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IDENTIFICATION OF TRANSCRIPTION FACTORS INVOLVED IN THE RESPONSE TO BOTH BPH INFESTATION (BIOTIC STRESS) AND DIFFERENT LEVELS OF NITROGEN (ABIOTIC STRESS) IN RICE CULTIVARS

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Plants have evolved to develop astonishing survival strategies to adapt to variations in environmental conditions include rapid onset of abiotic and biotic stresses. These extreme conditions have caused constraints on the growth and development of plants as well as caused enormous economic loss globally to crops. Rice, *Oryza sativa* is one of the most important staple foods for more than half of the world population. In order to fulfil the food demand of the growing population, rice production needs to be increased significantly to 42%, from its current level. Stresses such as nitrogen (N) deficiency (abiotic stress) and brown planthopper (BPH) infestation (biotic stress) has been a major constraint in rice growing areas. The present study identified two TF genes which were involved in the combination of the reduced levels of N and BPH infestation in TN1 (susceptible to BPH) and IR70 (resistant to BPH) rice cultivars. *OsNCL1* and *OsNCL2* which was previously reported to be potentially related to BPH-resistance showed differential expression patterns in response to the combination of both the stresses. These TFs were up-regulated in response to the reduced levels of N (1.04 mM NH_4NO_3, 0.64 mM NH_4NO_3 and 0.24 mM NH_4NO_3) compared to the optimal N level (1.44 mM NH_4NO_3) at different time points of BPH infestation whilst the resistant IR70 was down-regulated to a greater magnitude in response to the reduced levels of N compared to the optimal upon BPH infestation. Down-regulation of both the genes in the resistant IR70 cultivar under the reduced levels of N and in the presence of BPH infestation shows that these TFs have repressed many active pathways to prevent further damage and is an efficient method of defence against infestation of the insect pest. Ultimately understanding the gene-regulatory network is important to develop or select for stress-tolerant and high yielding rice cultivars.

BIOGRAPHY

Uma Priya Kupusamy has completed her PhD recently (Jun 2018) from Newcastle University, United Kingdom. Her field of study involved molecular responses of rice to abiotic and biotic stress. She is currently the head of food microbiology section in the department chemistry, Malaysia and also a member of reputed working groups in Malaysia.

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