

Community Ecology Ytical Methods Using R And Excel

Biogeography may be defined simply as the study of the geographical distribution of organisms, but this simple definition hides the great complexity of the subject. Biogeography transcends classical subject areas and involves a range of scientific disciplines that includes geogra phy, geology and biology. Not surprisingly, therefore, it means rather different things to different people. Historically, the study of biogeogra phy has been concentrated into compartments at separate points along a spatio-temporal gradient. At one end of the gradient, ecological biogeography is concerned with ecological processes occurring over short temporal and small spatial scales, whilst at the other end, historical biogeography is concerned with evolutionary processes over millions of years on a large, often global scale. Between these end points lies a third major compartment concerned with the profound effects of Pleistocene glaciations and how these have affected the distribution of recent organisms. Within each of these compartments along the scale gradient, a large number of theories, hypotheses and models have been proposed in an attempt to explain the present and past biotic distribution patterns. To a large extent, these compartments of the subject have been non-interactive, which is understandable from the different interests and backgrounds of the various researchers. Nevertheless, the distribu tions of organisms across the globe cannot be fully understood without a knowledge of the full spectrum of ecological and historical processes. There are no degrees in biogeography and today' s biogeographers are primarily born out of some other discipline.

Until fairly recently, populations were handled as homogenized averages, which made modeling feasible but which ignored the essential fact that in any population there is a great variety of individuals of different ages, sizes, and degrees of fitness. Recently, because of the increased availability of affordable computer power, approaches have been developed which are able to recognize individual differences. Individual-based models are of great use in the areas of aquatic ecology, terrestrial ecology, landscape or physiological ecology, terrestrial ecology, landscape or physiological ecology, and agriculture. This book discusses which biological problems individual-based models can solve, as well as the models' inherent limitations. It explores likely future directions of theoretical development in these models, as well as currently feasible management applications and the best mathematical approaches and computer languages to use. The book also details specific applications to theory and management.

Interactions between species are of fundamental importance to all living systems and the framework we have for studying these interactions is community ecology. This is important to our understanding of the planets biological diversity and how species interactions relate to the functioning of ecosystems at all scales. Species do not live in isolation and the study of community ecology is of practical application in a wide range of conservation issues. The study of ecological community data involves many methods of analysis. In this book you will learn many of the mainstays of community analysis including: diversity, similarity and cluster analysis, ordination and multivariate analyses. This book is for undergraduate and postgraduate students and researchers seeking a step-by-step methodology for analysing plant and animal communities using R and Excel. Microsoft's Excel spreadsheet is virtually ubiquitous and familiar to most computer users. It is a robust program that makes an excellent storage and manipulation system for many kinds of data, including community data. The R program is a powerful and flexible analytical system able to conduct a huge variety of analytical methods, which means that the user only has to learn one program to address many research questions. Its other advantage is that it is open source and therefore completely free. Novel analytical methods are being added constantly to the already comprehensive suite of tools available in R. Mark Gardener is both an ecologist and an analyst. He has worked in a range of ecosystems around the world and has been involved in research across a spectrum of community types. His knowledge of R is largely self-taught and this gives him insight into the needs of students learning to use R for complicated analyses.

Research in Fisheries

Ecology and Wildlife Biology

Measuring Abundance

Integrating Models with Data

Spatial Analytical

Analysis of Ecological Communities offers a rationale and guidance for selecting appropriate, effective, analytical methods in community ecology. The book is suitable as a textbook and reference book on methods for multivariate analysis of ecological communities and their environments. The book covers distance measures, data transformation, outlier analysis, coordination, cluster analysis, PCA RA, CA, DCA, NMS, NMS, CCA, Bray-Curtis, MRPP, Mantel test, discriminant analysis, twinspan, classification and regression trees, structural equation modeling, and more. It also includes brief treatments of community sampling and diversity measures. The 304 page book is richly illustrated. It provides many examples from the literature and demonstrations of basic principles with simulated and real data sets.

Covers many of the mainstays of community analysis including: diversity, similarity and cluster analysis, ordination and multivariate analyses. Aimed at undergraduate and postgraduate students and researchers seeking a step-by-step methodology for analysing plant and animal communities using R and Excel.

