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 1.5 to 5.6-fold higher in resistant cv. 190rnP-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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