the already healthy performance displayed by the motherline at adult plant stage. The introgression of the HLP mutation conferred heightened leafrust resistance and caused no kernel weight reduction on the backcrossed progenies. Taken together, these data validate the direct use of this type of mutations in disease resistance breeding.

KEYWORDS

 Hypersensitive Response; LesionMimic Mutant; *Puccinia triticina*, Wheat Commercial Stocks

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