

Biodiversity And Taxonomy

Microbial Taxonomy, Phylogeny and Biodiversity
Frontiers Media SA

This text aims to encourage communication among scientists exploring different areas of related research work, to bring important up-to-date scientific advancements on the subject together in a single volume for easy accessibility and to try to solve problems in taxonomy.

This book offers the first comprehensive review of parasitic Crustacea, which are among the most successful and diverse parasites. Starting with an introductory chapter, followed by an historic overview and topic-specific chapters, each presenting a different aspect of parasitic crustacean biology, it enables readers to gain a better understanding of how these parasites function and allows direct comparisons between the different parasitic crustacean groups. The authors also discuss, in depth, the adaptations and interactions that have made parasitic Crustacea as successful as they are today, covering topics ranging from the history of their discovery, their biodiversity, phylogeny, evolution and life strategies to their role as vectors, or hosts of other organisms, and their significance in ecological processes. Consisting of ten chapters from leading international experts in the field, this volume offers a one-stop resource for all researchers, lecturers, students and practitioners.

Plant classifications are based on morphological characters and it is difficult, particularly in small plants

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and grasses, to identify these below generic level on the basis of these characters using a dissecting microscope. Plant species have intra- and inter-specific variation in secondary metabolites which can be utilized as marker compounds for identification and classification of plants. Secondary metabolites are produced as a result of primary metabolism and the production of these compounds not only involves several genes but also it is an energy dependent process. Hence these products cannot be considered as insignificant for the plant and the environment. Modern tools of molecular biology and secondary metabolites present in them can definitively decide about classification of plants. Absence of correct identification of plant is associated to many problems of resource utilization. Due to wide availability of these tools, interest has revived in systematics and correct classification of plants based on these parameters for their sustainable utilization and resource management. The purpose of this book is to assess the potential of phytochemical and molecular tools in the systematic and classification of plants. The topics covered include species concept, barcoding and phylogenetic analysis, chemotaxonomy use of polyketides, carotenes, cuticular wax, volatile oils, biodiversity of corals, metazoans, *Ruta* and *Echinocereus*. It provides comprehensive and broad subject-based reviews, useful for students, teachers, researchers, and all others interested in the field. The field has been kept wide and general to accommodate the wide-ranging topics. This book will be useful to agriculturists, chemists, botanists, industrialists, and those involved in planning of crop plants.

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The undergraduate and postgraduate students as well as the teachers of Zoology, Entomology and other allied subjects and the naturalists will find this comprehensive book extremely useful and interesting. Contents:

Introduction / Taxonomy and Biodiversity / Rise of Taxonomy / Newer Trends in Taxonomy / Zoological Classification / Concept of Species / Taxonomic Collection: Identification-Description and Publication / Reference Works in Taxonomy / Zoological Nomenclature / References / Glossary / Index

The depletion of biodiversity is an alarming problem all over the country. The world conservation strategy suggests that the initial effort of biodiversity conservation should aim at establishment and maintenance of a network of protected area systems by making policy changes involving local people in the protected areas management and mobilising financial resources for their conservation and protection. The problem of biodiversity conservation has become a global issue. It is being realised that forests existing in a country is not a resource just for that country, but for the whole of the world. The Amazoian Rain Forests have been called the Lungs of the World as they serve to purity of the global atmosphere by release of oxygen and absorption of Pollutants. The rate of deforestation is several times higher in the developing countries than the developed countries, as the forests are being felled to generate funds and space for development. The

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total number of species in the world is estimated to be around 5 to 30 million but of which about 1.4 millions species have been described. The total number of plant species in India is estimated to be about 45,000 (15,000 flowering plants, 64 gymnosperms, 2843 bryophytes, 1042 pteridophytes, 1940 lichans and 23,000 fungi). Nearly 4900 of those species are endemic to India out of which 1500 are highly threatened (MOEF, 1994). Contents Chapter 1: Plant biodiversity; Chapter 2: Phyto sociological region of india; Chapter 3: Phyto sociological region of the trans-himalaya; Chapter 4: Phyto sociological region of the west himalaya; Chapter 5: Phyto sociological region of the eastern himalaya; Chapter 6: Phyto sociological region of north-east india; Chapter 7: Phyto sociological region of the indian desert; Chapter 8: Phto sociological region of the semi-aridzone; Chapter 9: Phyto sociological region of the gangetic plains; Chapter 10: Phyto sociological region of the western ghats; Chapter 11: Phyto sociological region of the deccan peninsula; Chapter 12: Phyto sociological region of the indian coasts; Chapter 13: Phyto sociological regions of andaman and nicobar islands; Chapter 14: Phyto sociological region of the lakshadeep islands; Chapter 15: Aquatic and wetland vegetation; Chapter 16: Weed and aliens; Chapter 17: Taxonomy: A view; Chapter 18: Angiosperms; Chapter 19: Gymnosperms;

