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Biological Systematics The Evolution of Phylogenetic Systematics Case Studies in Plant Taxonomy Phylogeny, Ecology, and Behavior Ordination in the Study of Morphology, Evolution and Systematics of Insects Systematics. The Journal of the Institute for the Comparative Study of History, Philosophy and the Sciences. Vol. I. No. 1-vol. II Micromolecular Evolution, Systematics and Ecology Phylogenetics Next Generation Systematics Systematics and the Origin of Species Foundations of Systematics and Biogeography Systematic Biology Biological Systematics The Development of Biological Systematics Systematic Climate Change, Ecology and Systematics Systematics and Evolution A Biosystematic Study of the African and Madagascan Rubiaceae-Anthospermeae Systematics and the Origin of Species, from the Viewpoint of a Zoologist What, if anything, are species? Trends, Priorities, and Needs in Systematic Biology Coevolution and Systematics Cladistics Systematics Molecular Systematics of Fishes Molecular Systematics of Plants II Descriptive Taxonomy Trends in the Systematics of Bacteria and Fungi Here Be Dragons Long-term Studies of Vertebrate Communities Natural History Collections in the Science of the 21st Century Avian Molecular Evolution and Systematics Phylogenetic Systematics Reconstructing the Tree of Life Molecular Systematics and Plant Evolution Approaches to Research on the Systematics of Fish-Borne Trematodes Molecular Systematics of Plants Ontologies, Taxonomies and Thesauri in Systems Science and Systematics Plant Systematics A Dictionary of Ecology, Evolution, and Systematics

Methods in microbial systematics have developed and changed significantly in the last 40 years. This has resulted in considerable change in both the defining microbial species and the methods required to make reliable identifications. Developments in information technology have enabled ready access to vast amounts of new and historic data online. Establishing both the relevance, and the most appropriate use, of this data is now a major consideration when undertaking identifications and systematic research. This book provides some insights into how current methods and resources are being used in microbial systematics, together with some thoughts and suggestions as to how both methodologies and concepts may develop in the future. Mycology, the study of fungi, originated as a subdiscipline of botany and was a des criptive discipline, largely neglected as an experimental science until the early years of this century. A seminal paper by Blakeslee in 1904 provided evidence for self incompatibility, termed "heterothallism", and stimulated interest in studies related to the control of sexual reproduction in fungi by mating-type specificities. Soon to follow was the demonstration that sexually reproducing fungi exhibit Mendelian inheritance and that it was possible to conduct formal genetic analysis with fungi. The names Burgetf, Kniep and Lindegren are all associated with this early period of fungal genet ics research. These studies and the discovery of penicillin by Fleming, who shared a Nobel Prize in 1945, provided further impetus for experimental research with fungi. Thus began a period of interest in mutation induction and analysis of mutants for biochemical traits. Such fundamental research, conducted largely with Neurospora crassa, led to the one gene: one enzyme hypothesis and to a second Nobel Prize for fungal research awarded to Beadle and Tatum in 1958. Fundamental research in biochemical genetics was extended to other fungi, especially to Saccharomyces cerevisiae, and by the mid-1960s fungal systems were much favored for studies in eukaryotic molecular biology and were soon able to compete with bacterial systems in the molecular arena. Cheap and plentiful genome sequence data is transforming biology, and will surely transform systematics. This volume explores how. Systematics: A Course of Lectures is designed for use in an advanced undergraduate or introductory graduate level course in systematics and is meant to present core systematic concepts and literature. The book covers topics such as the history of systematic thinking and fundamental concepts in the field including species concepts, homology, and hypothesis testing. Analytical methods are covered in detail with chapters devoted to sequence alignment, optimality criteria, and methods such as distance, parsimony, maximum likelihood and Bayesian approaches. Trees and tree searching, consensus and super-tree methods, support measures, and other relevant topics are each covered in their own sections. The work is not a bleeding-edge statement or in-depth review of the entirety of systematics, but covers the basics as broadly as could be handled in a one semester course. Most chapters are designed to be a single 1.5 hour class, with those on parsimony, likelihood, posterior probability, and tree searching two classes (2 x 1.5 hours). Sequenced biological macromolecules have revitalized systematic studies of evolutionary history. Molecular Systematics of Fishes is the first authoritative overview of the theory and application of these sequencing data to fishes. This volume explores the phylogeny of fishes at multiple taxonomic levels, uses methods of analysis of molecular data that apply both within and