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Review of *Bacterial Disease Resistance in Plants: Molecular Biology and Biotechnological Applications* by P. Vidhyasekaran

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ous. As Fenchel notes, the evolutionary process is contingent: "The origin of oxygenic photosynthesis and oxygen respiration was one condition, but without the special geochemical properties that allowed for the accumulation of oxygen in the atmosphere, we would all still be bacteria" (p 155).

LYNN MARGULIS, *Geosciences, University of Massachusetts, Amherst, Massachusetts*

GENE BIOTECHNOLOGY. *Second Edition.*

By William Wu, Michael J Welsh, Peter B Kaufman, and Helen H Zhang. Boca Raton (Florida): CRC Press. \$99.95. x + 523 p; ill.; index. ISBN: 0-8493-1288-4. 2004.



MICROBIOLOGY

MICROBIAL SUBVERSION OF HOST CELLS. *Based on a symposium held in Edinburgh, United Kingdom, April 2003. Symposia of the Society for General Microbiology, Volume 62.*

Edited by C D O'Connor and D G E Smith. Published for the Society for General Microbiology by Cambridge University Press, Cambridge and New York. \$125.00. xii + 258 p; ill.; index. ISBN: 0-521-82998-4. 2003.

This volume consists of 14 articles that review original research in key areas of the exciting new discipline of cellular microbiology. The articles elucidate the phenomena at the molecular and cellular levels as to how bacteria and viruses survive in the host and cause disease. The papers and topics have been arranged in the same order as a microbe encounters a host cell and its processes. The cellular mechanisms of microbes and host cell interactions include enteropathogenic *Escherichia coli*, *Yersinia pseudotuberculosis*, *Listeria monocytogenes*, *Salmonella*, *Legionella pneumophila*, pathogenic mycobacteria, *Helicobacter pylori*, and *Shigella* infections.

Some articles discuss the interaction between the bacterial and cellular components and demonstrate the innovative and complex mechanisms as to how the microbes cause inflammation, injury, and disease. Examples of mechanisms discussed include how enteric gram-negative pathogens apply the type III secretion system to subvert host cell functions, and how *Listeria monocytogenes* is a food borne pathogen that can survive and replicate in phagocytic cells. Also, *Listeria* is able to induce its entry into nonphagocytic cells as a first step for dissemination into host tissues. The *Listeria* organism interacts with two transmembrane proteins, E-cadherin and Met. Articles on viral and host cell interactions discuss

Vaccinia virus movement in cells, Toll-like receptor signaling by viruses, lipid-protein interactions in enveloped virus entry, and herpes simplex viruses and apoptosis.

The chapters have excellent illustrations and figures that outline fundamental cellular-microbe interactions. The references for each article allow readers to easily explore additional information related to the reviews.

ROBERT M NAKAMURA, *Pathology, Scripps Clinic and Research Foundation, La Jolla, California*

ANNUAL REVIEW OF MICROBIOLOGY. *Volume 57: 2003.*

Edited by L Nicholas Ornston, Albert Balows, and Susan Gottesman. Palo Alto (California): Annual Reviews. \$74.00. xii + 752 p + 14 pl; ill.; subject index and cumulative indexes (contributing authors and chapter titles, Volumes 53-57). ISBN: 0-8243-1157-4. 2003.



PLANT SCIENCES

BACTERIAL DISEASE RESISTANCE IN PLANTS: MOLECULAR BIOLOGY AND BIOTECHNOLOGICAL APPLICATIONS. *Crop Science.*

By P Vidhyasekaran. Food Products Press. Binghamton (New York): Haworth Press. \$110.95 (hardcover); \$59.95 (paper). xiv + 452 p; ill.; index. ISBN: 1-56022-924-1 (hc); 1-56022-925-X (pb). 2002.

The molecular biology of plant-bacterial interactions is a field that continues to provide a wealth of information in the context of infectious diseases of plants. Thus, it is curious that few textbooks on this topic are available. Admittedly, active areas of research change rapidly, and book content can be rendered obsolete prior to publication. Even given this scenario, a textbook that summarizes the development (both conceptually and experimentally) of research strategies, the status of model systems, and future issues is needed. Thus, the timing and need for this broad-based volume, which covers the molecular phytobacteriology, is long overdue. An important question is whether such a book is sufficiently comprehensive, even though it will not be completely up to date. Importantly, the author does a very good job in covering the major areas and issues in question.