This handbook focuses on the enormous literature applying statistical methodology and modelling to environmental and ecological processes. The 21st century statistics community has become increasingly interdisciplinary, bringing a large collection of modern tools to all areas of application in environmental processes. In addition, the environmental community has substantially increased its scope of data collection including observational data, satellite-derived data, and computer model output. The resultant impact in this latter community has been substantial; no longer are simple regression and

analysis of variance methods adequate. The contribution of this handbook is to assemble a state-of-the-art view of this interface. Features: An internationally regarded editorial team. A distinguished collection of contributors. A thoroughly contemporary treatment of a substantial interdisciplinary interface. Written to engage both statisticians as well as quantitative environmental researchers. 34 chapters covering methodology, ecological processes, environmental exposure, and statistical methods in climate science.

Modeling and Managing Interdependent Complex Systems of Systems

McGraw-Hill Encyclopedia of Science and Technology

The sciences and engineering. B

Data Collection, Exploration, Analysis and Presentation

Methods for the Estimation of Population Size and Species Richness

An accessible introduction to the theory and practice of multivariate analysis for graduates, researchers and professionals dealing with ecological problems.

A synthesis of contemporary analytical and modeling approaches in population ecology The book provides an overview of the key analytical approaches that are currently used in demographic, genetic, and spatial analyses in population ecology. The chapters present current problems, introduce advances in analytical methods and models, and demonstrate the applications of quantitative methods to ecological data. The book covers new tools for designing robust field studies; estimation of abundance and demographic rates; matrix population models and analyses of population dynamics; and current approaches for genetic and spatial analysis. Each chapter is illustrated by empirical examples based on real datasets, with a companion website that offers online exercises and examples of computer code in the R statistical software platform. Fills a niche for a book that emphasizes applied aspects of population analysis Covers many of the current methods being used to analyse population dynamics and structure Illustrates the application of specific analytical methods through worked examples based on real datasets Offers readers the opportunity to work through examples or adapt the routines to their own datasets using computer code in the R statistical platform Population Ecology in Practice is an excellent book for upper-level undergraduate and graduate students taking courses in population ecology or ecological statistics, as well as established researchers needing a desktop reference for contemporary methods used to develop robust population assessments.

A comprehensive handbook outlining state-of-the-art analytical techniques used in geomicrobiology, for advanced students, researchers and professional scientists.

An Integrated Approach to the Study of Animal and Plant Distributions

Methods in Ecoacoustics

Proceedings of the National Academy of Sciences of the United States of America

Making Sense of Complex Data

CE.

All the information researchers, students, and practitioners need to conduct innovative, state-of-the-art research on small mammals. Rodents and insectivores constitute the vast majority of mammals on our planet, yet we often overlook the importance of this group. As seed dispersers, prey species, and disease regulators, these animals are critical to the functioning of our ecological systems. While considerable material exists that describes these species, there has been no dedicated guide explaining how to effectively research them—until now. *Methods for Ecological Research on Terrestrial Small Mammals* is a one-stop resource compiling all the information readers need to conduct state-of-the-art research on small terrestrial mammals across the globe. The authors cover the full spectrum of issues, from capture, handling, identification, reproduction, demography, and taxonomy to behavior, diet, evolution, diseases, movements, morphometrics, and more. They also:

- highlight the latest techniques while carefully explaining the tried-and-tested methods needed to conduct rigorous scientific inquiries;
- provide step-by-step examples and case studies, demonstrating how the methods discussed can be used in actual research projects;
- compare and contrast methodologies, analytical techniques, and software packages, helping researchers determine which pathways and tools will yield the best results for their studies.

A comprehensive and invaluable resource, *Methods for Ecological Research on Terrestrial Small Mammals* is a must-have for any ecologist working on small mammals. Community ecology has undergone a transformation in recent years, from a discipline largely focused on processes occurring within a local area to a discipline encompassing a much richer domain of study, including the linkages between communities separated in space (metacommunity dynamics), niche and neutral theory, the interplay between ecology and evolution (eco-evolutionary dynamics), and the influence of historical and regional processes in shaping patterns of biodiversity. To fully understand these new developments, however, students continue to need a strong foundation in the study of species interactions and how these interactions are assembled into food webs and other ecological networks. This new edition fulfills the book's original aims, both as a much-needed up-to-date and accessible introduction to modern community ecology, and in identifying the important questions that are yet to be answered. This research-driven textbook introduces state-of-the-art community ecology to a new generation of students, adopting reasoned and balanced perspectives on as-yet-unresolved issues. *Community Ecology* is suitable for advanced undergraduates, graduate students, and researchers seeking a broad, up-to-date coverage of ecological concepts at the community level.

