

## Research Article

**Pathogenicity Inducing Effector Genes of *Xanthomonas axonopodis* pv *punicae* Reveals Differential Expression Pattern in Host and Pathogen****Kartar Singh<sup>1</sup>, MK Prasannakumar<sup>2</sup>, HB Mahesh<sup>3</sup>, C Manjunatha<sup>4</sup> ME Puneeth<sup>2</sup> and Manoj Choudahry<sup>5</sup>**

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**Abstract**

Pomegranate is a premier export intended crop in India. Of late, bacterial blight disease in pomegranate is causing significant yield loss. The disease causing bacteria *Xanthomonas axonopodis* pv *punicae* (Xap) secretes type III effector proteins to suppress the pathogen associated molecular pattern (PAMP)-triggered plant immunity (PTI) and fosters the disease. The role and induction of *effector* genes during host-pathogen interaction in pomegranate Xap is not known. In this context, an attempt was made to identify the expression profile of ten putative effectors (pathogenicity-related genes) during host-pathogen interaction. These candidate pathogenicity-related genes were identified through *in silico* analysis, which includes seven genes with putative type III secretion system (XopAK, XopV1, XopP, XopN, XopR, HpaP and HrpB), and one each of a general secretory pathway gene (GspH), a lipase family protein gene (Abhydrolase) and a serine/threonine kinase gene (PKc). The PCR-based amplification confirmed the homology between *in silico* and *in vivo* analysis of selected candidate effector proteins. Expression analysis through real-time quantitative PCR showed the induction of candidate pathogenicity-related genes during infection. The XopN, Abhydrolase and PKc gene were highly induced on an interaction between host-pathogen, than pathogen alone. The expression of these effector genes in the host during different time points of infection provided significant insight to deciphering the virulence mechanism of Xap. Unidentified and potentially new virulence factors were reported, which could be subverting host cell resistance processes.

**Key words:** Bacterial blight, effector proteins, gene expression, pomegranate, T3SS

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