The first two chapters discuss the elusive topic of recognition and traditional defense mechanisms. Chapters 3 through 5 cover inducible defense,

including reactive oxygen species, secondary metabolites, and pathogenesis-related (PR) proteins. The book concludes with a scientific discussion of biotechnological applications that have offered significant promise, but have not been entirely delivered. The author comprehensively reviews this aspect and offers much food for experimental thought, bringing readers from the relatively early studies of the molecular aspects of bacterial diseases, all the way to using such information in an applied context.

Although this book is generally thorough, a significant omission is the lack of genomics data. Many of the prominent players in this book (e.g., *Arabidopsis*; *Pseudomonas syringae* DC3000) have genomes that have been sequenced, and functional analyses are well underway. It is unfortunate that this exciting new field is absent from this volume.

On balance, this comprehensive book should be a valuable teaching aid and useful for researchers as well as students interested in or actively working on bacterial-plant interactions.

MARTIN B DICKMAN, *Plant Pathology, University of Nebraska, Lincoln, Nebraska*

PLANT REPRODUCTION. *Annual Plant Reviews, Volume 6.*

Edited by Sharman D O'Neill and Jeremy A Roberts. Sheffield (United Kingdom): Sheffield Academic Press; Boca Raton (Florida): CRC Press. \$139.95. xiii + 300 p; ill.; index. ISBN: 1-84127-226-4 (Sheffield Academic Press); 0-8493-9791-X (CRC Press). 2002.

This is the sixth volume in a series of annual plant reviews intended for researchers and postgraduates in the plant sciences. The first volume reviewed genome-level research on diverse aspects of *Arabidopsis* life history. The present volume expands the short section on reproduction in the earlier volume, reflecting the rapidly accumulating knowledge of molecular genetic aspects of reproductive development in model systems. Of the nine chapters, five deal exclusively with *Arabidopsis*, one with *Arabidopsis* and cereals, two with model systems in a few other angiosperms, and one with a diversity of flowering plants.

The editors of *Plant Reproduction* state in the preface that their goal is to provide "an overview of our understanding of plant reproduction in a sequence that recapitulates the process of reproduction itself." The volume begins with two chapters on the genetic control of flowering and of flowering time, and a chapter each on ovule and pollen development. These are followed by a chapter on embryogenesis, one on endosperm development, and then two chapters on aspects of mating systems—gametophytic self-incompatibility and the

developmental regulation of apomixis and parthenocarpy. The final chapter explores the role of hormones in signaling flower senescence upon pollination.

The goal of providing an overview has been successfully exchanged for deeper insights by well-chosen experts into a few very narrowly defined areas of angiosperm reproduction. For example, the chapter by Brown et al. on endosperm development (accompanied by spectacular photomicrographs) focuses almost entirely on describing the formation of the cytoskeleton during free-nuclear endosperm development. A highlight of the book is the long chapter by Twell, which is outstanding in providing a well-organized and detailed picture of pollen development before pollen tube growth.

Plant Reproduction does not cover all aspects of reproduction (e.g., female gametophyte development, the progametic phase of pollen development, and the process of fertilization are notably absent), nor does it cover a broad spectrum of plants. Its strength lies in the unique specialties of particular authors.

JOSEPH H WILLIAMS, *Botany, University of Tennessee, Knoxville, Tennessee*

ANNUAL REVIEW OF PLANT BIOLOGY. *Volume 54: 2003.*

Edited by Deborah P Delmer, Hans J Bohnert, and Sabeeha Merchant. Palo Alto (California): Annual Reviews. \$70.00. xii + 773 p + 32 pl; ill.; subject index and cumulative indexes (contributing authors and chapter titles, Volumes 44-54). ISBN: 0-8243-0654-6. 2003.

INTRODUCTION TO PLANT TISSUE CULTURE. *Second Edition.*

By M K Razdan. Enfield (New Hampshire): Science Publishers. \$49.50 (paper). xii + 375 p; ill.; subject and author indexes. ISBN: 1-57808-237-4. 2003.

This comprehensive book on plant tissue culture covers the fundamental as well as applied aspects of this area. It will be a very useful textbook for students and researchers interested in this field. The volume contains five parts, including Introduction and Techniques; Basic Aspects; Applications to Plant Breeding; Application to Horticulture and Forestry; and General Applications. There are also over 500 references cited at the end of this book for further reading and investigation.

This volume is an excellent addition to the literature on plant tissue culture research. The coverage and balance of this book is commendable. It is well edited and highly recommended to senior and graduate students, professors, and researchers in the fields of biology, crop production, plant