which enhance the capacity of *Eca* to survive in a variety of environments. Brandl has described the epidemiology of food-borne diseases and the behaviour of human enteric pathogens like *Salmonella enterica* and *Escherichia coli* on plants. Considering an increase in the number of outbreaks of food-linked enteric diseases in recent years, there is a need to generate more knowledge about the factors influencing survival of enteric pathogens on plants, which will be useful in developing agricultural practices to minimize food contamination of plants by these ubiquitous human pathogens. In recent years, fluorescent bacteria have been widely used for biocontrol of plant diseases. Their efficacy depends on the antibiotic properties of pigmented heterocyclic nitrogen-containing secondary metabolites known as phenazines. Mavrodi *et al.* have reviewed the information on biosynthesis and regulation of phenazine compounds by pseudomonads. The review discusses the environmental impact, mode of action, genetics, biochemistry and biosynthesis of these compounds, and the biotechnological approaches for enhancing the performance of bacterial agents. Concerns related to the release of GM biocontrol agents to the environment have also been addressed. The review also raises several challenging questions in this emerging area of research.

Nematodes are serious pathogens of agricultural and non-agricultural plants. Niblack *et al.* have reviewed biology, population dynamics, genetic diversity and interactions with hosts of the soybean cyst nematode, which causes extensive damage to the production of soybean in many parts of the world. Recent advances in the identification of putative nematode parasitism genes will be useful in developing strategies for nematode-resistant transgenics.

RNA viral genomes are generally considered as linear molecules, but recent evidences, reviewed by Miller and White, show that viral RNA genomes appear to be three-dimensional due to the occurrence of long-distance RNA–RNA interactions across hundreds or thousands of nucleotides. The long-distance RNA–RNA interactions play a critical role in regulating viral processes like translation, replication and sg mRNA transcription. Rao has given well-illustrated mechanisms regulating selective packaging of viral RNA in mono-, bi- and tripartite isometric plant viruses, many of which also have sub-genomic RNAs, which are packaged separately or along with the genomic RNA in virus particles. The review is expected to motivate similar studies for understanding the complexities of genome packaging in icosahedral viruses. Ng and Falk deal with an important but neglected area of vector transmission of plant viruses. They have given an illustrated account of the mechanisms of transmission, elucidated by recent application of molecular and cell-biology techniques. Hopefully, this review will generate interest in virus–vector–host interactions. Fargette *et al.* have discussed molecular ecology and the mechanisms involved in emergence of tropical plant viruses like Rice yellow mottle, Cassava mosaic and Banana streak in Africa, and emphasize the need of multidisciplinary approaches to address the challenges of the emerging plant viruses.

Burdon *et al.* have examined the role of soil-borne and invasive pathogens on the structure and dynamics of natural plant communities at a broad range of genetic, ecological, spatial and temporal scales, including the expected direct and indirect effects of global climate change. Fitt *et al.* review the coexistence of related pathogen species on arable crops in space and time, with particular reference to data from long-term and medium-term experiments at Rothamsted. The long-term Rothamsted experiment is the only one of its kind providing data of over 160-year period. The review well illustrates the co-evolution of related pathogen species, *Septoria tritici* and *S. nodorum, Oculimacula yallundae* and *O. acuformis*, *Leptosphaeria maculans* and *L. biglobosa*. Savary *et al.* highlight the need of generating quantitative data, analysis and modelling for efficient use of disease management tools. In the last chapter, Garrett *et al.* examine the effects of climate change on plant disease. Limited research has been done in this area, but there are distinct indications of change in host–pathogen-vector interactions. The review emphasizes the need of closer link between empirical and modelling studies for better understanding of the climate-change effects.

The Editors and Editorial Committee of this volume must be complimented for selecting the topics and inviting authors to write outstanding critical reviews on the selected topics. The Editors also need to be complimented for their efforts in defining terms and acronyms used in individual reviews and also for highlighting key references through the judicious use of margin notes. This volume is a must for all those interested in plant pathology, microbiology and molecular biology.

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Ecology, Environment and Resource Conservation. J. S. Singh, S. P. Singh and S. R. Gupta. Anamaya Publishers, New Delhi. 2006. 688 pp. Price: Rs 850.

During the past fifty years, since the publication of *Fundamentals of Ecology*[1], which promoted the science of ecology worldwide, and particularly since its third edition 35 years ago[2], the earth's environment has undergone large and significant changes. The human population has increased considerably, land use/land cover has undergone drastic changes, forest cover and wetlands have declined, many species have become extinct or greatly reduced in their populations, air and water are increasingly polluted and global warming has become a reality. The concern for the rapidly degrading environment is therefore no more academic but has become real, as its consequences are being felt everywhere. Since the 1972 Stockholm Conference, the world community is increasingly engaged with environmental issues, and several conventions focus on different aspects of environmental conservation and protection. The importance of ecosystems in providing invaluable goods and services is now recognized and the terms 'ecosystem' and 'ecosystem services' have entered the everyday vocabulary of the policy- and decision-makers. Industrialists and the corporate community have recognized the need for action regarding conservation, and are gradually becoming partners for environment protection. Sustainability of economic development based on the limited natural resources is the key to the future of humans on the earth. Therefore, the need for education about environment, the causes of its degradation, and the mitigatory measures are more urgent than ever

before. Ecology lies at the core of environmental management and resource conservation.