Chapter 20: Pteridophytes; Chapter 21: Bryophytes; Chapter 22: Algae; Chapter 23: Ecology and distribution of the marine forms; Chapter 24: Fungi; Chapter 25: Lichens; Chapter 26: Botanical regions of india and their floristic compositions; Chapter 27: Some alien flowering plants.

The diversity of marine life is being affected dramatically by fishery operations, chemical pollution and eutrophication, alteration of physical habitat, exotic species invasion, and effects of other human activities. Effective solutions will require an expanded understanding of the patterns and processes that control the diversity of life in the sea. Understanding Marine Biodiversity outlines the current state of our knowledge, and propose research agenda on marine biological diversity. This agenda represents a fundamental change in studying the ocean--emphasizing regional research across a range of space and time scales, enhancing the interface between taxonomy and ecology, and linking oceanographic and ecological approaches. Highlighted with examples and brief case studies, this volume illustrates the depth and breadth of undescribed marine biodiversity, explores critical environmental issues, advocates the use of regionally defined model systems, and identifies a series of key biodiversity research questions. The authors examine the utility of various research approaches--theory and modeling, retrospective

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analysis, integration of biotic and oceanographic surveys--and review recent advances in molecular genetics, instrumentation, and sampling techniques applicable to the research agenda. Throughout the book the critical role of taxonomy is emphasized. Informative to the scientist and accessible to the policymaker, *Understanding Marine Biodiversity* will be of specific interest to marine biologists, ecologists, oceanographers, and research administrators, and to government agencies responsible for utilizing, managing, and protecting the oceans.

The lactic acid bacteria (LAB) are a group of related micro-organisms that are enormously important in the food and beverage industries. Generally regarded as safe for human consumption (and, in the case of probiotics, positively beneficial to human health), the LAB have been used for centuries, and continue to be used worldwide on an industrial scale, in food fermentation processes, including yoghurt, cheeses, fermented meats and vegetables, where they ferment carbohydrates in the foods, producing lactic acid and creating an environment unsuitable for food spoilage organisms and pathogens to survive. The shelf life of the product is thereby extended, but of course these foods are also enjoyed around the world for their organoleptic qualities. They are also important to the brewing and winemaking industries, where they are

often undesirable intruders but can in specific cases have desirable benefits. The LAB are also used in producing silage and other agricultural animal feeds. Clinically, they can improve the digestive health of young animals, and also have human medical applications. This book provides a much-needed and comprehensive account of the current knowledge of the lactic acid bacteria, covering the taxonomy and relevant biochemistry, physiology and molecular biology of these scientifically and commercially important micro-organisms. It is directed to bringing together the current understanding concerning the organisms' remarkable diversity within a seemingly rather constrained compass. The genera now identified as proper members of the LAB are treated in dedicated chapters, and the species properly recognized as members of each genus are listed with detailed descriptions of their principal characteristics. Each genus and species is described using a standardized format, and the relative importance of each species in food, agricultural and medical applications is assessed. In addition, certain other bacterial groups (such as *Bifidobacterium*) often associated with the LAB are given in-depth coverage. The book will also contribute to a better understanding and appreciation of the role of LAB in the various ecological ecosystems and niches that they occupy. In summary, this volume gathers together information

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designed to enable the organisms' fullest industrial, nutritional and medical applications. Lactic Acid Bacteria: Biodiversity and Taxonomy is an essential reference for research scientists, biochemists and microbiologists working in the food and fermentation industries and in research institutions. Advanced students of food science and technology will also find it an indispensable guide to the subject. The current world biodiversity consists of an inestimable amount of living forms, that at all levels, from genes to biomes, from individuals to populations, from species to communities, are in constant pursuit of the best strategies to react to the natural and anthropic environmental changes. The arrangement of new and dynamic ecosystems balanced by the formation and the vanishing of species, is the direct consequence of these changes. This book contains comprehensive overviews and original studies focused on ecological and ecosystem functioning studies, hazards and conservation management, assessment of environmental variables affecting species diversity, also considering species richness and distribution, in order to identify the best management strategies to face and solve the conservation problems. The present book offers an overall up-to-date overview of the biological diversity, comprising many interesting chapters focussing on the different aspects of biodiversity. Most of the chapters include

findings of investigations and observations on biodiversity, whilst a few are based on statistically and theoretically derived information. The book produced sufficient information on the occurrence and distribution of many plant and animal species or groups of organisms with environmental estimates from a wide variety of interesting terrestrial and aquatic habitats. With 18 interesting and elaborately prepared chapters, the present book would definitely be an ideal source of scientific information to the advanced students, junior researchers, scientists and a portion of the public involved in ecology and other research areas involving biodiversity studies. It will also help to the development of the growing awareness of the close linkage between the conservation of biodiversity and economic development.

