



Identification of Fusarium wilt-resistance genes from tomato

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Slatyer seminar room R.N. Robertson Building (Bldg. 46), Linnaeus Way, ANU



Fusarium wilt disease affects a broad range of economically important plant species. This devastating disease is the result of vascular tissue colonisation by the soil-borne fungal pathogen *Fusarium oxysporum*. Due to its agricultural importance, wilt disease of tomato caused by *F. oxysporum* f. sp. *lycopersici* (Fol) has been extensively studied and is currently one of the best-characterized plant-pathogen interactions involving a vascular wilt pathogen. Several Fusarium wilt resistance (R) genes have been incorporated into cultivated tomato (*Solanum lycopersicum*) from wild tomato species and work towards the isolation and characterisation of several of these R genes has been a primary focus of our research.

The *I-3* gene was introgressed from *S. pennellii* and confers resistance to Fol race 3. We isolated this gene by map-based cloning and found it to be a member of an S receptor-like kinase (SRLK) gene family. Consequently, *I-3* represents a new class of plant resistance protein, suggesting novel signalling and downstream responses might be recruited in the defence against Fol. A second and distinct *S. pennellii* gene, also conferring resistance to Fol race 3, is *I-7*. Recently, we identified an *I-7* candidate gene by SNP (single nucleotide polymorphism) analysis of RNA-seq data from *I-7* resistant and susceptible lines. This approach proved invaluable as the introgression carrying *I-7*, which

was found to be small (~210 kb), was not revealed in an earlier genome-wide screen using 200 different markers. We are also working towards the isolation of the *I* gene, which has been introgressed from *S. pimpinellifolium* and provides resistance to Fol race 1. We have narrowed the search for this gene to a 1 Mb region which contains four candidate genes. Currently, we are screening for recombinants to reduce this region further, as well as cloning each *I* gene candidate for functional testing.

Presented by

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