

### **High-resolution mapping of the wheat *Lr46* pleiotropic rust resistance locus**

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Rust diseases are globally the most important diseases of wheat, and durable sources of genetic resistance are considered the most effective means of control. The pleiotropic *Lr46* gene confers durable, race non-specific resistance to leaf rust and stripe rust but little is known about its mechanism of action. Using a population of 3931 lines with a genetic resolution of approximately 0.01 cM, fine-scale mapping of the *Lr46* locus was carried out for both the development of molecular markers and map-based cloning of the gene. Existing markers were used to probe wheat hexaploid and tetraploid bacterial artificial chromosome (BAC) libraries and, following low-pass sequencing of selected BACs, contigs were assembled that were the source of many additional markers. However, no recombination was detected between BAC-derived markers, so synteny with the model grass genome, *Brachypodium distachyon*, was explored. Markers spanning the *Lr46* locus were colinear with a 90 kbp physical region from *Brachypodium*, which was used to identify wheat ESTs and develop new markers. Subsequently, we delimited *Lr46* to a 13 kbp physical region in *Brachypodium* and a 0.45 cM genetic interval, where the closest marker was 0.02 cM distal to the gene. This high-resolution map will form the basis of map-based cloning.