

Molecular Mapping of Greenbug Resistance Genes in Wheat

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BACKGROUND

The greenbug is an important aphid pest of small grain crops in many parts of the world. For many years, use of pesticides was the major control method to the annual occurrence and frequent outbreaks of the greenbug in this region. This added environmental concerns to the considerable financial impact caused by this pest. The greenbug resistance gene *Gb3* in the wheat cultivar TAM 110 and several of its derivatives is currently conferring resistance to prevailing biotypes in the field. New greenbug strains being able to damage all known host resistance of wheat have been found. *Gb3*-conferred resistance could be potentially overcome by newly emerging virulent greenbug biotypes. In order for effective and sustainable control of the greenbug damage, it is necessary to explore new sources of greenbug resistance and study the genetic and molecular mechanisms of host resistance against this aphid pest.

OBJECTIVES

- Identify molecular markers linked with the resistance gene *Gb3* in wheat.
- Identify and characterize new sources of greenbug resistance genes for wheat improvement.

RESULTS

A new source of greenbug resistance was identified in a synthetic hexaploid wheat line W7984. Genetic analysis suggested that a single, dominant gene governs the greenbug resistance in W7984 (Fig. 1), which was placed in chromosome arm 7DL by linkage analysis with molecular markers. Allelism tests revealed that the greenbug resistance in W7984 and Largo carrying the greenbug resistance gene *Gb3* was controlled by two different genes in 7DL. Using a target mapping strategy, a genetic map of *Gb3* was constructed. One co-segregating and four closely linked markers with *Gb3* were identified (Fig. 2). Deletion mapping placed *Gb3* into the telomeric 18% region of 7DL. It was suggested that the greenbug resistance gene in W7984 be designated as *Gb7*. The molecular maps of the two resistance genes will be a valuable tool for marker-assisted selection of greenbug resistance in wheat breeding.

Fig. 1 Reactions of Opata85 (1), Largo (2), W7984 (3) and TAM 105 (4) to greenbug feeding.



Fig. 2 A genetic map showing molecular markers linked with resistance gene *b3*.

