Dna Barcoding And Related Molecular Markers For Fish

Molecular Systematics and Plant EvolutionIssues in Life Sciences: Molecular Biology: 2011 EditionDNA BarcodingThe Biology and Identification of the Coccidia (Apicomplexa) of Rabbits of the WorldDNA Barcoding in Marine PerspectivesFifty Years of Invasion EcologyDNA barcoding: a practical tool for fundamental and applied biodiversity researchThe Handbook of NanomedicineA Textbook of Molecular BiotechnologyThe Leguminosae of MadagascarInsect BiodiversityNext-Generation Genome SequencingPlant DNA Fingerprinting and BarcodingThe Future of Fisheries Science in North AmericaBiotechnology and Biology of TrichodermaDiptera DiversityDetermining Mycotoxins and Mycotoxigenic Fungi in Food and FeedMolecular Markers in PlantsMolecular Markers in MycologyTumor Immunology and Immunotherapy – Molecular MethodsComputer and Computing Technologies in Agriculture IVAdvances in Food Authenticity TestingThe Vegetation and Physiography of SumatraDictionary of DNA and Genome TechnologyCRISPR in Animals and Animal ModelsAn Introduction to Ecological GenomicsDNA Barcoding in Marine PerspectivesNematologySeafood Authenticity and TraceabilityMolecular PharmacognosyNew Horizons in Insect Science: Towards Sustainable Pest ManagementInsect Molecular GeneticsPlant GenotypingSpecies Concepts and Phylogenetic TheoryDNA barcoding: a practical tool for fundamental and applied biodiversity researchDNA Barcoding and Molecular PhylogenyMolecular EcologyDNA BarcodesPhylogenetic DiversityEncyclopedia of Evolutionary Biology

Molecular Systematics and Plant Evolution

No question in theoretical biology has been more perennially controversial or perplexing than "What is a species?" Recent advances in phylogenetic theory have called into question traditional views of species and spawned many concepts that are currently competing for general acceptance. Once the subject of esoteric intellectual exercises, the "species problem" has emerged as a critically important aspect of global environmental concerns. Completion of an inventory of biodiversity, success in conservation, predictive knowledge about life on earth, management of material resources, formulation of scientifically credible public policy and law, and more depend upon our adoption of the "right" species concept. Quentin D. Wheeler and Rudolf Meier present a debate among top systematic biology theorists to consider the strengths and weaknesses of five competing concepts. Debaters include (1) Ernst Mayr (Biological Species Concept), (2) Rudolf Meier and Rainer Willmann (Hennigian species concept), (3) Brent Mishler and Edward Theriot (one version of the Phylogenetic Species Concept), (4) Quentin Wheeler and Norman Platnick (a competing version of the Phylogenetic Species Concept), and (5) E. O. Wiley and Richard Mayden (the Evolutionary Species Concept). Each author or pair of authors contributes three essays to the debate: first, a position paper with an opening argument for their respective concept of species; second, a counterpoint view of the weakness of competing concepts; and, finally, a rebuttal of the attacks made by other authors. This unique and lively debate format makes the comparative advantages and disadvantages of competing species concepts

clear and accessible in a single book for the first time, bringing to light numerous controversies in phylogenetic theory, taxonomy, and philosophy of science that are important to a wide audience. Species Concepts and Phylogenetic Theory will meet a need among scientists, conservationists, policy-makers, and students of biology for an explicit, critical evaluation of a large and complex literature on species. An important reference for professionals, the book will prove especially useful in classrooms and discussion groups where students may find a concise, lucid entrée to one of the most complex questions facing science and society.

