

Phytoplasmas: Plant Pathogenic Bacteria - III

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Editors

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Genomics, Host Pathogen Interactions
and Diagnosis

 Springer

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Preface

Phytoplasma-associated diseases are severely limiting the quality and productivity of many ornamental, horticultural, and other economically important crops worldwide. Their dangerous impact is economically relevant in sugarcane, sesame, grapevine, fruit trees, and coconut palm, severely reducing the economic revenues for farmers and stakeholders. There is no effective cure for these diseases; therefore, the basic knowledge about their biological and biochemical influence on plant and insect vectors are the basic instruments for designing management options aimed to minimize their spread by insect vectors, propagation materials, and host-plant resistance. The scientific literature concerning genome, effectors, and pathogenicity factors is allowing the understanding of the phytoplasma-host metabolic interaction. It provides comprehensive information on biological, serological, and molecular characterization of the phytoplasmas including the recent approaches for diagnostics. Transcriptomics studies paved the way for analyzing the gene expression pattern in phytoplasmas upon infection and revealed the upregulation of genes associated to hormonal response, transcription factors, and signaling genes. Although phytoplasmas remain the most poorly characterized pathogens, recent studies have identified virulence factors that induce typical disease symptoms and have characterized the unique reductive evolution of the genome. The presentation of the progresses in cultivation in axenic media together with the perspectives for future research that will allow reducing the incidence and the losses due to these pathogens in the agriculture worldwide are also presented. Hence, the major recent research findings are compiled in this book.

We greatly acknowledge all the contributed authors for their efforts in synthesizing the most updated reviews on the subjects. We also like to thank the support and input of the publisher, Springer Nature (Pvt Ltd), Singapore, for its effort to publish this book. We strongly hope that it will be useful to everyone interested in phytoplasma research, plant pathology, microbiology, plant biology, and agriculture and

serve as an exhaustive and up-to-date reference on various aspects of phytoplasma-associated diseases in order to help the further progress of this branch of the plant pathology scientific knowledge.

Bologna, Italy
Stuttgart, Germany
Tokyo, Japan
New Delhi, India

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Michael Kube
Kenro Oshima
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and Assunta Bertaccini

About the Editors



Assunta Bertaccini is a Professor of Plant Pathology at the University of Bologna, Italy. In more than 40 years of research, she has focused on studying plant diseases associated with phytoplasmas and bacteria, particularly their biology and epidemiology. She was an invited speaker at national and international meetings and seminars. Among her major awards is the Emmy Klienenberger-Nobel 2014 for distinguished research in mycoplasmaology. She has mentored dozen of students in phytobacteriology and is the author of about 800 publications. She is Editor-in-Chief of *Phytopathogenic Mollicutes*, Senior Editor of *Phytopathologia Mediterranea*, and Founder and Leader of the International Phytoplasmaologist Working Group (IPWG) (<http://www.ipwgnet.org>).



Kenro Oshima is a Professor of Plant Pathology at the Hosei University, Japan. He has 20 years of research experience in the field of plant pathology, especially the genomes and pathogenicity of phytoplasmas. He is an Associate Editor of the *Journal of General Plant Pathology*. He has published more than 60 peer-reviewed articles in international journals and has delivered numerous oral and poster presentations at national and international meetings. He received the Kitamoto Award from the Japanese Society of Mycoplasmaology in 2018.



Michael Kube is a Professor and Head of the Department of Integrative Infection Biology Crops Livestock at the University of Hohenheim, Germany. He has been working on phytoplasmas and other bacterial pathogens for more than a decade, and his research covers topics in the disciplines of molecular biology and microbiology with a focus on omics technologies. His findings are documented in more than 100 research publications. He participated as invited speaker at several national and international conferences, meetings, and seminars.



Govind Pratap Rao is a Principal Scientist of Plant Pathology at the Indian Agricultural Research Institute, New Delhi, India. He has 30 years of research experience in the field of plant pathology, especially virus and phytoplasma diseases of several cultivated crops. He has published over 150 research publications and authored or edited 20 books. He is the Editor-in-Chief of *Phytopathogenic Mollicutes* and has received numerous national and international awards. He has given invited talks and training, pursued research, and participated in panel discussions and workshops and conferences around the globe.