

## Regulation of Defense-Related Enzymes Associated with Bacterial Spot Resistance in Tomato

R. Kavitha<sup>1</sup> and S. Umesha<sup>1,\*</sup>

Twenty tomato (*Solanum lycopersicon*) cultivars were screened for resistance against bacterial spot disease incited by *Xanthomonas axonopodis* pv. *vesicatoria* under field conditions with and without pathogen infection. Screening was done by artificially inoculating a *X. axonopodis* pv. *vesicatoria* suspension to 4-week-old tomato seedlings and observing them for typical symptoms of the disease. Seedlings were categorized into highly resistant, resistant, susceptible and highly susceptible cultivars on the basis of disease incidence. Tomato cultivars were screened for defense-related enzymes, total phenols and lignin contents. The temporal patterns of all these enzymes were estimated with a moderately susceptible tomato cultivar. Native PAGE analysis of both peroxidase (POX) and polyphenol oxidase (PPO) was carried out for the time course of enzyme activities and also by selecting three different tomato cultivars, following infection with the pathogen. Based on the inducible amounts of these enzymes upon pathogen infection, the tomato cultivars were correlated with the disease incidence under field conditions. A significant ( $P \leq 0.05$ ) correlation was observed between the degree of host resistance and the enzyme levels. In highly resistant tomato cultivars the enzyme levels, total phenols and lignin contents were increased in comparison with highly susceptible tomato cultivars. Isoform analysis of POX and PPO enzymes indicated a clear difference between resistant and susceptible tomato cultivars in the number of isoforms and also in the intensity of each isoform in the presence of pathogen infection. The possible regulation of defense-related enzymes in imparting host resistance is discussed.

**KEY WORDS:** Peroxidase; phenylalanine ammonia lyase; polyphenol oxidase; *Solanum lycopersicon*; susceptibility; *Xanthomonas axonopodis* pv. *vesicatoria*

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<sup>1</sup>Dept. of Applied Botany, Seed Pathology and Biotechnology, University of Mysore, Manasagangotri, Mysore 570 006, Karnataka, India. \*Corresponding author [e-mail: pmumesh@yahoo.com] Present address: Dept. of Plant Pathology, Physiology & Weed Science, Virginia Polytechnic Institute & State University, Virginia Beach, VA, USA.