between fish populations, and employs molecule-based phylogenies to address broader questions of evolution. Targeted readers include ichthyologists, marine scientists, and all students, faculty, and researchers interested in fish evolution and ecology and vertebrate systematics. Focuses on the phylogeny and evolutionary biology of fishes Contains phylogenies of fishes at multiple taxonomic levels Applies molecule-based phylogenies to broader questions of evolution Includes methods for critique of analysis of molecular data Anyone interested in comparative biology or the history of science will find this myth-busting work genuinely fascinating. It draws attention to the seminal studies and important advances that have shaped systematic and biogeographic thinking. It traces concepts in homology and classification from the 19th century to the present through the provision of a unique anthology of scientific writings from Goethe, Agassiz, Owen, Naef, Zangerl and Nelson, among others. Plant Systematics is a comprehensive and beautifully illustrated text, covering the most up-to-date and essential paradigms, concepts, and terms required for a basic understanding of plant systematics. This book contains numerous cladograms that illustrate the evolutionary relationships of major plant groups, with an emphasis on the adaptive significance of major evolutionary novelties. It provides descriptions and classifications of major groups of angiosperms, including over 90 flowering plant families; a comprehensive glossary of plant morphological terms, as well as appendices on botanical illustration and plant descriptions. Pedagogy includes review questions, exercises, and references that complement each chapter. This text is ideal for graduate and undergraduate students in botany, plant taxonomy, plant systematics, plant pathology, ecology as well as faculty and researchers in any of the plant sciences. The Henry Allan Gleason Award of The New York Botanical Garden, awarded for "Outstanding recent publication in the field of plant taxonomy, plant ecology, or plant geography" (2006) Contains numerous cladograms that illustrate the evolutionary relationships of major plant groups, with an emphasis on the adaptive significance of major evolutionary novelties Provides descriptions and classifications of major groups of angiosperms, including over 90 flowering plant families Includes a comprehensive glossary of plant morphological terms as well as appendices on botanical illustration and plant description Approaches to Research on the Systematics of Fish-Borne Trematodes is a concise guide for systematic studies of the prevalence of fish-borne trematodes both in the endemic areas and experimental laboratories. It includes methods to identify species of fish-borne trematodes to enhance the precision of research studies based on the metacercarial stage. Misidentification of trematode species is a common occurrence when researchers are new to the field and have no guidance. Consequentially, sometimes publications report inaccurate prevalence rates of these parasites. This compact guide gives clear direction on: Collection of parasites in the final hosts Collection of cercaria from snail first intermediate hosts Collection of metacercaria from fish hosts Molecular identification of parasites Systematics of fish-borne trematodes Provides research guidelines and protocols for studying systematics of fish-borne trematodes using both morphological and molecular data Presents keys to enable identification of metacercariae of fish-borne trematodes in the Greater Mekong subregion The originality of this book, which deals with such a new subject matter, lies in the application of methods and concepts never used before – such as ontologies and taxonomies, as well as thesauri - to the ordering of knowledge based on primary information. Chapters in the book also examine the study of ontologies, taxonomies and thesauri from the perspective of systematics and general systems theory. Ontologies, Taxonomies and Thesauri in Systems Science and Systematics will be extremely useful to those operating within the network of related fields, which includes documentation and information science. Ontologies and Taxonomy Knowledge classification Systems Thesauri Climate change has shaped life in the past and will continue to do so in the future. Understanding the interactions between climate and biodiversity is a complex challenge to science. With contributions from 60 key researchers, this book examines the ongoing impact of climate change on the ecology and diversity of life on earth. It discusses the latest research within the fields of ecology and systematics, highlighting the increasing integration of their approaches and methods. Topics covered include the influence of climate change on evolutionary and ecological processes such as adaptation, migration, speciation and extinction, and the role of these processes in determining the diversity and biogeographic distribution of species and their populations. This book ultimately illustrates the necessity for global conservation actions to mitigate the