Issues in Life Sciences: Molecular Biology: 2011 Edition

Molecular cloning and DNA-based analysis have become part of every molecular life science laboratory. The rapid adoption of DNA-based techniques has been facilitated by the introduction of the polymerase chain reaction (PCR), which has made cloning and characterization of DNA quick and relatively simple. PCR is virtually part of every variation of the plethora of approaches used for DNA fingerprinting today. Plant DNA Fingerprinting: Methods and Protocols aims to bring together the different currently available genome-based techniques into one repository. This volume contains detailed protocols for the preparation of plant genomic DNA, fingerprinting of plants for the detection of intra-species variations, the use of DNA barcoding, as well as methods for the bioinformatic analysis of data. Also included are several discussions on the broader issues of genome-based approaches in order to provide a sound understanding of the principles of these methods. Written in the successful Methods in Molecular BiologyTM series format, chapters include introductions to their respective topics, lists of the necessary materials and reagents, step-by-step, readily reproducible protocols, and notes on troubleshooting and avoiding known pitfalls. Authoritative and easily accessible, Plant DNA Fingerprinting: Methods and Protocols is tailored principally for those who seek to augment their current methods of plant analysis and quality control using genome-based approaches as well as for scientists and researchers in different plant sciences.

DNA Barcoding

Written by leading experts from industry and academia, this first single comprehensive resource addresses recent developments in next generation DNA sequencing technology and their impact on genome research, drug discovery and health care. As such, it presents a detailed comparative analysis of commercially available platforms as well as insights into alternative, emerging sequencing techniques. In addition, the book not only covers the principles of DNA sequencing techniques but also social, ethical and commercial aspects, the concept of personalized medicine and a five-year perspective of DNA sequencing.

The Biology and Identification of the Coccidia (Apicomplexa) of Rabbits of the World

Fifteen years ago, approximately half the world population was estimated to live in continental and insular South-East Asia (Burma, Thailand, Kampuchea, Vietnam, Laos, Indonesia, Philippines). Then the region had a population growth of four million people every month, and the problem of malnutrition was acute for the rural population. International agricultural development organisations decided that their primary aim would be to double existing levels of agricultural production and, taking account of population growth, to double it again by the end of the century (Whyte 1976). Today, while global issues have greatly affected the parameters of the problem, the situation remains both serious and difficult. Despite impressive efforts in education and health, Indonesia for example, where population (179 millions) growth eased off only slightly between 1980 and 1990 (from 2. 3 percent to 1. 9 percent), is having to cope with increasing difficulties in managing natural resources and particularly its evanescent forest assets which, until 1986, were the second largest source of national revenue. Indonesia has the second largest surface area of tropical rain forests in the world (after Brazil) and thus all the problems linked with management and disappearance of those forests. The latest estimate gives a figure of 109 million hectares of forest in 1990, of which 40. 8 million hectares are production forests (Anon. -F AO 1990).

DNA Barcoding in Marine Perspectives

Insect science is fast changing as insects are evolving to a plethora of newer chemical molecules, climate change, management tactics and transformation of the landscapes. Through the International Conference, the editors have attempted to gather together newer aspects of Insect Sciences like Insect Taxonomy, DNA Barcoding, Physiology, Toxicology, Vectors and their Management, Molecular Biology, RNA interference in Pest Management, Semiochemicals and Pest Management using Host Plant Resistance and Biological Control appropriated especially for the developing world. Both basic and applied aspects of insect science have been included to stimulate comprehensive studies on insect science. The book not only deals with insect science but also environmental and ecological aspects in the hope that the book will be of immense use to students, researchers, extension workers, planners, administrators, farmers and other end users. The Chapters on diversified aspects of Insect Science are contributed by leading scientists for the coming 21st century in which entomology is witnessing a dramatic advancement in management of pests through in-depth investigations. The dimensions of Insect Science covered in the book are pest management approaches that can be adopted worldwide with ascent on sustainability.