From earlier ecological studies it has become apparent that simple univariate or bivariate statistics are often inappropriate, and that multivariate statistical analyses must be applied. Despite several difficulties arising from the application of multivariate methods, community ecology has acquired a mathematical framework, with three consequences: it can develop as an exact science; it can be applied operationally as a computer-assisted science to the solution of environmental problems; and it can exchange information with other disciplines using the language of mathematics. This book comprises the invited lectures, as well as working group reports, on the NATO workshop held in Roscoff (France) to improve the applicability of this new method numerical ecology to specific ecological problems.

Developments in Numerical Ecology

Bibliography of Agriculture

Handbook of Environmental and Ecological Statistics

Multivariate Analysis of Ecological Data using CANOCO 5

The Acoustic Complexity Indices

Measuring the abundance of individuals and the diversity of species are core components of most ecological research projects and conservation monitoring. This book brings together in one place, for the first time, the methods used to estimate the abundance of individuals in nature. The statistical basis of each method is detailed along with practical considerations for survey design and data collection. Methods are illustrated using data ranging from Alaskan shrubs to Yellowstone grizzly bears, not forgetting Costa Rica and Prince Edward Island lobsters. Where necessary, example code for use with the open source software R is supplied. Where appropriate, reference is made to other widely used programs. After opening with a brief synopsis of relevant statistical methods, the first section deals with the abundance of stationary items such as trees, shrubs, coral, etc. Following a discussion of the use of quadrats and the contexts of forestry sampling and the assessment of plant cover, there are chapters addressing line-intercept sampling, the use of neighbour distances, and variable sized plots. The second section deals with individuals that move, such as birds, mammals, insects, etc. Approaches discussed include double-observer sampling, removal sampling, capture-recapture methods and distance sampling. The final section deals with the measurement of species richness; species diversity; species-abundance distributions; and other measures of diversity such as evenness, similarity, turnover and rarity. This is an essential reference for anyone involved in advanced undergraduate or postgraduate ecological research and teaching, or those planning and carrying out data analysis as part of conservation survey and monitoring programmes.

This edited volume is an introduction to diverse methods and applications in operations research focused on local population and community-based organizations that have the potential to improve the lives of individuals and communities in tangible ways. Themes include: space, place and community; disadvantaged, underrepresented or underserved populations; international and cross-cultural applications; multimethod, cross-disciplinary and comparative approaches and appropriate technology; and analytics. The book is comprised of eleven original submissions, a re-print of a 2007 article by Johnson and Smilowitz that introduces CBOR, and a chapter that provides policy motivation, antecedents to CBOR in OR/MS, a theory of CBOR and a comprehensive review of the literature. It is hoped that this book will provide a resource to academics and practitioners who seek to develop methods and applications that bridge the divide between traditional OR/MS rooted in mathematical models and newer streams in 'soft OR' that emphasize problem solving, methods, critical approaches to OR/MS and community engagement and capacity-building.

This is a book about the scientific process and how you apply it to data in ecology. You will learn how to plan for data collection, how to assemble data, how to analyze data and finally how to present the results. The book uses Microsoft Excel and the powerful R program to carry out data handling as well as producing graphs. Statistical approaches covered include: data exploration; t-test and U-test; difference – t-test and U-test; correlation – Spearman's rank test and Pearson product-moment; association including Chi-square and goodness of fit; multivariate testing using analysis of variance (ANOVA) and Kruskal-Wallis test; and multiple regression. Topics taught in this book include: how to plan ecological projects; how to record and assemble your data; how to use R and Excel for analysis and graphs; how to carry out a wide range of statistical analyses including analysis of variance and regression; how to produce professional looking graphs; and how to present your results. New in this edition: a completely revised chapter on graphics including chart types and their uses, Excel Chart Tools, R graphics commands and producing different chart types in Excel and in R; an expanded support material online, including; example data, exercises and additional notes & explanations; a new chapter on basic community statistics, biodiversity and similarity; chapter summaries and end-of-chapter exercises. Praise for the first edition: This book is a must for all those looking at how to design investigations and collect data to support their findings. – Sue Townsend, Biodiversity Manager, Field Studies Council [M]akes it easy for the reader to synthesise R and Excel and there is extra help and sample code on the free companion webpage if needed. I recommended this text to the university library as well as to colleagues at my university who are new to R. Although I initially bought this book when I wanted to discover R I actually also learned new techniques for data manipulation and management in Excel – Mark Edwards, EcoBlogging A must for anyone getting to grips with data analysis using R and excel. 5-star review It has been very easy to follow and will be perfect for anyone. – Amazon 5-star review A solid introduction to R, Excel and R. The writing is clear and informative, the book provides plenty of examples and figures so that each string of code in Excel is understood by the reader. – Goodreads, 4-star review