effects of climate change in a world that is already undergoing a biodiversity crisis of unprecedented scale. For several decades botanists have been impressed by the discovery that the distribution of secondary plant substances follows the general lines of plant relationships. However, it soon became clear that little was to be gained from the study of individual compounds and their natural distribu tion. Therefore, more comprehensive studies were attempt ed in which the secondary chemistry of a major plant group was carefully studied and evaluated in the broader context of comparative phytochemistry. Holger Erdtman's admir able work on Coniferae is the foremost example of this kind. Since then, there has been an upswing in the study of the biosynthesis of secondary plant substances and it has become quite customary to make use of biosynthetic knowledge in interpreting chemosystematic evidence. More over, since taxonomists have insisted that use be made of all potentially available evidence for building classifications, it has been claimed that chemosystematics too should con sider the whole array of constituents present in a major taxon. However, in practice it has proved difficult to utilize fully the potential of natural product chemistry and biosynthetic studies for plant systematics and evolution, because bota nists found themselves rather disorientated by the scattered, often hardly accessible chemical literature and the fact that the chemical evidence was difficult for them to evaluate! Although the pioneering work of E. C. Taking a multidisciplinary approach, this book explores how new technologies are facilitating more effective collection and dissemination of taxonomic data. Molecular Systematics and Plant Evolution discusses the diversity and evolution of plants with a molecular approach. It looks at population genetics, phylogeny (history of evolution) and developmental genetics, to provide a framework from which to understand evolutionary patterns and relationships amongst plants. The international panel of contributors are all respected systematists and evolutionary biologists, who have brought together a wide range of topics from the forefront of research while keeping the text accessible to students. It has been written for senior undergraduates, postgraduates and researchers in the fields of botany, systematics, population / conservation genetics, phylogenetics and evolutionary biology. The use of DNA and other biological macromolecules has revolutionized systematic studies of evolutionary history. Methods that use sequences of nucleotides and amino acids are now routinely used as data for addressing evolutionary questions that, although not new questions, have defied description and analysis. The world-renowned contributors use these new methods to unravel particular aspects of the evolutionary history of birds. Avian Molecular Evolution and Systematics presents an overview of the theory and application of molecular systematics, focusing on the phylogeny and evolutionary biology of birds. New, developing areas in the phylogeny of birds at multiple taxonomic areas are covered, as well as methods of analysis for molecular data, evolutionary genetics within and between bird populations, and the application of molecular-based phylogenies to broader questions of evolution. Contains authoritative contributions from leading researchers Discusses the utility of different molecular markers for questions of avian evolution, involving populations and higher-level taxa Applies molecular-based phylogenies of birds and molecular population genetics data to broad questions of organismal and molecular evolution. Compares and contrasts molecular and morphological data sets The long-awaited revision of the industry standard on phylogenetics Since the publication of the first edition of this landmark volume more than twenty-five years ago, phylogenetic systematics has taken its place as the dominant paradigm of systematic biology. It has profoundly influenced the way scientists study evolution, and has seen many theoretical and technical advances as the field has continued to grow. It goes almost without saying that the next twenty-five years of phylogenetic research will prove as fascinating as the first, with many exciting developments yet to come. This new edition of Phylogenetics captures the very essence of this rapidly evolving discipline. Written for the practicing systematist and phylogeneticist, it addresses both the philosophical and technical issues of the field, as well as surveys general practices in taxonomy. Major sections of the book deal with the nature of species and higher taxa, homology and characters, trees and tree graphs, and biogeography—the purpose being to develop biologically relevant species, character, tree, and biogeographic concepts that can be applied fruitfully to phylogenetics. The book then turns its focus to phylogenetic trees, including an in-depth guide to tree-building algorithms. Additional coverage includes: Parsimony and parsimony analysis Parametric phylogenetics including maximum likelihood and Bayesian approaches Phylogenetic classification Critiques of evolutionary taxonomy, phenetics, and transformed cladistics Specimen selection, field collecting, and curating Systematic publication and the rules of nomenclature Providing a thorough synthesis of the field, this important update to Phylogenetics is essential for students and researchers in the areas of evolutionary biology, molecular evolution, genetics and evolutionary genetics, paleontology, physical