Fifty Years of Invasion Ecology

Fisheries science in North America is changing in response to a changing climate, new technologies, an ecosystem approach to management and new thinking about the processes affecting stock and recruitment. Authors of the 34 chapters review the science in their particular fields and use their experience to develop informed opinions about the

future. Everyone associated with fish, fisheries and fisheries management will find material that will stimulate their thinking about the future. Readers will be impressed with the potential for new discoveries, but disturbed by how much needs to be done in fisheries science if we are to sustain North American fisheries in our changing climate. Officials that manage or fund fisheries science will appreciate the urgency for the new information needed for the stewardship of fish populations and their ecosystems. Research organizations may want to keep some extra copies for a future look back into the thoughts of a wide range of fisheries professionals. Fisheries science has been full of surprises with some of the surprises having major economic impacts. It is important to minimize these impacts as the demand for seafood increases and the complexities of fisheries management increase.

DNA barcoding: a practical tool for fundamental and applied biodiversity research

Nematology being an established discipline covers a wide range of area ranging from basic aspect to the advanced and applied aspects involving recent advances in molecular techniques. This book discusses the following topics: the role of nematodes in our life (in agriculture, ecosystem functioning, experimental biology, ecological studies, pest management programs, or biocontrol), identification of GRSPs in nematode genomes, novel way for the diagnosis of pathogenic nematodes involving various recent molecular techniques, other methodologies for successful control of termites, evolution of plant-parasitic nematodes, viability of adult filarial nematode parasites, the impact of plant-parasitic nematodes on crops, and harnessing useful rhizosphere microorganisms for nematode control. The book also encompasses on classical study, molecular study, bioinformatics in nematology, biodiversity analysis, and culturing of nematodes in laboratory condition.

The Handbook of Nanomedicine

Issues in Life Sciences: Molecular Biology / 2011 Edition is a ScholarlyEditions™ eBook that delivers timely, authoritative, and comprehensive information about Life Sciences—Molecular Biology. The editors have built Issues in Life Sciences: Molecular Biology: 2011 Edition on the vast information databases of ScholarlyNews.™ You can expect the information about Life Sciences—Molecular Biology in this eBook to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of Issues in Life Sciences: Molecular Biology: 2011 Edition has been produced by the world’s leading scientists, engineers, analysts, research institutions, and companies. All of the content is from peer-reviewed sources, and all of it is written, assembled, and edited by the editors at ScholarlyEditions™ and available exclusively from us. You now have a source you can cite with authority, confidence, and credibility. More information is available at http://www.ScholarlyEditions.com/.

A Textbook of Molecular Biotechnology

This book includes a multitude of aspects of DNA barcoding and molecular phylogeny along with some case studies which will be beneficial to researchers and academics around the globe in a total of 27 chapters. Bioinformatics is an important part of DNA barcoding and the concept of R in DNA Barcoding is a very recent development. This book contains a full chapter devoted to this very important topic. Further areas where DNA barcoding can be applied are: management of invasive alien species, plant animal interactions, forensic botany, clinical microbiology especially in relation to infection management, DNA database management, among others. This book also includes very useful information related to the DNA barcoding and molecular phylogeny of microbes, aquatic plants, algae, mosquitoes, elasmobranchs, fishes, reptiles, birds and ruminant mammals. Some unique case studies describe DNA barcoding of reptiles dwelling in Saudi Arabian deserts, DNA barcoding of a high altitude medicinal plant, genetic variation studies in both wild and hatchery populations of Anabas testudineus, DNA Barcoding and molecular phylogeny of Ichthyoplankton and juvenile fishes of Kuantan River in Malaysia.

