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## Paul A. Rochelle (ed): Environmental molecular microbiology: protocols and applications

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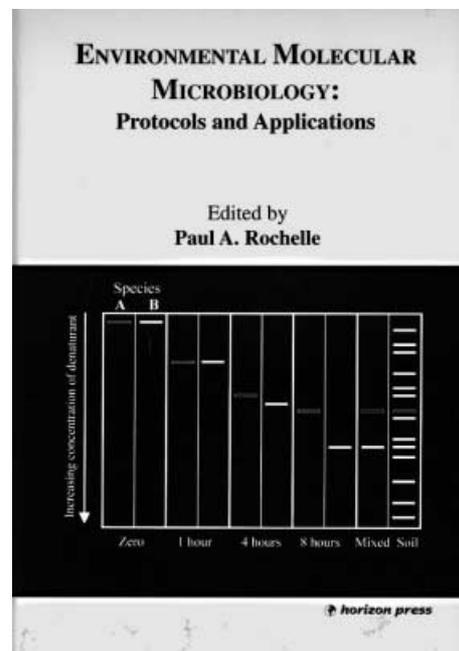
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There is no doubt about the interrelationship and even dependence between microbiology and other experimental sciences and technology. This was apparent long time ago, when the occurrence and velocity of technological advances were slower than now. Previously, many ideas could not efficiently be put in practice because of the lack of appropriate technical tools and equipment. Today, recognition, if not homage, is due to the many researchers in the field of microbiology who, with small and large discoveries, greatly contributed to our knowledge of the complex physiological and metabolic functions and processes of microorganisms.

In recent years, the widespread use of molecular techniques has revolutionized the method and timing of progress in all biological fields. In microbiology, this is particularly true with respect to the understanding of the composition and physiology of microbial communities and of many other essential processes for life and its maintenance and evolution on Earth.

For microbial ecologists, the focus of environmental microbiology is on the study of the role of microorganisms in natural habitats and the underlying interactions between organisms and their surroundings, which may be biotic (living) or abiotic (nonliving). The interrelationships among the members of a microbial community are based on physiology, and because the ecosystems are in constant flux, the ecological balance is easily disrupted. In a very concrete way, Paul A. Rochelle, editor and author of the introductory chapter of this book, defines environmental molecular microbiology as the study of microbes in the environment (samples) by means of techniques that analyze the biochemical components of the cells.

Sometimes questions and doubts arise about the conceptual basis of different names for scientific fields that are apparently very similar. This is the case for environmental microbiology and microbial ecology.



Perhaps we are dealing with a functional/conventional nomenclature established more for curricular purposes than for defining true differences between two subjects. On the basis of experience, it might be useful to consider microbial ecology as focusing on the basic aspects of the distribution of microorganisms within the environment, the complex interrelationships between populations, and the essential metabolic functions of microorganisms.

*Environmental Molecular Microbiology* (both the book and the subject) deals with the use of advanced molecular techniques with the dual goal of advancing our knowledge and developing new applications. As Paul A. Rochelle states, although the term “molecular biology” seems to exclusively evoke DNA manipulation, it is related to any method of working with the basic molecular constituents of life, such as nucleic acids, proteins, lipids and polysaccharides. In the book,

renowned authors have developed a series of laboratory techniques. Cautionary notes are included to avoid some of the common problems that can affect the interpretation of both the results and the mechanisms revealed by the techniques. Careful attention has also been paid not only to the application aspects but also to basic principles and to a discussion on future methodological progress. The fact that the editor and authors have stressed the need to consider the limitations of molecular approaches to prevent misleading conclusions and results deserves special mention.

Those interested in microbes from the environment will find a useful tool in this book, which in 17 chapters presents the most advanced molecular techniques, such as the use of PCR to study microbial diversity (Chap. 3), the amplification of environmental DNA

targets (Chap. 4) and the detection of mycobacteria (Chap. 5). The extraction of nucleic acids (Chap. 2), microbial community proteomics (Chap. 10) and technological innovations in biodetection systems for environmental molecular microbiology (Chap. 17) are some examples of the contents of the book. Selected recent references accompany each chapter. The book is addressed to scientists working in environmental microbiology and to all those involved in the fields of microbial diversity, community structure, bioremediation, and the detection of pathogens, or any specific microorganism, in the environment. Although a familiarity with the basic principles of environmental microbiology is assumed, this book will be useful to both beginners and experienced molecular microbiologists.