Perhaps keeping pace with the growth of environmental problems and proliferation of its dimensions, there has also been an exponential increase in the number of seminars and conferences as well as books, periodicals and research publications on all aspects of ecology and environmental science. Vast majority of the books for students are authored by Western scientists who invariably tend to empasize upon the regional issues and perspectives of their countries, and rarely touch upon the ecosystems and their studies in the developing countries. There are many ecologists and environmental scientists of international stature in many developing countries, but they have rarely attempted to write an authoritative textbook for students of developing countries, with examples from these regions. Most of the books on ecology and environment published by these scientists are at best for local use in their respective countries and are either too sketchy or superficial.

In this context, it is most gratifying that three senior Indian and internationally acclaimed ecologists joined hands to author a comprehensive textbook that brings together a synthesis of ecological principles and their application to environmental issues and resource conservation. The book is divided into 30 chapters. Beginning with the scope and development of ecology from early biogeography to the present predictive science, its linkages with environmental issues such as resource conservation, global warming, ecosystem health and sustainable development, in the first chapter, four chapters describe the environmental factors – light, temperature, water, soil and fire, and their relationships with organisms. An account of the concept of tolerance ranges and adaptation of plants and animals to different environments is followed by a chapter on biogeography and life zones, focusing on speciation and the biogeographic regions of India. Two chapters cover population ecology – characteristics, growth and regulation of populations and various kinds of interactions between species (both intra- and interspecific). The structure and dynamics of communities and methods for the study of plant communities and succession are covered in some detail in three chapters. Further, four chapters are devoted to ecosystem processes, namely primary production, energy transfer to higher trophic levels, secondary production and decomposition of organic matter, and nutrient cycles at ecosystem and global levels. Major terrestrial biomes, and freshwater and marine ecosystems are described in a separate chapter. Twelve chapters deal with all major environmental issues of current concern – pollution of air, water and soil, noise pollution, exotoxicology, global climate change and depletion of ozone layer, biological invasion, degradation and conservation of natural resources, biodiversity, ecological restoration, environmental impact assessment, sustainable development and ecological economics. The techniques and tools of remote sensing and GIS, which are being increasingly applied to the assessment and management of natural resources and monitoring of a variety of environmental problems, are described in a separate chapter. The authors have relied upon about 1050 books, reports and research/review papers and these references, together with a list of important web resources are listed at the end. The book includes an exhaustive list of contents and a comprehensive index.

The authors have covered a wide range of topics and referred to a large amount of recent literature. There are more than 130 references to Indian studies, of which about half is contributed by research groups of the three authors. The book is profusely illustrated and includes numerous tables. The production is of a high quality. A book of this nature can be expected to have a few shortcomings, which are perceived differently according to the biases of the reviewer. In my view, the Indian and tropical studies should have received greater coverage. Several environmental issues of concern to the Indian subcontinent and several significant contributions from other Indian scientists deserved greater attention. I wish the authors had produced a book that showcased ecological research in the Indian subcontinent and referred to American or European literature either to explain the major concepts and theories, or to highlight the gaps in Indian studies. Ecology of animals and animal communities should have certainly been discussed in more detail. I could not locate some recent topics of interest, such as patch dynamics and intermediate disturbance hypothesis. At several places the authors have described methods in great detail that interrupt the flow of the text. Printing errors are relatively few. Some of the illustrations needed improvement and a few photographs would have added to the value of the book.

As stated in the Preface, the authors have aimed at a synthesis of the current understanding of ecology and environmental science and designed the book 'to familiarize the graduate students with the basic concepts'. The authors have several decades of teaching experience in three of the best known universities in India, and understandably they know well the students' requirements. I have no doubt that the book will be most useful to the students pursuing their Master's programme in ecology and/or environmental science not only in India, but also in the neighbouring countries and elsewhere in the developing world. The authors must be congratulated for their valuable contribution and service to the students as well as teachers of ecology and environmental science.

Every student and researcher in ecology and/or environmental science should like to possess a personal copy of the book. However, the price is relatively on the higher side for an average Indian student and may affect the wide circulation that the book deserves, especially because an Indian reprint of the 5th edition of Odum's well-known book[3] has appeared at the same time at about half the price.

1. Odum, E. P., *Fundamentals of Ecology*, W.B. Saunders, Philadelphia, USA, 1953, 1st edn, p. 384.
2. Odum, E. P., *Fundamentals of Ecology*, W.B. Saunders, Philadelphia, USA, 1971, 3rd edn, p. 546.
3. Odum, E. P. and Barrett, G. W., *Fundamentals of Ecology*, Thomson Brooks/Cole, USA, 2005, 5th edn, p. 598, Indian reprint, Affiliated East West Press, New Delhi, 2006.

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