The Leguminosae of Madagascar

Insect Molecular Genetics, Third Edition, summarizes and synthesizes two rather disparate disciplines—entomology and molecular genetics. This volume provides an introduction to the techniques and literature of molecular genetics; defines terminology; and reviews concepts, principles, and applications of these powerful tools. The world of insect molecular genetics, once dominated by Drosophila, has become much more diverse, especially with the sequencing of multiple arthropod genomes (from spider mites to mosquitoes). This introduction includes discussion of honey bees, mosquitoes, flour beetles, silk moths, fruit flies, aphids, house flies, kissing bugs, cicadas, butterflies, tsetse flies and armyworms. This book serves as both a foundational text and a review of a rapidly growing literature. With fully revised and updated chapters, the third edition will be a valuable addition to the personal libraries of entomologists, geneticists, and molecular biologists. Up-to-date references to important review articles, websites, and seminal citations in the disciplines Well crafted and instructive illustrations integral to explaining the techniques of molecular genetics Glossary of terms to help beginners learn the vocabulary of molecular biology

Insect Biodiversity

Biotechnology and Biology of Trichoderma serves as a comprehensive reference on the chemistry and biochemistry of one of the most important microbial agents, Trichoderma, and its use in an increased number of industrial bioprocesses for the synthesis of many biochemicals such as pharmaceuticals and biofuels. This book provides individuals working in the field of Trichoderma, especially biochemical engineers, biochemists and biotechnologists, important information on how these valuable fungi can contribute to the production of a wide range of products of commercial and ecological interest. Provides

a detailed and comprehensive coverage of the chemistry, biochemistry and biotechnology of Trichoderma, fungi present in soil and plants Includes most important current and potential applications of Trichoderma in bioengineering, bioprocess technology including bioenergy & biofuels, biopharmaceuticals, secondary metabolites and protein engineering Includes the most recent research advancements made on Trichoderma applications in plant biotechnology and ecology and environment

Next-Generation Genome Sequencing

A fully updated guide to the increasingly prevalent use of molecular data in ecological studies Molecular ecology is concerned with how molecular biology and population genetics may help us to better understand aspects of ecology and evolution including local adaptation, dispersal across landscapes, phylogeography, behavioral ecology, and conservation biology. As the technology driving genetic science has advanced, so too has this fast-moving and innovative discipline, providing important insights into virtually all taxonomic groups. This third edition of Molecular Ecology takes account of the breakthroughs achieved in recent years to give readers a thorough and up-to-date account of the field as it is today. New topics covered in this book include next-generation sequencing, metabarcoding, environmental DNA (eDNA) assays, and epigenetics. As one of molecular ecology's leading figures, author Joanna Freeland also provides those new to the area with a full grounding in its fundamental concepts and principles. This important text: Is presented in an accessible, user-friendly manner Offers a comprehensive introduction to molecular ecology Has been revised to reflect the field's most recent studies and research developments Includes new chapters covering topics such as landscape genetics, metabarcoding, and community genetics Rich in insights that will benefit anyone interested in the ecology and evolution of natural populations, Molecular Ecology is an ideal guide for all students and professionals who wish to learn more about this exciting field.

Plant DNA Fingerprinting and Barcoding

The Biology and Identification of the Coccidia (Apicomplexa) of Rabbits of the World is a taxonomic summation of a damaging intestinal parasite found in rabbits and transmissible to other species, including humans. This book conceptually and historically summarizes the world's literature on the parasite and also provides a quick guide to isolation procedures, identification, strategies for management, and available chemotherapy. It is a vital source of knowledge about coccidia's real and potential transmission to humans, which can lead to dangerous health problems, like severe dehydration, vomiting, lethargy and even death. Coccidiosis is an intestinal disease that affects several different animal species, including canines and humans, and is one of the most prevalent protozoal infections in North America. The causative agent is a protozoan that has the ability to multiply rapidly and cause major damage in the intestinal wall, rupturing the cells of the intestinal lining. The final stage, the oocyst, is extremely resistant to environmental stress and is difficult to completely remove from

the environment. Oocysts are frequent contaminants of feed and water and when the sporulated oocysts are ingested by other animals, they start the life cycle over in the new host. With the demand for rabbits in scientific research and for rabbit meat for human consumption increasingly globally each year, rabbits are of epidemiologic significance for laboratory workers, university researchers, veterinarians, pet owners, and breeders. Evaluates the scientific and scholarly merit of each of the publications written about coccidian from every rabbit species, providing a complete historical rendition A treatise for the identification of coccidia and their treatment as needed Written in a style that can be understood by most educated lay persons and laboratory workers Written by the first ranked author team among the world-class parasitologists who study coccidia Combined in one single source, this book follows the gold standards in coccidian biology and identification Brings all that information together in one volume and solves the problems faced by researchers, veterinarians, students and others in trying to find and navigate through this scattered literature