Ecology

Populations, Communities and Ecosystems

Community-Based Operations Research

The Tangled Web of Community Ecology

Readings in Population and Community Ecology

Encyclopedia of Animal Behavior, Second Edition, the latest update since the 2010 release, builds upon the solid foundation established in the first edition. Updated sections include Host-parasite interactions, Vertebrate social behavior, and the introduction of 'overview essays' that boost the book's comprehensive detail. The structure for the work is modified to accommodate a better grouping of subjects. Some chapters have been reshuffled, with section headings combined or modified. Represents a one-stop resource for scientifically reliable information on animal behavior Provides comparative approaches, including the perspective of evolutionary biologists, physiologists, endocrinologists, neuroscientists and psychologists Includes multimedia features in the online version that offer accessible tools to readers looking to deepen their understanding

Ecological communities are governed by complicated processes that give rise to observable patterns. Making sense of these patterns, much less inferring the underlying processes, has proved challenging for several reasons. Manipulative experiments in natural communities may not be feasible due to large numbers of variables, lack of adequate replication, or the risk of undesirable consequences (e.g., introducing an invasive species). The multivariate nature of ecological datasets presents analytical problems as well; many statistical techniques familiar to ecologists have difficulty handling large numbers of potentially collinear variables. I present results from three studies of spider communities in which I employ a combination of familiar and less familiar statistical approaches to elucidate the factors

influencing community structure in spiders. These approaches include null model analyses, nonmetric multidimensional scaling (NMS) for variable reduction of predictor and response data matrices, multiple regression, and observed variable structural equation modeling (SEM). While NMS has been employed as a multivariate descriptive analysis, examples of its use in further analyses are rare. SEM is a technique widely applied in other fields, but has only recently been used in ecological studies. General results from analyses of these three studies suggest that: 1) significant patterns of spider species co-occurrence based on null model analyses are consistent with a hypothesis of shared habitat preferences rather than one of species interactions, 2) in multiple regressions using NMS axes as predictor and response variables to compare the roles of plant species composition and habitat architecture in influencing spider species composition, the plants explained as much or more variation as the architecture, and 3) based on SEM analyses using NMS axes for spider species, plant species, arthropod orders and habitat architecture as variables, plant species composition acts both indirectly (through its effect on arthropods and architecture) and directly. The combination in these analyses of a traditionally descriptive multivariate approach (NMS) with null models, a classic regression approach, and SEM permits the analysis of otherwise statistically intractable datasets (the original data matrices). This suite of approaches provides new insights into spider community structure, and can be applied by ecologists working in other systems as well.

Many microbial ecology experiments use sequencing data to measure a community's response to an experimental treatment. In a common experimental design, two units, one control and one experimental, are sampled before and after the treatment is applied to the experimental unit. The four resulting samples contain information about the dynamics of organisms that respond to the treatment, but there are no analytical methods designed to extract exactly this type of information from this configuration of samples. Here we present an analytical method specifically designed to visualize and generate hypotheses about microbial community dynamics in experiments that have paired samples and few or no replicates. The method is based on the Poisson lognormal distribution, long studied in macroecology, which we found accurately models the abundance distribution of taxa counts from 16S rRNA surveys. To demonstrate the method's validity and potential, we analyzed an experiment that measured the effect of crude oil on ocean microbial communities in microcosm. Our method identified known oil degraders as well as two clades, *Maricurvus* and *Rhodobacteraceae*, that responded to amendment with oil but do not include known oil degraders. Furthermore, our approach is sensitive to organisms that increased in abundance only in the experimental unit but less sensitive to organisms that increased in both control and experimental units, thus mitigating the role of bottle effects.