anthropology, and zoology. Biosystematic studies on the Rubiaceae have a long tradition at the Institute of Botany in Vienna. Within this family the Anthospermeae, and especially its African and Madagascan members, are of particular interest because of several aspects in their evolution: I) Perfection of anemophily within an otherwise nearly exclusively zoophilous family; 2) transitions from hermaphrodity to polygamy and finally dioecy; 3) differentiation from large and long-lived shrubs to short-lived herbs; 4) adaptive radiation from humid to seasonally dry, fire-exposed and xeric habitats. However, morphological diversity linked to sexual differentia tion, modificatory plasticity, and eco-geographical polymorphism have for a long time hampered our understanding of the relationships among these African Anthospermeae. Thus, it was imperative to put special emphasis on field observations and to carry out a variety of experiments with cultivated plants in addition to the analysis of an enormous herbarium material. The author, for this reason, carried out extensive field work, often under very adverse conditions, and covered most African countries from Ethiopia to Southern Africa and twice visited Madagascar. In this way a multitude of data was accumulated on the group in respect to germination and growth form, vegetative and reproductive morphology, anatomy and biology, embryology, karyology, crossing relationships, phytochemistry, distribu tion and ecology, etc. Cladistics is the method of choice for systematic classification and comparative studies in all fields of biology. In cladistics, reconstructed genealogies are based on common ancestry rather than on simple anatomical similarity and therefore effectively reveal true phylogenetic relationships. This book is an introduction to cladistics and is based on the popular training course originally offered by the Systematics Association. The book first introduces the principle of parsimony and methods for character coding and the determination of character polarity. Methods of cladistic tree-building follow and tree statistics are detailed. Alternatives to parsimony, molecular applications of cladistics, and the relevance of fossils are then discussed. The concluding chapters review two important topics in cladistics: cladistic biogeography and the implementation of cladistic results in systematics. This book provides an up-to-date account of the techniques of modern cladistics, written in a clear, readable style. It will be an invaluable text for all students interested in systematics and comparative studies. The Evolution of Phylogenetic Systematics aims to make sense of the rise of phylogenetic systematicsÑits methods, its objects of study, and its theoretical foundationsÑwith contributions from historians, philosophers, and biologists. This volume articulates an intellectual agenda for the study of systematics and taxonomy in a way that connects classification with larger historical themes in the biological sciences, including morphology, experimental and observational approaches, evolution, biogeography, debates over form and function, character transformation, development, and biodiversity. It aims to provide frameworks for answering the question: how did systematics become phylogenetic? "The merits of this work are many. A rigorous integration of phylogenetic hypotheses into studies of adaptation, adaptive radiation, and coevolution is absolutely necessary and can change dramatically our collective 'gestalt' about much in evolutionary biology. The authors advance and illustrate this thesis beautifully. The writing is often lucid, the examples are plentiful and diverse, and the juxtaposition of examples from different biological systems argues forcefully for the validity of the thesis. Many new insights are offered here, and the work is usually accessible to both the practiced phylogeneticist and the naive ecologist."—Joseph Travis, Florida State University "[Phylogeny, Ecology, and Behavior] presents its arguments forcefully and cogently, with ample . . .support. Brooks and McLennan conclude as they began, with the comment that evolution is a result, not a process, and that it is the result of an interaction of a variety of processes, environmental and historical. Evolutionary explanations must consider all these components, else they are incomplete. As Darwin's explanations of descent with modification integrated genealogical and ecological information, so must workers now incorporate historical and nonhistorical, and biological and nonbiological, processes in their evolutionary perspective."—Marvalee H. Wake, Bioscience "This book is well-written and thought-provoking, and should be read by those of us who do not routinely turn to phylogenetic analysis when investigating adaptation, evolutionary ecology and co-evolution."