**INTRODUCTION**

*Erwinia carotovora* subsp. *atroseptica* (*Eca*) is an economically important pathogen of potato, causing tuber soft rot and blackleg. There are no chemical treatments to control *Eca* in the field. Moreover, there are no commercial cultivars with total resistance to *Eca*. Understanding mechanisms used by *Eca* during infection is crucial in the development of resistant cultivars.

The main weapons used by *Eca* to infect plants are plant cell wall degrading enzymes. However, the recently identified type III secretion system (T3SS) in *Eca* is also instrumental in injecting effector proteins into the host plant to suppress, manipulate or modulate defences during early stages of infection (Toth and Birch, 2005). The aims of this project were:

- To identify a mutant in *geneX*, a putative effector, and to assess its role in pathogenicity.
- To identify potato defence pathways modified by this putative effector.
- To use this knowledge for enhanced resistance to *Erwinia*.

**Microarrays**

To determine which other genes are up-regulated together with TF1 transcription factor, cDNA from leaves infiltrated with *Eca* wt vs. *geneX* mutant 0.5 hours post inoculation (hpi) were hybridised to an Agilent microarray. *PR1* gene was also shown to be up-regulated together with the TF1. *PR1* is a marker of salicylic acid-dependant pathways.

**Improved resistance**

- The above results suggest that constitutive expression of TF1 transcription factor can increase resistance to *Erwinia*.
- Transgenic lines with increased expression of the TF1 transcription factor were generated.
- Pathogenicity assays on Desiree vs. transgenic TF1 lines.
- Lesion measured from 2 to 17 days post inoculation (dpi).

**Characterisation of *geneX* mutant and Real-Time PCR**

The role of *geneX* in virulence was determined by identifying a Tn5 insertion mutant in this gene. Thereafter, pathogenicity tests were carried out on both potato tubers and stems to compare virulence of *geneX* mutant vs *Eca* wild type (wt) strain. Results showed reduced virulence of mutant. *GeneX* mutant was also complemented with plasmid carrying *geneX* and complementation restored virulence of mutant to *Eca* wt levels.

**Overexpression of TF1 enhances resistance of potato cultivar Desiree to Eca**

**References**


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