

## Cloning and Analysis of the *Tomato yellow leaf curl virus* Resistance Gene *Ty-5*

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The breeding line TY172, thought to be originating from *Solanum peruvianum*, is highly resistant to *Tomato yellow leaf curl virus* (TYLCV) and in most cases- a symptomless carrier of the virus. Genetic analysis of this line led previously to the conclusion that TYLCV resistance in TY172 is mainly controlled by a major recessive QTL, termed *Ty-5*, which maps to chromosome 4 (Anbinder et al., 2009, *Theor. Appl. Genet.* 119:519-530). The objective of this work was to fine-tune map *Ty-5*. The associations between 27 polymorphic DNA markers, spanning the *Ty-5* locus, and the resistance characteristics of individual plants inoculated with TYLCV in segregating populations were analyzed. These analyses led to the localization of *Ty-5* into a 425 bp region containing a T-to-G transversion in the first exon of a gene, and a T-to-A transversion in its proximal promoter region in TY172 compared to susceptible lines. The T-to-G transversion is manifested by a single amino acid substitution between the resistant TY172 line and its susceptible counterparts. Quantitative RT-PCR analysis in inoculated and non-inoculated susceptible R13 and resistant TY172 plants revealed that transcript level of the gene remained unchanged. This suggests that the polymorphism discovered in the coding region of the gene controls resistance. Constitutive over-expression of the susceptible allele of the gene in TY172 rendered TY172 highly susceptible, while constitutive over-expression of the resistant allele in susceptible R13 plants did not have any significant effect. These results confirm the recessive nature of the *Ty-5* gene. The gene and its possible role in TYLCV infection will be disclosed and discussed.