

climate change, based on the literature for the period 2007–2011.

I wish there was a concluding chapter highlighting the current threats to mangroves, including climate change, how the current efforts of conservation and restoration are inadequate and also making recommendations on policies, institutions, technical interventions and capacity-building requirements to promote conservation and restoration of mangroves. The monograph finally presents the recommendations from a workshop proceedings; instead, it should have been the result of the analysis in its various chapters. The monograph should have had a couple of chapters from neighbouring countries such as Bangladesh, where serious efforts are being made to conserve and restore mangroves, to learn lessons on best practices for consideration by Indian authorities.

To conclude, despite a few limitations, this monograph will be a valuable addition to the literature and information on mangroves, so badly needed to promote conservation and restoration. It may contribute to the generation of scientific knowledge on various aspects of mangroves. The monograph is professionally produced with high-quality photographs and charts to keep the interest of the readers. In India, most people think of the Sunderbans as the only mangrove forest of importance, whereas mangroves spread across the coast and also those which have been degraded or lost should receive adequate attention of researchers and policy-makers. We should not remember mangroves only in times of adversities such as cyclones and hurricanes. Instead we must have a comprehensive programme to monitor, conserve and restore mangroves by involving all the stakeholders, particularly the local communities.

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Soil Enzymology in the Recycling of Organic Wastes and Environmental Restoration. Carmen Trasar-Cepeda *et al.* (eds). Springer Verlag, Berlin, Heidelberg. 2012. 354 pp. Price: € 149.95. ISBN 97836421-211614.

In recent years soil enzyme activities have been discussed as indicators of soil quality, soil fertility and soil microbial activity under degraded, agriculture and forest ecosystems and to determine the success of restoration process. While soil enzymology has been practised in various polluted, degraded and natural ecosystems for centuries, the scientific understanding is still in its infancy. Therefore, soil scientists, ecologists and environmentalists are embarking on the understanding of ecological functions of extracellular and intracellular soil enzymes using advanced molecular tools. Honestly, I am a beginner in understanding the complexities of degraded lands and the role of microbial activity in their restoration. In this context, I have been looking for new books that provide up-to-date wider information synthesis and review of soil enzymology.

This book is a compilation of a number of specific case studies on soil enzymology, presented in an international meeting organized by the Spanish Group of Soil Enzymology held in December 2008 in Burgos, Spain. It has been edited by five eminent Spanish scientists. Eighty-six authors – 71 (Spain), 8 (Italy), 6 (Austria) and 1 (Mexico) have contributed to this book. The aim of the book, as described in the Preface, is to disseminate the Spanish research on soil enzymology to the global scientific communities. In my opinion, publication of specific case studies/research papers in a book form is rather unenthusiastic. Journals, dealing with soil fertility, biology, biochemistry and ecology, can provide maximum readership and on-line as well as off-line exposition.

The book opens with an introductory chapter by Paolo Nannipieri *et al.* which provides an up-to-date revision of the history of soil enzymology, the future research prospects and challenges and usefulness of the emerging tools in molecular microbial ecology. They have suggested that 'the present enzyme assays determine potential rather than real enzyme activities and the existing soil enzyme assays are simple, accurate and

inexpensive. But they do not discriminate the contribution of extracellular stabilised enzymes from that of intracellular enzyme activities (associated to active microbial cells). Enzyme assays distinguishing the contribution of extracellular stabilized enzymes from that of intracellular enzyme activities are needed.'

The synopsis of the book (sections, chapters and content) is described in the Preface. In brief, the content is arranged in three parts. Part I includes nine research papers, which assess soil carbon, nitrogen, phosphorus, soil microbial biomass, soil enzymes and other biochemical properties in organic and mineral amended soils, volcanic tuffs (Mexican *Tepetates*), Canary Islands, disturbed lands, *Eucalyptus* stands and agriculture ecosystems. Part II includes ten research papers, which assess changes in soil microbial community structure and activities in heavy metal-polluted landscape, gypsiferous soils, degraded agricultural soils, fungicide (2,4,5-trichlorophenol) and herbicide-amended soils. Part III includes five papers, which assess humus-enzyme complexes in vermicompost, L-glutaminase in compost of urban refuse and microbial interactions in lettuce-rhizosphere soil.

The strength of the book is that it contains excellent individual research papers which have novel findings of microbial and enzyme activities in a range of soil environments. Possible effects of heavy metals (Cd, Ni, Zn and Cu) on microbial community structure and activity in the soil are reviewed in chapter 1 of part II. The importance of soil organic matter in modulating the effects of heavy metals on microbial activities is also reviewed in this chapter. Moreover, few research papers in this book include physiological, biochemical and molecular (nucleic acid profiling using PCR-based denaturing gradient gel electrophoresis) fingerprinting methods to assess soil microbial diversity and functions in a range of created and natural soil environments. Chapter 1 of part III suggests a new approach for fingerprinting of 16S rRNA genes of prokaryotes involved both in aerobic (oligonucleotide microarray COMPOCHIP) and anaerobic (ANAE-ROCHIP) processes in the biological treatment of organic waste.

However, the book suffers from several shortcomings, which limit its usefulness. Most of the contributors are from Spain, few are from the same institute

and seem to have communicated well during the production of the book. But there is considerable overlap from chapter to chapter. Chapters 1 and 2 of part I describe the role of humo-enzyme complexes in restoration of soil ecosystems and β -glucosidase-humic complexes in organic and mineral amended soil respectively. Not only are the studies more or less similar in these chapters, there is even copying of the description of sodium pyrophosphate extraction, ultrafiltration and isoelectric focusing techniques in the introduction as well as in the methodology. Similarly, there is duplication of description of study sites, soil sampling and enzyme assays in chapters 5 and 7 of part I, written by the same authors. These two chapters address the effect of a wide range of plant cover, climatic conditions and lithologic characteristics and of air-drying and re-wetting on organic carbon, microbial biomass, soil respiration, evolution of the respiration process and activities of β -glucosidase, β -galactosidase and urease, respectively. In addition, chapters 6 and 7 of part II, by Diana Bello *et al.* seem to cover subject matter somewhat similar to their published study¹. These two chapters address the effect of three doses (0, 100 and 500 mg kg⁻¹ soil) of 2,4,5-trichlorophenol (2,4,5-TCP is a fungi-

cide) on hydrolytic (urease and invertase) and oxidoreductases (dehydrogenase and catalase) enzymes after 3 days (chapter 6) and 3, 10, 17 and 24 days (chapter 7) of addition of 2,4,5-TCP. The only difference in these chapters is that soil treated with 2,4,5-TCP originated from different parental rocks. The protocols describing the approaches to assess soil microbial community structure and functions and enzyme activities in most of the chapters are somewhat similar and cover about one fourth length of the book. Consequently, there is repetition of citations in the text and list of each chapter. In terms of content, matter is somewhat selective; in all chapters the authors seem to be comfortable with their own studies than with comprehensive discussion of recently published work on soil enzymology in different environmental restoration projects. However, the merits of research papers in this book cannot be overshadowed by the above blemishes.

In conclusion, this book will be valuable as a collection of two reviews and 23 research papers on soil enzymology in various ecosystems. Readers interested in these findings may own this book for comprehensive reviews and syntheses of soil enzymology, one can also refer to other recent books²⁻⁴ and reviews^{5,6}.

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