

UNDERSTANDING PLANT PHYSIOLOGY

Physiology and Biochemistry of Plant Pathogen-Interactions. By I. J. Misaghi. Pp. 287. ISBN 0-30604105901 (Plenum Press: New York). \$32.50

There is increasing interest among plant pathologists and plant physiologists in the developing area of host-parasite relationships. This book attempts to cover almost all the events that occur during the interaction between the plant pathogen (fungus, bacteria, or virus) and its host.

The author has successfully organized the book into 14 chapters according to the different categories of the subjects treated. Each chapter is divided into a number of sections and subsections. Wherever possible the author has pointed out uncertainties or speculative suggestions.

The book begins with a short chapter of phytopathological definitions, followed by step-by-step descriptions of the phenomena of pathogen attraction and penetration by means of cell wall-degrading enzymes and toxins; it concludes with the reaction of the plant to invasion. The author discusses metabolites produced by the pathogens and the physiological and structural changes occurring in the host. The book also includes chapters on crown gall tumor formation, the mechanism of resistance, and induced resistance.

The author pays careful attention to all the important topics of this subject. On the one hand, it really is a remarkable achievement that he has been able to include so much information; on the other hand, this comprehensive overview has led to a very brief review of individual subjects. For example, induced resistance is an exciting subject that deserves more attention than the four pages allotted. Moreover, antiviral activity in plants is described very briefly and, unfortunately, the author cites only very old papers (from 1966) from two of the most active groups working in this area—G. Loebenstein and I. Selan—when there is much important recent work. I believe that the recognition phenomenon is exceptionally interesting and may open a new door to our understanding of the specificity of pathogenic microorganisms. The book deals with some of our present knowledge, but misses recent work

showing that fungi bind to various plant agglutinins. On the other hand, even though the plant-*Rhizobium* system is an interesting one, I don't think such a detailed description is justified in a relatively short book dealing with pathogenicity.

I found the chapter on the toxins excellent. It deals with the role of toxins in a very elegant way and describes in detail host-selective and non-selective toxins. I also enjoyed reading the four chapters that describe the alterations that occur in plants as a result of disease, including water flow, carbohydrate metabolism, phenol metabolism, and especially alterations in transcription and translation.

The topics in this book are described very clearly, giving the reader an excellent overview of the subject of host-parasite relationships. At the end of most chapters there is a discussion, conclusion, or suggestions for future studies. This gives the reader

some ideas about the potential and role of the subject discussed. It is important to emphasize the extensive list of references, including over 1300 literature citations, for this exciting and developing subject, which combines plant pathology, physiology, and biochemistry.

To summarize, this is a very useful book for students, teachers, and researchers who are interested in a general overview of the biochemical and physiological processes taking place during plant-pathogen interactions. The book can also provide excellent information to individuals working in related areas who want a general understanding of the relationships between plants and invading microbes.

Ilan Chet, Ph.D., is professor and head of the Department of Plant Pathology and Microbiology, The Hebrew University of Jerusalem, Rehovot, 76-100, Israel.

BIOCHEMICAL HANDBOOK

Biochemical Engineering and Biotechnology Handbook. Edited by Bernard Aikens and Ferda Mavituna. Pp. 1119. ISBN 0 333 33274 1 (The Nature Press: New York). \$97.00

The authors have assembled an impressive array of information, undoubtedly useful to workers in the field. The book is divided into 14 well-organized chapters.

The first five chapters provide a textbook-like description of microbiology; microorganism morphology, growth characteristics, and metabolism are well covered. The chapter titled "Stoichiometric Aspects of Microbial Metabolism," is exceptionally complete and current. The editors cite examples to illustrate variable yield coefficients through the use of the maintenance term. Chapter one touches upon this subject in a cursory way, but one might wish for comparable detail in the section on techniques in gene manipulation. Perhaps a later edition will devote a complete chapter to this subject, provided by an editor who is well versed on the subject.

Chapters three and four have useful appendices that detail the meth-

ods of handling microbial growth data. There are ample charts and figures in the first four chapters, providing the less experienced researcher with numerous examples of the actual results of biological fermentations. Chapter six is a short course in enzymology, including a section on immobilization and physical modification of enzyme form.

Chapter seven features the classical chemical engineering approach to reaction engineering and unit operations. The chapter includes a detailed review of reactor design considerations with numerous illustrations of working systems.

Chapters eight through 10 present a thorough discussion of mass, energy, and momentum transport in biochemical process systems. Chapter 10, entitled "Solid and Liquid-Phase Mass Transfer," reviews the effect of diffusion on the reaction rate in viscous liquids. Extension of this section to include solid and semi-solid fermentation systems would have been helpful.

The chemical engineering approach is continued in chapters 12 and 13, which discuss downstream