This collection of articles, developed in association with the EU funded ViBRANT project, illustrates how advances to research infrastructures are reciprocally changing the practice of taxonomy. A detailed review of data issues in the life sciences (Thessen and Patterson 2011) sets the tone for subsequent articles in this special issue, whose contributions broadly fall into three categories. The initial articles consider some of the major infrastructure platforms that support the production and management of biodiversity data. These include the EDIT Platform for Cybertaxonomy, Wiki-based approaches including BioWikiFarm and the Scratchpads Virtual Research Environment. Later articles provide

deeper coverage of specialist areas of interest to taxonomic and biodiversity researchers. The topics covered include the mark-up (Penev et al. 2011) and management (King et al. 2011) of taxonomic literature, geospatial assessment of species distributions (Bachman et al. 2011) and licensing issues specific to life science data (Hagedorn et al. 2011). Finally, the special issue closes with a series of research and review papers that provide detailed use cases illustrating how these research infrastructures are being put into practice. Highlights from this section include citizen science approaches to collecting species information by the COMBER Marine observation network (Arvanitidis et al. 2011) and the Australian Bush Blitz programme (Lambkin and Bartlett 2011); use of new tools for data publishing like the Global Biodiversity Information Facility (GBIF) Integrated Publishing Toolkit (IPT) and the DRYAD Data Repository; new forms of publication via ?data papers? that allow checklists and identification keys to be formally published as structured datasets (e.g., Narwade et al. 2011); and finally new taxonomic revisions and species descriptions constructed from within the collaborative systems like XPER2 and Scratchpads.

DNA Barcoding has been promoted since 2003 as a new, fast, digital genomics-based means of identifying natural species based on the idea that a small standard fragment of any organisms genome (a so-called micro-genome) can faithfully identify and help to classify every species on the planet. The fear that species are becoming extinct before they have ever been known

fuels barcoders, and the speed, scope, economy and user-friendliness claimed for DNA barcoding, as part of the larger ferment around the genomics revolution, has also encouraged promises that it could inspire humanity to reverse its biodiversity-destructive habits. This book is based on six years of ethnographic research on changing practices in the identification and classification of natural species. Informed both by Science and Technology Studies (STS) and the anthropology of science, the authors analyse DNA barcoding in the context of a sense of crisis concerning global biodiversity loss, but also the felt inadequacy of taxonomic science to address such loss. The authors chart the specific changes that this innovation is propelling in the collecting, organizing, analyzing, and archiving of biological specimens and biodiversity data. As they do so they highlight the many questions, ambiguities and contradictions that accompany the quest to create a genomics-based environmental technoscience dedicated to biodiversity protection. They ask what it might mean to recognise ambiguity, contradiction, and excess more publicly as a constitutive part of this and other genomic technosciences. *Barcoding Nature* will be of interest to students and scholars of sociology of science, science and technology studies, politics of the environment, genomics and post-genomics, philosophy and history of biology, and the anthropology of science.

To document the world's diversity of species and reconstruct the tree of life we need to undertake some simple but mountainous tasks. Most importantly, we need to tackle species rich groups. We need to collect,

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name, and classify them, and then position them on the tree of life. We need to do this systematically across all groups of organisms and because of the biodiversity crisis we need to do it quickly. With contributions from key systematic and taxonomic researchers, *Reconstructing the Tree of Life: Taxonomy and Systematics of Species Rich Taxa* outlines the core of the problem and explores strategies that bring us closer to its solution. The editors split the book into three parts: introduction and general concepts, reconstructing and using the tree of life, and taxonomy and systematics of species rich groups (case studies). They introduce, with examples, the concept of species rich groups and discuss their importance in reconstructing the tree of life as well as their conservation and sustainable utilization in general. The book highlights how phylogenetic trees are becoming “supersized” to handle species rich groups and the methods that are being developed to deal with the computational complexity of such trees. It discusses factors that have lead some groups to speciate to a staggering degree and also provides case studies that highlight the problems and prospects of dealing with species rich groups in taxonomy. To understand species rich taxa, evolution has set scientists a difficult, but not unattainable, challenge that requires the meshing together of phylogenetics and taxonomy, considerable advances in informatics, improved and increased collecting, training of taxonomists, and significant financial support. This book provides the tools and methods needed to meet that challenge. Volume One of the thoroughly revised and updated

