Plant Pathology and Weed science

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Abstract

Plant diseases pose a serious threat for sustainable agriculture. In this study we establish RAV1, an ethylene responsive transcription factor as a master transcriptional regulator of defense genes. The overexpression of AtRAV1 provided resistance against necrotrophic fungal pathogen (Rhizoctonia solani) in Arabidopsis thaliana whereas the atrav1 mutant demonstrated hyper-susceptibility to the infection. Several defense genes including AtMPK3, AtMPK4 and AtMPK6 were induced in the AtRAV1 overexpression (OE) lines but not in the atrav1 mutant, upon R. solani infection. The AtMPK3/AtMPK6 proteins seems essential for AtRAV1 mediated disease resistance, as knocking out AtMPK3/AtMPK6 in OE1 background, rendered plants susceptible to infection. We demonstrate that AtMPK3 (but not AtMPK6) phosphorylates AtRAV1 and the phospho-defective variants of AtRAV1 are unable to impart disease resistance in A. thaliana. Considering that AtRAV1 orthologs are conserved in diverse plant species, we hypothesize that they can be gainfully deployed to control economically important diseases. Indeed, overexpression of tomato ortholog of AtRAV1 provided broad spectrum disease resistance against bacterial (Ralstonia solanacearum), fungal (R. solani) and viral (Tomato leaf curl virus) infections in tomato.

Biography:-

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Note:- This work is partly presented at webinar on Plant Pathology on March 26, 2021 in the Time zone of London, UK