The Future of Fisheries Science in North America

Seafood Authenticity and Traceability: a DNA-based Pespective is a concise reference showcasing the latest developments in the field. Written for those in food authenticity who may not have a technical molecular biology background, the book covers methods used for DNA analysis and an overview of their applications in fish and seafood, also providing reviews of the technology and processes for each method. It offers a practical and succinct overview of the relationship between accurate identification, traceability, sustainability, and safety of seafood, including an overview of the supply chain and the industry's need for improved traceability. Presents current and future perspectives in the emerging field of traceability, including solid coverage of DNA analysis for origin detection Includes molecular authentication tools to improve species identification throughout the seafood industry Provides reviews of the technology and processes for each DNA analysis method Offers a comprehensive overview for those in food authenticity who may not have an in-depth molecular biology background

Biotechnology and Biology of Trichoderma

This book constitutes Part III of the refereed four-volume post-conference proceedings of the 4th IFIP TC 12 International Conference on Computer and Computing Technologies in Agriculture, CCTA 2010, held in Nanchang, China, in October 2010. The 352 revised papers presented were carefully selected from numerous submissions. They cover a wide range of interesting theories and applications of information technology in agriculture, including simulation models and decision-support systems for agricultural production, agricultural product quality testing, traceability and e-commerce technology, the application of information and communication technology in agriculture, and universal information service technology and service systems development in rural areas.

Diptera Diversity

DNA barcoding has become a well-accepted and popular tool for the identification of species and the detection of cryptic taxonomic diversity. As such, it has a tremendous potential for a wide variety of applications in taxonomy, agronomy, conservation biology, forensics etc. Therefore, several countries, institutions and organizations have launched DNA barcoding projects in the context of the international ?Consortium for the Barcode of Life? (CBOL) initiative. Also Belgium has done so with the establishment of the FWO research community ?Belgian Network for DNA barcoding?. In 2012, this network organized the ?Third European Conference for the Barcode of Life? (ECBOL3) in Brussels. During this event a call was made to publish a collection of papers under the thematic title ?DNA barcoding: a practical tool for fundamental and applied biodiversity research?. With the financial support of the EC project ?ViBRANT? (Virtual Biodiversity Research and Access Network for Taxonomy), 21 papers were bundled to form this special ?ZooKeys? issue with the aim to present various applications, advantages and limitations of DNA barcoding. Hence, it is the editors? hope that this issue provides a modest, but timely, contribution to the already vast literature on DNA barcoding.

Determining Mycotoxins and Mycotoxigenic Fungi in Food and Feed

Mycotoxins - toxic secondary metabolites produced by mycotoxigenic fungi – pose a significant risk to the food chain. Indeed, they may be the most hazardous of all food contaminants in terms of chronic toxicity and legislative limits on their levels in food and feed continue to be developed worldwide. Rapid and reliable methods for the determination of both mycotoxigenic fungi and mycotoxins in food and feed are therefore essential. This book reviews current and emerging methods in this area. Part one focuses on the essentials of mycotoxin determination, covering sampling, sample preparation and clean-up and key determination techniques, such as chromatographic separation, liquid chromatography-mass spectrometry and immunochemical methods. Part two then goes on to describe quality assurance, official methods and performance criteria for determining mycotoxins in food and feed. Topics covered include laboratory accreditation, method validation and measurement uncertainty. The development and analysis of biomarkers for mycotoxins are discussed in part three. Individual chapters focus on detecting exposure in humans and animals. Part four is concerned with the processes involved in determining mycotoxigenic fungi in food and feed. It also describes the identification of genes and gene clusters involved in mycotoxin synthesis, as well as DNA barcoding of toxigenic fungi. Finally, part five explores some of the emerging methods for mycotoxin analysis, ranging from bio-sensing to spectroscopic techniques. With its distinguished editor and international team of contributors, Determining mycotoxins and mycotoxigenic fungi in food and feed is a standard reference for all those concerned with reducing mycotoxin contamination in the food chain. Focuses on the essentials of mycotoxin determination, covering sampling, sample preparation, clean-up and key determination techniques Documents quality assurance and official methods and performance criteria for determining mycotoxins in food

