

# Recent Advances in Plant Virology



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Viruses that infect plants are responsible for reduction in both yield and quality of crops around the world, and are thus of great economic importance. This has provided the impetus for the extensive research into the molecular and cellular biology of these pathogens and into their interaction with their plant hosts and their vectors. However interest in plant viruses extends beyond their ability to damage crops. Many plant viruses, for example tobacco mosaic virus, have been used as model systems to provide basic understanding of how viruses express genes and replicate. Others permitted the elucidation of the processes underlying RNA silencing, now recognised as a core epigenetic mechanism underpinning numerous areas of biology. This book attests to the huge diversity of research in plant molecular virology. Written by world authorities in the field, the book opens with two chapters on the translation and replication of viral RNA. Following chapters cover topics such as viral movement within and between plants, plant responses to viral infection, antiviral control measures, virus evolution, and newly emerging plant viruses. To close there are two chapters on biotechnological applications of plant viruses. Throughout the book the focus is on the most recent, cutting-edge research, making this book essential reading for everyone, from researchers and scholars to students, working with plant viruses.

**Chapter 1.** Roles of Cis-acting Elements in Translation of Viral RNAs. *W. Allen Miller, Jelena Kraft, Zhaohui Wang and Qiuling Fan*

**Chapter 2.** Replication of Plant RNA viruses. *Peter D. Nagy and Judit Pogany*

**Chapter 3.** Plasmodesmata as Active Conduits for Virus Cell-to-Cell Movement. *Lourdes Fernandez-Calvino, Christine Faulkner and Andy Maule*

**Chapter 4.** Systemic Movement of Viruses Via the Plant Phloem. *Vicente Pallás, Ainhoa Genovés, M. Amelia Sánchez-Pina and José Antonio Navarro*

**Chapter 5.** Functions of Virus and Host Factors During Vector-mediated Transmission. *Stéphane Blanc and Martin Drucker*

**Chapter 6.** RNA Silencing and the Interplay Between Plants and Viruses. *Lourdes Fernández-Calvino, Livia Donaire and César Llave*

**Chapter 7.** Mechanism of Action of Viral Suppressors of RNA Silencing. *József Burgyán*

**Chapter 8.** NB-LRR Immune Receptors in Plant Virus Defense. *Patrick Cournoyer and Savithramma P. Dinesh-Kumar*

**Chapter 9.** Plant Resistance to Viruses Mediated by Translation Initiation Factors. *Olivier Le Gall, Miguel A. Aranda and Carole Caranta*

**Chapter 10.** Advanced Breeding for Virus Resistance in Plants. *Alain Palloix and Frank Ordon*

**Chapter 11.** Sustainable Management of Plant Resistance to Viruses. *Benoît Moury, Alberto Fereres, Fernando García-Arenal and Hervé Lecoq*

**Chapter 12.** Integrated Control Measures Against Viruses and Their Vectors. *Alberto Fereres and Aranzazu Moreno*

**Chapter 13.** Population Dynamics and Genetics of Plant Infection by Viruses. *Fernando García-Arenal and Aurora Fraile*

**Chapter 14.** Evolutionary Constraints on Emergence of Plant RNA Viruses. *Santiago F. Elena*

**Chapter 15.** Emergence of Begomovirus Diseases. *Enrique Moriones, Jesus Navas-Castillo and Juan-Antonio Díaz-Pendón*

**Chapter 16.** Genomic Approaches to Discovery of Viral Species Diversity of Non-cultivated Plants. *Ulrich Melcher and Veenita Grover*

**Chapter 17.** Endogenous Viral Sequences in Plant Genomes. *Pierre-Yves Teycheney and Andrew D.W. Geering*

**Chapter 18.** Virus Particles and the Uses of Such Particles in Bio- and Nanotechnology. *George P. Lomonosoff*

**Chapter 19.** Plant Viral Vectors for Protein Expression. *Yuri Y. Gleba and Anatoli Giritch*

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