

Bio-Genetic Activities Associated with Resistant in Peppers to *Phytophthora capsici*

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Abstract : Root and collar rot disease caused by *Phytophthora capsici* (Leonian) is one of the most serious diseases in pepper, *Capsicum annuum* L. In this study, a diverse collection of 37 commercial edible and ornamental pepper genotypes infected with *P. capsici* were investigated for biomass parameters and enzymatic activity of peroxidase or peroxide reductases (EC), superoxide dismutase (SOD), polyphenol oxidase (PPOs), catalase (CAT) and phenylalanine ammonia-lyase (PAL). Seven candidate DEG genes were also evaluated on resistant and susceptible pepper cultivars, through measuring product formation, using spectrophotometry and real-time polymerase chain reaction. All the five enzymes and seven defense-gene candidates were up-regulated in all inoculated pepper accessions to *P. capsici*. But, the enzymes and DEG genes were highly expressed in resistant cv. 19OrnP-PBI, 37ChillP-Paleo, and "23CherryP-Orsh". The expression level of enzymes were 1.5 to 5.6-fold higher in the resistant peppers, than the control non-inoculated genotypes. Also, the transcriptional levels of related candidate DEG genes were 3.16 to 5.90-fold higher in the resistant genotypes. There was a direct and high correlation coefficient between resistance, bio-mass parameters, enzymatic activity, and resistance gene expression. The related enzymes and candidate genes expressed herein will provide a basis for further gene cloning and functional verification studies, and also will aid in an understanding of the regulatory mechanism of pepper resistance to *P. capsici*.

Keywords : AP2/ERF, cDNA, enzymes, MIP gene, q-RTPCR, XLOC

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