—Mark R. MacNair, Journal of Natural History This book is an extended argument for abandoning the species rank. Instead, the author proposes that the rank of "species" be replaced by a pluralistic and multi-level view. In such a view, all clades including the smallest identifiable one would be named and studied within a phylogenetic context. What are currently called "species" represent different sorts of things depending on the sort of organisms and processes being considered. This is already the case, but is not formally recognized by those scientists using the species rank in their work. Adopting a rankless taxonomy at all levels would enhance academic studies of evolution and ecology and yield practical benefits in areas of public concern such as conservation. The Open Access version of this book, available at http://www.taylorfrancis.com/books/e/9781498714549, has been made available under a Creative Commons Attribution-Non Commercial license. KEY FEATURES • Proposes the replacement of restrictive species concepts with a pluralistic view • Suggests abandoning the formal taxonomic rank of "species" • Considers zoological, botanical, and microbiological aspects of the species level • Deals with practical issues such as conservation, inventories, and field guides This study, first published in 1942, helped to revolutionize evolutionary biology by offering a new approach to taxonomic principles, and correlating the ideas and findings of modern systematics with those of other life disciplines. This book is one of the foundational documents of the Evolutionary Synthesis. It is the book in which Ernst Mayr pioneered his concept of species based chiefly on such biological factors as interbreeding and reproductive isolation, taking into account ecology, geography and life history. In the introduction to

this edition, Mayr reflects on the place of this work in the subsequent history of his field. Contributions to the workshop on Ordination Methods in Entomological Systematics, along with ordination-based research presented at the congress symposium on The Structural Basis and Analysis of Allometric Growth in Insects, formed the initial basis for this volume. Taking those sessions even further, this book portrays many current, distinct aspects of ordination analyses that have never been covered, as well as conveying a wealth of possibilities for the biological and evolutionary interpretations that these techniques allow. Several of the aspects here are still evolving in theory and implementation, hence the text incorporates disagreement and varied usage to enable the reader to see and understand the philosophies and arguments involved.The aim of this volume is to provide insights and inspirations for those already experienced in morphometric research, and also to provide examples for inexperienced workers. Examples and arguments for required cautions and the limitations of the techniques are included, as is a wide range of methods from which to choose, each with its own characteristics and potential applications.The emphasis of this publication is thus on how researchers use and interpret ordinations to solve systematic problems in their particular taxonomic groups; it will serve as a catalyst for the exploration of the potential of ordinations in systematic and evolutionary research. Presents ten case studies and three examples designed to help students learn to make taxonomic judgments. Topics include: the significance of systematics and classification; explanation of the taxonomic hierarchy; collection and types of data used; and case studies. This unique book synthesizes the ongoing long-term community ecology studies of fish, amphibians, reptiles, birds, and mammals. The studies have been conducted from deserts to rainforests as well as in terrestrial, freshwater, and marine habitats and provide valuable insight that can be obtained only through persistent, diligent, and year-after-year investigation. Long-Term Studies of Vertebrate Communities is ideal for faculty, researchers, graduate students, and undergraduates in vertebrate biology, ecology, and evolutionary biology, including ecology, natural history, and systematics. Key Features * Provides unique perspectives of community stability and variation * Details the influence of natural and other perturbations on community structure * Includes synopses by well-known authors * Presents results from a broad range of vertebrate taxa * Studies were conducted at different latitudes and in different habitats A comprehensive dictionary covering the science of biological diversity. Natural history collections have recently acquired an unprecedented place of importance in scientific research. Originally created in the context of systematics and taxonomy, they are now proving to be fundamental for answering various scientific and societal questions that are as significant as they are current. Natural History Collections in the Science of the 21st Century presents a wide range of questions and answers raised by the study of collections. The billions of specimens that have been collected from all around the world over more than two centuries provide us with information that is vital in our quest for knowledge about the Earth, the universe, the diversity of life and the history of humankind. These collections also provide valuable reference points from the past to help us understand the nature and dynamics of global change today. Their physical permanence is the best guarantee we have of a return to data and to information sources in the context of open science. Why do we find polar bears only in the Arctic and penguins only in the Antarctic? Why do oceanic islands often have many types of birds but no large native mammals? As Charles Darwin and Alfred Russel Wallace travelled across distant lands studying the wildlife