Analytical Biogeography

Decision Modeling for Local Impact and Diverse Populations

Theoretical Approaches to Community Ecology

A Project Guide

Next Generation Sequencing and Microbial Ecology

Functional and Phylogenetic Ecology in R is designed to teach readers to use R for phylogenetic and functional trait analyses. Over the past decade, a dizzying array of tools and methods were generated to incorporate phylogenetic and functional information into traditional ecological analyses. Increasingly these tools are implemented in R, thus greatly expanding their impact. Researchers getting started in R can use this volume as a step-by-step entryway into phylogenetic and functional analyses for ecology in R. More advanced users will be able to use this volume as a quick reference to understand particular analyses. The volume begins with an introduction to the R environment and handling relevant data in R. Chapters then cover phylogenetic and functional metrics of biodiversity; null modeling and randomizations for phylogenetic and functional trait analyses; integrating phylogenetic and functional trait information; and interfacing the R environment with a popular C-based program. This book presents a unique approach through its focus on ecological analyses and not macroevolutionary analyses. The author provides his own code, so that the reader is guided through the computational steps to calculate the desired metrics. This guided approach simplifies the work of determining which package to use for any given analysis. Example datasets are shared to help readers practice, and readers can then quickly turn to their own datasets.

The book titled "Next Generation Sequencing and Microbial Ecology" is a very timely and succinct compilation of the current developments in nucleic acid sequencing methods and their applications especially in helping understand microbial interaction and their form, community structure and function in various biotic communities. The book introduces the readers to different methods of sequencing DNA - from conventional to next generation sequencing, and discussing invariably the limitation and advantages of each of these methods, with respect to microbial ecology studies. The book highlights several gene families which have been favourably taken up in the recent past for the purpose of dissecting the communities and their possible roles. In this book, we also discuss some very novel aspects of microbial ecology, like "the metagenomics approach", which scientist have been able to work out mainly by culture independent approaches. We will highlight how this is helping us understand the structural and functional aspect i.e., "who is out there" and "what they are doing" in a number of different environments and the ecological significance of these aspects. We hope that the book will find a useful for students, researchers and teachers as a reference for choosing an appropriate sequencing approach, with respect to the gene family and analytical methods for studying microbes and their role in a community/ecosystem. Suggestions for improving the book are cordially invited.

This novel, interdisciplinary text achieves an integration of empirical data and theory with the aid of mathematical models and statistical methods. The emphasis throughout is on spatial ecology and evolution, especially on the interplay between environmental heterogeneity and biological processes. The book provides a coherent theme by interlinking the modelling approaches used for different subfields of spatial ecology: movement ecology, population ecology, community ecology, and genetics and evolutionary

ecology (each being represented by a separate chapter). Each chapter starts by describing the concept of each modelling approach in its biological context, goes on to present the relevant mathematical models and statistical methods, and ends with a discussion of the benefits and limitations of each approach. The concepts and techniques discussed throughout the book are illustrated throughout with the help of empirical examples. This is an advanced text suitable for any biologist interested in the integration of empirical data and theory in spatial ecology/evolution through the use of quantitative/statistical methods and mathematical models. The book will also be of relevance and use as a textbook for graduate-level courses in spatial ecology, ecological modelling, theoretical ecology, and statistical ecology.

