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DIFFERENTIAL ANALYSIS OF DURUM WHEAT-*THINOPYRUM PONTICUM* RECOMBINANT LINES CARRYING THE *LR19* LEAF RUST RESISTANCE GENE BY NBS-PROFILING

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Lr19, one of the few remaining largely effective genes conferring resistance to leaf rust, was transferred from chromosome 7AgL of *Thinopyrum ponticum* to 7AL of durum wheat. To identify specific DNA fragments tightly linked to *Lr19* and to enrich the 7AL/7AgL region with new markers, several recombinant lines with varying amounts of alien chromatin, some carrying and others lacking *Lr19*, were genotyped by NBS profiling. This PCR-based approach efficiently targets resistance (*R*) genes and *R*-gene analogues using degenerate primers targeted to the conserved nucleotide binding sites (NBS) characteristic of the frequent NBS-LRR class of *R* genes. The fingerprints of two near-isogenic recombinant lines (NIRL) were compared. One NIRL carries *Lr19*, and has 23% of its 7AL replaced by 7AgL; the other lacks *Lr19*, with 22% of 7AL replaced by 7AgL. This allowed us to isolate *R* gene fragments located within the 1% 7AgL chromatin containing *Lr19*. Two such polymorphic bands were identified, cloned and sequenced, and new sets of primers were designed and validated to allow the development of a codominant assay for *Lr19*. The 7AgL and 7AL sequences generated by NBS profiling share high homology with known NBS-LRR wheat genes. In order to identify expressed NBS-like sequences induced by leaf rust infection, and encoded by the 1% of 7AgL containing *Lr19*, a modified NBS profiling protocol was then applied to cDNA obtained from infected seedlings of the two NIRLs. At particular time points post infection, NBS fragments were identified which were specific to plants carrying *Lr19*, and these are currently being characterized. NBS profiling applied to wheat-alien recombinant lines is a promising strategy to describe, at the DNA and RNA levels, the *R*-gene content of introgressed segments. It may also represent a first step for cloning important *R* genes such as *Lr19*.