they both noticed that the distribution of plants and animals formed striking patterns - patterns that held strong clues to the past of the planet. The study of the spatial distribution of living things is known as biogeography. It is a field that could be said to have begun with Darwin and Wallace. In this lively book, Denis McCarthy tells the story of biogeography, from the 19th century to its growth into a major field of interdisciplinary research in the present day. It is a story that encompasses two great, insightful theories that were to provide the explanations to the strange patterns of life across the world - evolution, and plate tectonics. We find animals and plants where we do because, over time, the continents have moved, separating and coalescing in a long, slow dance; because sea levels have risen, cutting off one bit of land from another, and fallen, creating land bridges; because new and barren volcanic islands have risen up from the sea; and because animals and plants vary greatly in their ability to travel, and separation has caused the formation of new species. The story of biogeography is the story of how life has responded and has in turn altered the ever changing Earth. It is a narrative that includes many fascinating tales - of pygmy mammoths and elephant birds; of changing landscapes; of radical ideas by bold young scientists first dismissed and later, with vastly growing evidence, widely accepted. The story is not yet done: there are still questions to be answered and biogeography is a lively area of research and debate. But our view of the planet has been changed profoundly by biogeography and its related fields: the emerging understanding is of a deeply interconnected system in which life and physical forces interact dynamically in space and time. 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, 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 b Most students who take a course in biological systematics do so to learn how to construct a data matrix and generate and evaluate a tree of phylogenetic relationships. Biological Systematics: Principles and Applications, by Randall T. Schuh, provides a welcome tool for these students and their instructors: it is a comprehensive and completely new textbook, the first of its kind since 1981. Systematics, the study of the reconstruction of the history of life, forms the underlying basis for organizing the knowledge of biology; cladistics is the diagrammatic method of charting phylogenetic relationships over time among evolving life forms. Cladistics analysis, the key tool used in this book, is also of great use outside pure systematic studies, and interests many students of population biology, ecology, epidemiology, and natural resources.Suitable for both graduate and advanced undergraduate students, Biological Systematics: Principles and Applications covers the core material for courses in biological systematics, with equal emphasis on both botany and zoology. It includes sections on the history and resources of the field; biological nomenclature; the theory of homology, character analysis, and computer algorithms; and the application of the results of systematic studies in the areas of biological classification, biogeography, adaptation and co-evolution, and biodiversity and conservation. Phylogenetic Systematics: Haeckel to Hennig traces the development of phylogenetic systematics against the foil of idealistic morphology through 100 years of German biology. It starts with the iconic Ernst Haeckel-the German Darwin from Jena-and the evolutionary morphology he developed. It ends with Willi Hennig, the founder of modern phylogenetic A brilliant young scientist introduces us to the fascinating field that is changing our understanding of how the body works and the way we can approach healing. SYSTEMATIC is the first book to introduce general readers to systems biology, which is improving medical treatments and our understanding of living things. In traditional bottom-up biology, a biologist might spend years studying how a single protein works, but systems biology studies how networks of those proteins work together--how they promote health and how to remedy the situation when the system isn't functioning properly. Breakthroughs in systems biology became possible only when powerful computer technology enabled researchers to process massive amounts of data to study complete systems, and has led to progress in the study of gene regulation and inheritance, cancer drugs personalized to an individual's genetically unique tumor, insights into how the brain works, and the discovery that the bacteria and other microbes that live in the gut may drive malnutrition and obesity. Systems biology is allowing us to understand more complex phenomena than ever before. In accessible prose, SYSTEMATIC sheds light not only on how systems within the body work, but also on how research is yielding new kinds of remedies that enhance and harness the body's own defenses. A reevaluation of the history of biological systematics that discusses the formative years of the so-called natural system of classification in the eighteenth and nineteenth centuries. Shows how classifications came to be treated as conventions; systematic practice was not linked to clearly articulated theory; there was general confusion over the "shape" of