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Unraveling Cross Talk in Biotic and Abiotic Stress Signaling for Development of Strategies to Enhance Crop Tolerance to Combined Stresses



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Abstract

Stress is generally understood as the reaction of a biological system to extreme environmental factors that, depending on their intensity and duration, may cause significant changes in the system. Plants adapt to changing environmental conditions through global cellular responses involving successive changes in, and interactions among, expression patterns of numerous genes. They have evolved a wide range of mechanisms to cope with biotic and abiotic stresses and the molecular mechanisms that are involved in each stress have been revealed to a great extent. However, in nature no stress occurs individually and constant interactions of various biological and environmental take place. Hence, it is quite obvious that plants have mechanisms that govern the convergence points of different stresses but our knowledge of these interactions and signaling pathways are just emerging. Recent studies have revealed several molecules, including transcription factors and kinases, as promising candidates for common players that are involved in crosstalk between stress signaling pathways. Emerging evidence also suggests that hormone signaling pathways regulated by abscisic acid, salicylic acid, jasmonic acid and ethylene, as well as ROS signaling pathways, play key roles in the crosstalk between biotic and abiotic stress signaling.

Key words: Abiotic stress, bitoic stress, cross talk, hormone signaling, reactive oxygen species

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