and feed Explores the processes of determining mycotoxigenic fungi in food and feed including the identification of genes and gene clusters

Molecular Markers in Plants

More than two third of the surface area of our planet is covered by oceans and assessment of the marine biodiversity is a challenging task. With the increasing global population, there is a tendency to exploit marine recourses for food, energy and other requirements. This puts pressure on the fragile marine environment and needs sustainable conservation efforts. Marine species identification using traditional taxonomical methods are often burdened with taxonomic controversies. Here in this book we will discuss the comparatively new concept of DNA barcoding and its significance in marine perspective. This molecular technique can be helpful in the assessment of cryptic species which are widespread in marine environment, and can also be used to link the different life cycle stages to the adult which is difficult to accomplish in marine ecosystems. Other advantages of DNA barcoding include authentication and safety assessment of seafood, wildlife forensics, conservation genetics and detection of invasive alien species (IAS). Global DNA barcoding efforts in the marine habitat include MarBOL, CeDAMar, CMarZ, SHARK-BOL, etc. DNA barcoding of different marine groups ranging from the microbes to mammals is to be revealed. In conjugation with newer and faster techniques like high throughput sequencing, DNA barcoding is serving as an effective modern tool in marine biodiversity assessment and conservation.

Molecular Markers in Mycology

Encyclopedia of Evolutionary Biology is the definitive go-to reference in the field of evolutionary biology. It provides a fully comprehensive review of the field in an easy to search structure. Under the collective leadership of fifteen distinguished section editors, it is comprised of articles written by leading experts in the field, providing a full review of the current status of each topic. The articles are up-to-date and fully illustrated with in-text references that allow readers to easily access primary literature. While all entries are authoritative and valuable to those with advanced understanding of evolutionary biology, they are also intended to be accessible to both advanced undergraduate and graduate students. Broad topics include the history of evolutionary biology, population genetics, quantitative genetics; speciation, life history evolution, evolution of sex and mating systems, evolutionary biogeography, evolutionary developmental biology, molecular and genome evolution, coevolution, phylogenetic methods, microbial evolution, diversification of plants and fungi, diversification of animals, and applied evolution. Presents fully comprehensive content, allowing easy access to fundamental information and links to primary research Contains concise articles by leading experts in the field that ensures current coverage of each topic Provides ancillary learning tools like tables, illustrations, and multimedia features to assist with the comprehension process

Tumor Immunology and Immunotherapy – Molecular Methods

The Leguminosae of Madagascar is an encyclopaedic tour de force of one of the largest and most diverse families in the unique flora of Madagascar. Economic uses are explored in detail, with local names recorded along with habitats, distribution, flowering time, conservation status, and climate and soil type.

Computer and Computing Technologies in Agriculture IV

This is the first comprehensive synopsis of the biodiversity of Diptera, with chapters on all regional faunas, Diptera as ecological indicators, statistical techniques for estimating species diversity based on the known fauna, molecular tools and trends in digital publication.