nature; botany, elements of natural history, and systematics were conflated; and systematics took a position near the bottom of the hierarchy of sciences. In December 2004, the National Academy of Sciences sponsored a colloquium on "Systematics and the Origin of Species" to celebrate Ernst Mayr's 100th anniversary and to explore current knowledge concerning the origin of species. In 1942, Ernst Mayr, one of the twentieth century's greatest scientists, published Systematics and the Origin of Species, a seminal book of the modern theory of evolution, where he advanced the significance of population variation in the understanding of evolutionary process and the origin of new species. Mayr formulated the transition from Linnaeus's static species concept to the dynamic species concept of the modern theory of evolution and emphasized the species as a community of populations, the role of reproductive isolation, and the ecological interactions between species. In addition to a preceding essay by Edward O. Wilson, this book includes the 16 papers presented by distinguished evolutionists at the colloquium. The papers are organized into sections covering the origins of species barriers, the processes of species divergence, the nature of species, the meaning of "species," and genomic approaches for understanding diversity and speciation. In the five years since the publication of Molecular Systematics of Plants, the field of molecular systematics has advanced at an astonishing pace. This period has been marked by a volume of new empirical data and advances in theoretical and analytical issues related to DNA. Comparative DNA sequencing, facilitated by the amplification of DNA via the polymerase chain reaction (PCR), has become the tool of choice for molecular systematics. As a result, large portions of the Molecular Systematics of Plants have become outdated. Molecular Systematics of Plants II summarizes these recent achievements in plant molecular systematics. Like its predecessor, this completely revised work illustrates the potential of DNA markers for addressing a wide variety of phylogenetic and evolutionary questions. The volume provides guidance in choosing appropriate techniques, as well as appropriate genes for sequencing, for given levels of systematic inquiry. More than a review of techniques and previous work, Molecular Systematics of Plants II provides a stimulus for developing future research in this rapidly evolving field. Molecular Systematics of Plants II is not only written for systematists (faculty, graduate students, and researchers), but also for evolutionary biologists, botanists, and

paleobotanists interested in reviewing current theory and practice in plant molecular systematics. Ideas and rules on the systematics of parasite groups, and to a lesser extent their hosts, have been influenced by the assumption that coevolution between parasites and hosts has resulted in parallel traits in their phylogenies, which, in turn, may be reflected in their systematics. The essays in this volume include studies of plant, insect, and vertebrate parasite groups and their hosts. The authors relate their findings to the implications of coevolutionary phenomena for the systematics of the organisms involved, and offer conclusions on the applicability of parasitological rules. The application of molecular techniques is rapidly transforming the study of plant systematics. The precision they offer enables researchers to classify plants that have not been subject to rigorous classification before and thus allows them to obtain a clearer picture of evolutionary relationships. Plant Molecular Systematics is arranged both conceptually and phylogenetically to accommodate the interests not only of general systematists, but also those of people interested in a particular plant family. The first part discusses molecular sequencing; the second reviews restriction site analysis and the sequencing of mitochondrial DNA. A third section details the analysis of ribosomal DNA and chloroplast DNA. The following section introduces model studies involving well-studied families such as the Onagraceae, Compositae and Leguminosae. The book concludes with a section addressing theoretical topics such as data analysis and the question of morphological vs. molecular data. Biological Systematics: Principles and Applications draws equally from examples in botany and zoology to provide a modern account of cladistic principles and techniques. It is a core systematics textbook with a focus on parsimony-based approaches for students and biologists interested in systematics and comparative biology. Randall T. Schuh and Andrew V. Z. Brower cover: -the history and philosophy of systematics and nomenclature; -the mechanics and methods of analysis and evaluation of results; -the practical applications of results and wider relevance within biological classification, biogeography, adaptation and coevolution, biodiversity, and conservation; and -software applications. This new and thoroughly revised edition reflects the exponential growth in the use of DNA sequence data in systematics. New data techniques and a notable increase in the number of examples from molecular systematics will be of interest to students increasingly involved in molecular and genetic work.

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