



Chapter 16 - Omics-assisted understanding of BPH resistance in rice: current updates and future prospective

Satyabrata Nanda

MS Swaminathan School of Agriculture, Centurion University of Technology and Management, Paralakhemundi, Odisha, India

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Abstract

Rice is one of the most important crops in the world and its production is severely challenged by the brown planthopper (BPH) infestations. Rice and BPH have coevolved and therefore exhibit complex molecular interaction mechanisms. However, the recent advancements in the area of omics, including genomics, transcriptomics, proteomics, and metabolomics huge number of data are being generated with respect to the rice–BPH interactions. These primary data offer a great scope to analyze and draw inferences on the rice immune responses against BPH attacks. In addition, the outcomes of these omics-assisted studies have accelerated the molecular breeding of resistant rice. Further, the transcriptional and proteomic investigations provided deeper insights into the involvement of the different genes and proteins in regulating rice resistance against BPH. Similarly, metabolomic studies have identified the key metabolites in rice–BPH interactions and suggested the different pathways that play a pivotal role in rice resistance. In this chapter a comprehensive representation of the role of genomics, transcriptomics, proteomics, and metabolomics in regulating rice resistance against BPH infestations has been made. In addition, the crucial players involved in each omics during the rice–BPH interactions are discussed extensively. Moreover, this chapter will serve as a brief comprehension to understand the different molecular aspects of the complex rice and BPH interactions.

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Keywords

Rice; brown planthopper (BPH); Genomics; Transcriptomics; Proteomics; Metabolomics

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