Analytical Methods Using R and Excel

Statistics for Ecologists Using R and Excel

Analysis of Ecological Communities

Population Ecology in Practice

Community Ecology

This book represents an introduction to ecoacoustics theory, to the application of the Acoustic Complexity Indices (ACIs) to acoustic survey, and to the use of an innovative software to process acoustic data. It enables readers to comprehend the main principles that guide the recent development of ecoacoustics and offers a synthesis about the role of sound in the ecological research. Readers will be introduced to the use of the ACIs by a detailed description of the main algorithms recently formulated and on their correct application in the acoustic processing concurring to the creation of sonic information systems. Readers will also find a new dedicated software application, namely SonoScape, that is described in detail with its codes attached in the supplementary material in a completely visible format. The SonoScape is a performing software application operating in MatLab® and is enriched of several options to manage single and large collection of acoustics files. It vides the feasibility to process data at different temporal scale, using different combination of parameters, and to extract novel complexity measures such as entropy and fractal dimension of ecoacoustic events. It also offers functions to visualize the results using customized 3-D plots or ternary plots, intuitively demonstrating the patterns of ACIs based on the vast number of numerical results. Finally, this book provides several examples of case studies with the aim of better understanding the potentiality of ACIs and the power of SonoScape as multitasking software to approaching the complexity of the ecoacoustic investigation. Students and scholars in ecology, land managers and technicians may find an important tool to interpret the complex relationship between humans and natural processes when sounds are adopted as proxy.

The ability to manipulate spatial data in different forms and to extract additional meaning from them is at the heart of GIS, yet genuine spatial analysis tools are rarely incorporated into commercial software, thus seriously limiting their usefulness. The future of GIS technology wil depend largely on the incorporation of more powerful analytical and modelling functions - and there is agreement within the GIS community of the urgent need to address these issues. This text attempts this task. It presents the latest information on incorporating spatial analysis tools into GIS, and includes concepts and applications from both the environmental and socio-econimc sciences.

A comprehensive guide to the theory, methodology, and development for modeling systems of systems Modeling and Managing Interdependent Complex Systems of Systems examines the complexity of, and the risk to, emergent interconnected and interdependent complex systems of systems in the natural and the constructed environment, and in its critical infrastructures. For systems modelers, this book focuses on what constitutes complexity and how to understand, model and manage it. Previous modeling methods for complex systems of systems were aimed at developing theory and methodologies for uncoupling the interdependencies and interconnections that characterize them. In this book, the author extends the above by utilizing public- and private- sector case studies; identifies, explores, and exploits the core of interdependencies; and seeks to understand their essence via the states of the system, and their dominant contributions to the complexity of systems of systems. The book proposes a reevaluation of fundamental and practical systems engineering and risk analysis concepts on complex systems of systems developed over the past 40 years. This important resource: Updates and streamlines systems engineering theory, methodology, and practice as applied to complex systems of systems Introduces modeling methodology inspired by philosophical and conceptual thinking from the arts and sciences Models the complexity of emergent interdependent and interconnected complex systems of systems by analyzing their shared states, decisions, resources, and decisionmakers Written for systems engineers, industrial engineers, managers, planners, academics and other professionals in engineering systems and the environment, this text is the resource for understanding the fundamental principles of modeling and managing complex systems of systems, and the risk thereto.

Energy Research Abstracts

Methods for Ecological Research on Terrestrial Small Mammals

Functional and Phylogenetic Ecology in R

A Novel Analysis Method for Paired-sample Microbial Ecology Experiments

Contributions - Scripps Institution of Oceanography

Community ecology: the study of the patterns and processes involving two or more species - has developed rapidly two decades, driven by new and more sophisticated research techniques, advances in mathematical theory and mo the increasing pressure on the environment wrought by humans. Once a purely descriptive science, it is now one of forward-looking areas of scientific inquiry. Morin skillfully guides the reader through the main tenets and central co community ecology - competition, predation, food webs, indirect effects, habitat selection, diversity, and succession attempt to introduce the reader to the most balanced coverage possible, Morin includes examples drawn from bot aquatic and terrestrial realm and from both plant and animal species. Balancing theory with experimentation and dr on exciting new studies to complement the historical foundations of the discipline, he also stresses that both the theoretical approaches are necessary to drive ecology foward into the new millenium. The final chapter on applied community ecology ably demonstrates how community ecological processes have a wide environmental relevance. A in its infancy, the application of community ecology to emerging problems in human-dominated ecosystems could m problems as diverse as management strategies for important diseases transmitted by animals and the restoration a reconstruction of viable communities. Required reading for all students and practitioners interested in community phenomena, Community Ecology marks an important contribution to the development of this protean discipline. The serious textbook for a decade on one of the keystone subdisciplines of ecology. Broad taxonomic and habitat cover

on implications of community ecology for environmental issues.