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guide to the study of biodiversity in insects The second edition of *Insect Biodiversity: Science and Society* brings together in one comprehensive text contributions from leading scientific experts to assess the influence insects have on humankind and the earth's fragile ecosystems. Revised and updated, this new edition includes information on the number of substantial changes to entomology and the study of biodiversity. It includes current research on insect groups, classification, regional diversity, and a wide range of concepts and developing methodologies. The authors examine why insect biodiversity matters and how the rapid evolution of insects is affecting us all. This book explores the wide variety of insect species and their evolutionary relationships. Case studies offer assessments on how insect biodiversity can help meet the needs of a rapidly expanding human population, and also examine the consequences that an increased loss of insect species will have on the world. This important text: Explores the rapidly increasing influence on systematics of genomics and next-generation sequencing Includes developments in the use of DNA barcoding in insect systematics and in the broader study of insect biodiversity, including the detection of cryptic species Discusses the advances in information science that influence the increased capability to gather, manipulate, and analyze biodiversity information Comprises scholarly contributions from leading scientists in the field *Insect Biodiversity: Science and Society* highlights the rapid growth of insect biodiversity research and includes an expanded treatment of the topic that addresses the major insect

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groups, the zoogeographic regions of biodiversity, and the scope of systematics approaches for handling biodiversity data.

This book is divided into three thematic areas. The first covers a revision of the taxonomy of algae, based on the algae portal, as well as the general aspects of biology and the methodologies used in this branch of marine biology. The second subject area focuses on the use of algae in environmental assessment, with an intensive implementation in Western economies and some emerging economies. The third topic is the potential use of algae in various industries including food, pharmaceuticals, cosmetics, agricultural fertilizers, and the emerging biofuels industries.

The history of Taxonomy coincidences with origin of human language - it is a language of communication. The science of naming and classifying organism is the original bioinformatics and a fundamental basis for biology. Imagine when all organism did not have paper names, it would have resulted in total chaos and anarchy. This book covers everything students and practitioners need to know about the origins and use of animal taxonomy and biodiversity.

Freshwater Biodiversity is a much underestimated component of global biodiversity, both in its diversity and in its potential to act as models for fundamental research in evolutionary biology and ecosystem studies.

Freshwater organisms also reflect quality of water bodies and can thus be used to monitor changes in ecosystem health. The present book comprises a unique collection of primary research papers spanning a wide range of

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topics in aquatic biodiversity studies, and including a first global assessment of specific diversity of freshwater animals. The book also presents a section on the interaction between scientists and science policy managers. A target opinion paper lists priorities in aquatic biodiversity research for the next decade and several reactions from distinguished scientists discuss the relevance of these items from different points of view: fundamental ecology, taxonomy and systematics, needs of developing countries, present-day biodiversity policy at European and at global scales. It is believed that such a platform for the interaction between science and science policy is an absolute necessity for the efficient use of research budgets in the future.

The great diversity of microbial life is the remaining major reservoir of unknown biological diversity on earth. To understand this vast, but largely unperceived diversity with its untapped genetic, enzymatic and industrial potential, microbial systematics is undergoing a revolutionary change in its approach to describe novel taxa based on genomic/envirogenomic information. The characterization of an organism is no longer bounded by methodological barriers, and it is now possible to fully sequence the whole genome of a strain to study individual genes, or to examine the genetic information by using different techniques. In fact, application of genomics is helping not only to provide a better understanding of the boundaries of genera and higher levels of classification, but also to refine our definition of the species concept. In addition, increased understanding of phylogeny is allowing to predict the

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genetic potential of microorganisms for biotechnological applications and adaptation to environmental changes. The present Research Topic on “Microbial Taxonomy, Phylogeny and Biodiversity” compiles a collection of papers covering the use of genomic sequence data in microbial taxonomy and systematics, including evolutionary relatedness of microorganisms; application of comparative genomics in systematic studies; or metagenomic approaches for biodiversity studies. We hope that this eBook incentives and encourages researchers for future discussions on microbial taxonomy and phylogenetics.

