

Plant Pathogenic Bacteria

Genomics and Molecular Biology



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Bacteria pathogenic for plants are responsible for devastating losses in agriculture. The use of antibiotics to control such infections is restricted in many countries due to worries over the evolution and transmission of antibiotic resistance. The advent of genome sequencing has enabled a better understanding, at the molecular level, of the strategies and mechanisms of pathogenesis, evolution of resistance to plant defence mechanisms, and the conversion of non-pathogenic into pathogenic bacteria.

In this book, internationally acclaimed experts review the most important developments providing an invaluable, up-to-date summary of the molecular biology and genomics of plant pathogenic bacteria. The book opens with two chapters on bacterial evolution, diversity and taxonomy, topics that have been transformed by molecular biology and genomics analyses. The third chapter delves into the crucially understudied area of pathogen adaptation to the plant apoplast environment. The following seven chapters focus on specific plant pathogens: *Agrobacterium*, *Leifsonia*, *Pectobacterium*, *Pseudomonas*, *Ralstonia*, *Xanthomonas*, and *Xylella*. The next four chapters review specific, intensively studied areas of research in the plant pathogen field: microbe associated molecular patterns (MAMPs) and innate immunity; use of bacterial virulence factors to suppress plant defence; cyclic di-GMP signalling and the regulation of virulence; and plasmids and the spread of virulence. The final chapter covers the critical area of bioinformatics.

With contributions from some of the pioneering bacterial plant pathogen genome sequencers, this book is essential reading for every plant pathogen researcher, from the PhD student to the experienced scientist, as it provides a timely review of the current and most topical areas of research.

Chapter 1. Origin and Evolution of Phytopathogenic Bacteria. *John Stavrinos*

Chapter 2. The Impact of Genomic Approaches on Our Understanding of Diversity and Taxonomy of Plant Pathogenic Bacteria. *Boris A. Vinatzer and Carolee T. Bull*

Chapter 3. Adaptation to the Plant Apoplast by Plant Pathogenic Bacteria. *Arantza Rico, Rachel Jones, and Gail M. Preston*

Chapter 4. The Genomics of *Agrobacterium*: Insights into its Pathogenicity, Biocontrol, and Evolution. *Joao C. Setubal, Derek Wood, Thomas Burr, Stephen K. Farrand, Barry S. Goldman, Brad Goodner, Leon Otten, and Steven Slater*

Chapter 5. Common Genes and Genomic Breaks: A Detailed Case Study of the *Xylella fastidiosa* Genome Backbone and Evolutionary Insights. *Alessandro M. Varani, Wanessa C. Lima, Leandro M. Moreira, Mariana C. de Oliveira, Rangel de Souza, Edwin Civerolo, Ana Tereza R. de Vasconcelos, Marie-Anne Van Sluys*

Chapter 6. Genome Sequence-based Insights into the Biology of the Sugarcane Pathogen *Leifsonia xyli* subsp. *xyli*. *Claudia B. Monteiro-Vitorello, Marcelo Marques Zerillo, Marie-Anne Van Sluys, and Luis Eduardo Aranha Camargo*

Chapter 7. Genomics-driven Advances in *Xanthomonas* Biology. *Damien F. Meyer and Adam J. Bogdanove*

Chapter 8. Genomics of the Enterobacterial Plant Pathogens. *Ian Toth, Leighton Pritchard, Paul Birch and Hui Liu*

Chapter 9. *Ralstonia solanacearum* and Bacterial Wilt in the Postgenomics Era. *Darby Brown*

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Chapter 12. The Art of Manipulation: Bacterial Type III Effectors and Their Plant Targets. *Jens Boch*

Chapter 13. Cyclic di-GMP Signalling and the Regulation of Virulence in Bacterial Plant Pathogens. *J. Maxwell Dow, Yvonne Fouhy, BelŽn Fernandez Garcia and Robert P. Ryan*

Chapter 14. Gene Traders: Characteristics of Native Plasmids from Plant Pathogenic Bacteria. *George W. Sundin and Jesús Murillo*

Chapter 15. Bioinformatics Aspects of High-Throughput Sequencing Technology. *Dan MacLean and David J. Studholme*

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