Offers a comprehensive, accessible introduction to experimental design, field monitoring skills for plants and animal analysis, interpretation and reporting This user-friendly book presents field monitoring skills for both plants and animals within the context of a research project. This text provides a single resource to take the reader all the way through the planning stage, into the field, guiding through sampling, organism identification, computer-based data analysis and interpretation, and finally how to present the results to maximise the impact of the work. Logically structured through and revised extensively in the second edition, the book concentrates on the techniques required to design a field-based ecological survey and shows how to execute an appropriate sampling regime. It evaluates appropriate sampling and methods, identifying potential problems associated with various techniques and how to mitigate these. The second edition of this popular text has updated reference material and weblinks, increased the number of case studies by 50% to illustrate use of specific techniques in the field, added over 20% more figures (including 8 colour plates), and made more extensive use of footnotes to provide extra details. Extensions to topics covered in the first edition include additional discussion on issues; statistical methods (sample size estimation, use of the statistical package R, mixed models); bioindicators, environmental freshwater pollution; seeds, fecundity and population dynamics including static and dynamic life tables; forestry techniques including tree coring and tree mortality calculations; the use of data repositories; writing for a journal and producing posters and oral presentations. In addition, the use of new and emerging technologies has been a particular focus, including mobile apps for environmental monitoring and identification; land cover and GIS; the use of drones including legal frameworks and codes of practice; molecular field techniques including DNA analysis in the field (including eDNA); photo-matching for identifying individuals; camera trapping; modern techniques for detecting and analysing bat echolocation calls; and cloud storage using the cloud. Divided into six distinct chapters, *Practical Field Ecology, 2nd Edition* begins at project inception with a chapter on planning—covering health and safety, along with guidance on how to ensure that the sampling and experimental design is suitable for subsequent statistical analysis. Following a chapter dealing with site characteristics and general aspects of species identification, subsequent chapters describe the techniques used to survey and census different groups of organisms. The final chapters cover analysing, interpreting and presenting data, and writing up the research. Offers a readable and approachable integrated guide devoted to field-based research projects Takes students from the planning stage, into the field, and clearly guides them through organism identification in the laboratory and computer-based data analysis, interpretation and data presentation Includes a chapter on how to write project reports and present them in a variety of formats to differing audiences Aimed at undergraduates taking courses in Ecology, Biology, Geography, Environmental Science, *Practical Field Ecology, 2nd Edition* will also benefit postgraduates seeking to support their research. Reprints from various publications.

An International Reference Work

Practical Field Ecology

Individual-Based Models and Approaches In Ecology

Plant community ecology: Papers in honor of Robert H. Whittaker

Data Analysis in Community and Landscape Ecology

R. K. Peet Dep. of Botany, University of North Carolina, Chapel Hill, N. C. 27514, USA Robert

Whittaker's contributions to ecology were many and remarkably varied. His publication record will long stand as a monument to his greatness, and whatever we do to honor him will likely be rather small in comparison. Less well known were his personal interactions and the impact they had on the development of ecology as well as individual scientists. Over the years he touched many of us and we felt not just a professional but also a deep personal loss in his passing. After his death I was contacted by numerous colleagues who wondered what they might do to honor him. Whittaker had long served on the editorial board of *Vegetatio*, which prompted Eddy van der Maarel to suggest that a series of papers in the journal might be a fitting memorial, and so this project was conceived. Whittaker was a master of synthesis and during his career he published numerous review papers which showed clearly how his work related to and built on that of others. For this reason it seemed inappropriate and redundant to solicit papers reviewing areas to which Whittaker made important contributions. Instead, I chose to solicit research papers illustrating current applications of approaches Whittaker developed and showing a few of the recent advances which have grown directly from his pioneering work.

Ecological data has several special properties: the presence or absence of species on a semi-quantitative abundance scale; non-linear relationships between species and environmental factors; and high inter-correlations among species and among environmental variables. The analysis of such data is important to the interpretation of relationships within plant and animal communities and with their environments. In this corrected version of *Data Analysis in Community and Landscape Ecology*, without using complex mathematics, the contributors demonstrate the methods that have proven most useful, with examples, exercises and case-studies. Chapters explain in an elementary way powerful data analysis techniques such as logistic regression, canonical correspondence analysis, and kriging.

Analytical Geomicrobiology

Dissertation Abstracts International

Encyclopedia of Animal Behavior

Quantitative Ecology and Evolutionary Biology