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Deciphering the *Chaetomium globosum* induced defense signaling network in tomato against Early Blight Disease

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Chaetomium globosum is a potential biological control agent against various plant pathogens. While most studies report on the mycoparastism and antibiosis of *C. globosum* against plant pathogenic fungi, only a few reports on its induced resistance. To gain insights into the induced defense mechanisms of *C. globosum* (Cg-2) against early blight of tomato, the suppression of disease by Cg-2 was evaluated and RNA-seq performed. There was 30.9 % reduction in disease severity in the Cg-2-treated plants. The expression of hormone signaling marker genes was analyzed by qPCR to determine the best time point for RNA sequencing. The transcriptome data revealed that 22,473 differentially expressed genes (DEGs) were expressed in tomato at 12 hpi compared to control plants, of which, 922 DEGs had a two-fold up- or down-regulation ($p<0.05$). The KEGG pathway analysis revealed that most of the DEGs represented metabolic pathways, biosynthesis of secondary metabolites, plant-pathogen interaction, chlorophyll metabolism and plant hormone signal transduction. GO analysis revealed that DEGs were mainly related to the binding and catalytic activities, metabolic processes, response to stimulus and biological regulation. The gene modulations in hormone signaling transduction, phenylpropanoid biosynthesis and MPK signaling indicated their involvement. The results revealed the activation of JA and SA signaling pathways indicating the potential involvement of both induced systemic resistance (ISR) and systemic acquired resistance (SAR) in the resistance activated by Cg-2 in tomato.

Speaker Biography

Jagmohan Singh has completed his Ph.D. from ICAR-Indian Agricultural Research Institute, New Delhi. He is the subject matter specialist (plant protection) at Guru Angad Dev Veterinary and Animal Science University, Ludhiana, India. He worked as Khorana fellow at department of plant pathology, Washington State University, USA with research work focused on potato viral diseases. He worked as visiting scholar in plant immunity laboratory at University of Edinburgh, Scotland, UK. He is currently serving as vice-chairperson of host resistance committee of American Phytopathological Society.

He was selected as IPS-APS travel grant award, to attend plant health conference by APS, USA, Aug, 2021. He received the best M.Sc. thesis award by SSDAT, at Rajasthan Agricultural Research Institute, Durgapura, Jaipur, and Oct 2018. He fetched the best poster award at national symposium by Indian Phytopathological Society at Banaras Hindu University, Varanasi, and Feb, 2019. The cover article award by agriculture letters magazine, Jul, 2020. He served as the judge at the Ohio State University, USA- Plant Sciences Symposium virtual poster competition on 26th Mar, 2021.

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