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# BIODIVERSITY

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*Edited by Adriano Sofò*

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Edited by **Adriano Sofo**

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**Biodiversity**

Edited by Adriano Sofo

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# Contents

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## **Preface VII**

### **Part 1 Ecosystem-Level Biodiversity 1**

- Chapter 1 **Integrating Spatial Behavioral Ecology in Agent-Based Models for Species Conservation 3**  
Christina A.D. Semeniuk, Marco Musiani and Danielle J. Marceau
- Chapter 2 **Evolution of Ecosystem Services in a Mediterranean Cultural Landscape: Doñana Case Study, Spain (1956-2006) 27**  
Erik Gómez-Baggethun, Berta Martín-López, Pedro L. Lomas, Pedro Zorrilla and Carlos Montes

### **Part 2 Organism-Level Biodiversity 47**

- Chapter 3 **Implications of Wood Collecting Activities on Invertebrates Diversity of Conservation Areas 49**  
Thokozani Simelane
- Chapter 4 **Cell Surface Display 63**  
Sharadwata Pan and Michael K. Danquah
- Chapter 5 **Biological Cr(VI) Reduction: Microbial Diversity, Kinetics and Biotechnological Solutions to Pollution 75**  
Evans M. N. Chirwa and Pulane E. Molokwane

### **Part 3 Biodiversity Measures 101**

- Chapter 6 **Biodiversity Measures in Agriculture Using DNA 103**  
Lucia Vieira Hoffmann, Tereza Cristina de Oliveira Borba, Laísa Nogueira Allem, Paulo Augusto Vianna Barroso and Raquel Neves de Mello
- Chapter 7 **Molecular Techniques to Estimate Biodiversity with Case Studies from the Marine Phytoplankton 117**  
Linda K. Medlin and Kerstin Töbe



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## Preface

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Biodiversity is strongly affected by the rapid and accelerating changes in the global climate, which largely stem from human activity. Anthropogenic activities are causing highly influential impacts on species persistence. The sustained environmental change that wildlife is experiencing may surpass the capacity of developmental, genetic, and demographic mechanisms that species have developed to deal with these alterations. How biodiversity is perceived and maintained affects ecosystem functioning, as well as the fact how the goods and services that ecosystems provide to humans can be used. Recognizing biodiversity is essential to preserve wildlife. Furthermore, the measure, management and protection of ecosystem biodiversity requires different and innovative approaches.

This book is divided in three sections. The first two correspond to the different levels at which biodiversity can be measured: ecosystems or organisms. The knowledge of species distribution is a vital component in wildlife conservation and management. Such information aids in quantifying organism–habitat relationships, describing and predicting differential space use by animals, and ultimately identifying habitat that is important to an organism. A study of this has produced a variety of models that combine observations of species occurrence or abundance with environmental estimates, based on statistically or theoretically derived information (Chapter 1). Internal and external factors of change seem to be currently degrading and homogenizing the biodiversity of many ecosystems, as in the case of Mediterranean cultural landscapes. Indeed, many results show decreased capacity of Mediterranean ecosystems to provide regulation services, a process that has continued in spite of the conservationist policies implemented during several decades (Chapter 2). At organism level, invertebrate diversity seems to be strongly affected by the amount of biomass, and in particular by deadwood. For this reason, it is necessary and important to determine the positive effects of deadwood on invertebrate diversity (Chapter 3). A series of molecular techniques, such as flow cytometry and biopanning, were recently discovered and used for *in vitro* studies of proteins on the surface of bacteria. All these tools are of key importance for estimation of bacterial diversity, that plays a key role in affecting biodiversity at the higher levels of terrestrial and aquatic trophic chains (Chapter 4). Regarding the latter, the reduction of Cr(VI)-Cr(III) in the environment is beneficial to ecosystems since Cr(VI) is highly toxic and mobile in aquatic systems but, in certain groups of bacteria, the Cr(VI) reduction capability may be transferred across

different species. Successful simultaneous removal of Cr(VI) with organic co-pollutants demonstrated the potential of biologically engineering microbial species to clean up environments contaminated with a range of diverse pollutants, so preserving ecosystem biodiversity. Therefore, Chapter 5 evaluates the prospects of application of the biological remediation against Cr(VI) pollution and recent improvements on this fundamental process.

The last section of this book is focused on the molecular techniques used for measuring biodiversity, a critical point of the studies on biodiversity. Indeed, with molecular and analytical techniques (FISH, DNA-microarray, etc.) now we can begin to understand how marine biodiversity supports ecosystem structure, dynamics and resilience. With these innovative techniques, it is possible to augment the understanding of biodiversity and ecosystem dynamics in all areas of the planktonic community. The authors of Chapter 6, review selected molecular techniques and provide case studies to illustrate their use for biodiversity purposes. One of the possibilities to measure biodiversity is to use DNA, as it is universal, relatively stable, suitable and reliable for measures, and comparable among a broad range of organisms. The increasing amount of data deriving from DNA sequencing it is not easy to manage, and the choice of good molecular markers should consider the species to be studied for specific biodiversity analysis.

The aim of the present book is to give an up-to-date overview of the studies on biodiversity at all levels, in order to better understand the dynamics and the mechanisms at the basis of the richness of life forms both in terrestrial (including agro-ecosystems) and marine environments. On this basis, the present volume would definitely be an ideal source of scientific information to the advanced students, junior researchers, faculty and scientists involved in ecology, agriculture, plant and animal sciences, environmental microbiology, molecular biology, biochemistry, biotechnology and other areas involving biodiversity studies.

I am thankful to all the contributors for their interests, significant contributions and cooperation that made the present volume possible. I also thank Prof. Antonio Scopa and Prof. Cristos Xiloyannis. Without their unending support, motivation and encouragements during all my years of academic career the present grueling task would never have been accomplished.

**Adriano Sofo, PhD**  
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Italy

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## NOTIFICATION OF APPOINTMENT

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February 11, 2011

Dear Dr. Sofo,

On behalf of the Scientific Board it is my pleasure to inform you that, based on your scientific background, your record of scientific accomplishment and your expert knowledge in your field of research, you have been appointed Book Editor of the book titled "Biodiversity / Book 8", ISBN: 978-953-307-1431-4.

Sincerely yours,

Aleksandar Lazinica, CEO



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