"Department of Life Sciences, Natural History Museum, London, UK. We are living in an age where biodiversity is being lost at an unprecedented rate, with the well-documented problems of habitat destruction being compounded by the largely unknown future effects of Climate Change. High quality, accurate and reliable biodiversity data are needed by biologists, conservationists and environmental modellers to understand and assess the ecosystems in which they work, to produce effective conservation strategies, and to feed computer-generated models which predict what environments and habitats we might face"--

In an age when biodiversity is being lost at an unprecedented rate, it is vital that floristic and faunistic information is up to date, reliable and easily accessible for the formulation of effective conservation strategies. Electronic data management and communication are transforming descriptive taxonomy radically, enhancing both the collection and dissemination of crucial data on

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biodiversity. This volume is written by scientists at the forefront of current developments of floras and faunas, along with specialists from applied user groups. The chapters review novel methods of research, development and dissemination, which aim to maximise the relevance and impact of data. Regional case studies are used to illustrate the outputs and impacts of taxonomic research. Integrated approaches are presented which have the capacity to accelerate the production of floras and faunas and to better serve the needs of a widening audience.

Finalist for 2009 The Council on Botanical & Horticultural Libraries Literature Award! A Fresh Look at Taxonomy The most fundamental of all biological sciences, taxonomy underpins any long term strategies for reconstructing the great tree of life or salvaging as much biodiversity as possible. Yet we are still unable to say with any certainty how many species are living on the earth. The New Taxonomy describes how a confluence of theory, cyberinfrastructure, and international teamwork can meet this unprecedented research challenge and marks an emerging field, cybertaxonomy. Taxonomy Meets the Challenges of the Biodiversity Crisis An in-depth discussion of the future of descriptive taxonomy, the book examines the efforts of several international groups to catalog the world's biodiversity and make it accessible. An answer to Julien Huxley's *The New Systematics*, the book

marks the beginning of an upward trajectory of taxonomy to meet the unprecedented challenges of the biodiversity crisis. Contemporary taxonomists reclaim the unique mission, goals, and importance of taxonomy as an independent science. They cover technologies such as DNA evidence and its applications, computer-assisted species identification, digital morphology, and E-typification. The book also provides insight into effective ways of organizing taxonomic information and discusses what benefits can be leveraged from a rapid growth of taxonomic knowledge. A Vision and A Strategy for the Future Not much has changed since E.O. Wilson pointed out how little we know of Earth's species in 1985. This book offers a vision and a strategy for changing all that. The first current, unapologetic look at morphology and descriptive taxonomy that points out their incredible importance to science and society, this book frames one of the most constructive responses to biodiversity crises. It is a call to action for the taxonomy and museum communities to come together and to organize, plan, innovate, and initiate the most ambitious period of exploration in the long history of taxonomy. Biodiversity of Fishes in Arunachal Himalaya: Systematics, Classification, and Taxonomic Identification provides a detailed piscatorial resource of the fish species living in the rich mountain waterbodies of the eastern Himalayan region. It

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presents the latest classifications and updated taxa of fish dwelling in high-altitude cold waters, mid-altitude cold and warm waters, and warm waters in the low altitude foothill regions of the Arunachal Himalaya. The book includes the scientific and vernacular names of more than 200 fish species, as well as coloration, distributional and conservational status. It addresses increasing threats to the endemic fishes of this region, including habitat shrinkage, habitat destruction, and more. This book will be a valuable resource for biodiversity and conservation researchers, especially those specializing in ichthyo-faunal diversity. Fishery researchers and students will also find the information presented on taxonomic and classification very useful to their initiatives.

Documents the taxonomy of 218 freshwater fish species from the headwaters of the Brahmaputra basin Includes quality photographs of each species, either in the wild or as fresh specimens, for easy visual identification Provides species registration numbers and key distinguishing features for fast field and research references

This book illustrates the key role played by taxonomy in the conservation and sustainable utilisation of plant biodiversity. It is a tribute to the work of Professor Vernon Heywood who has done so much to highlight the importance of sound scholarship, training and collaboration for plant conservation.

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Divided into four parts, the book opens with an overview of the place of taxonomy in science and in implementing the Convention on Biological Diversity. Part 2 outlines the theoretical basis of taxonomy, how it is done and how it contributes to measuring diversity. The third part explains how taxonomy is used to establish conservation priorities and actions and the concluding part illustrates taxonomy in the practice and measurement of effective conservation action. With contributions from taxonomists and also the users of taxonomy, the volume will provide a balanced treatment, suitable for advanced students, researchers and conservation professionals.

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