Advances in Food Authenticity Testing

Volume Two of the new guide to the study of biodiversity in insects Volume Two of Insect Biodiversity: Science and Society presents an entirely new, companion volume of a comprehensive resource for the most current research on the influence insects have on humankind and on our endangered environment. With contributions from leading researchers and scholars on the topic, the text explores relevant topics including biodiversity in different habitats and regions, taxonomic groups, and perspectives. Volume Two offers coverage of insect biodiversity in regional settings, such as the Arctic and Asia, and in particular habitats including crops, caves, and islands. The authors also include information on historical, cultural, technical, and climatic perspectives of insect biodiversity. 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 examine the consequences that an increased loss of insect species will have on the world. This important text: Offers the most up-to-date information on the important topic of insect biodiversity Explores vital topics such as the impact on insect biodiversity through habitat loss and degradation and climate change With its companion Volume I, presents current information on the biodiversity of all insect orders Contains reviews of insect biodiversity in culture and art, in the fossil record, and in agricultural systems Includes scientific approaches and methods for the study of insect biodiversity The book offers scientists, academics, professionals, and students a guide for a better understanding of the biology and ecology of insects, highlighting the need to sustainably manage ecosystems in an ever-changing global environment.

The Vegetation and Physiography of Sumatra

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.

Dictionary of DNA and Genome Technology

“Biodiversity” refers to the variety of life. It is now agreed that there is a “biodiversity crisis”, corresponding to extinction rates of species that may be 1000 times what is thought to be “normal”. Biodiversity science has a higher profile than ever, with the new Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services involving more than 120 countries and 1000s of scientists. At the same time, the discipline is re-evaluating its foundations – including its philosophy and even core definitions. The value of biodiversity is being debated. In this context, the tree of life (“phylogeny”) is emerging as an important way to look at biodiversity, with relevance cutting across current areas of concern – from the question of resilience within ecosystems, to conservation priorities for globally threatened species – while capturing the values of biodiversity that have been hard to quantify, including resilience and maintaining options for future generations. This increased appreciation of the importance of conserving “phylogenetic diversity”, from microbial communities in the human gut to global threatened species, has inevitably resulted in an explosion of new indices, methods, and case studies. This book recognizes and responds to the timely opportunity for synthesis and sharing experiences in practical applications. The book recognizes that the challenge of finding a synthesis, and building shared concepts and a shared toolbox, requires both an appreciation of the past and a look into the future. Thus, the book is organized as a flow from history, concepts and philosophy, through to methods and tools, and followed by selected case studies. A positive vision and plan of action emerges from these chapters, that includes coping with inevitable uncertainties, effectively communicating the importance of this “evolutionary heritage” to the public and to policy-makers, and ultimately contributing to biodiversity conservation policy from local to global scales.

CRISPR in Animals and Animal Models

CRISPR in Animals and Animal Models, Volume 152, the latest release in the Progress in Molecular Biology and Translational Science series, explores the genome editing CRISPR system in cells and animal models, its applications, the uses of the CRISPR system, and the past, present and future of CRISPR genome editing. Topics of interest in this updated volume include a section on CRISPR history, The genome editing revolution, Programming CRISPR and its applications, CRISPR

Delivery methods, CRISPR libraries and screening, CRISPR investigation in haploid cells, CRISPR in the generation of transgenic animals, CRISPR therapeutics, and Promising strategies and present challenges. Accessible to students and researchers alike Written by leading authorities in the field

An Introduction to Ecological Genomics

The Kingdom fungi encompass a massive diversity of taxa with wide-ranging ecologies, life cycles, and morphologies ranging from unicellular aquatic chytrids to large mushrooms. Before molecular methods came in existence, taxonomists considered this Kingdom to be a member of the plant kingdom due to certain life styles like immobility and growth habitats. Molecular markers (also known as DNA markers), facilitated a better alternative method over traditional morphological methods, employed for the identification, characterization, and to understand the evolution of fungi. The morphological methods used for identification are mainly dependent on spore color or microscopic features whereas molecular markers are based on DNA polymorphism in the genomic organization. Phylogenetic studies reported in last decade, based on molecular markers, have reshaped the classification system of Kingdom fungi, which divided into one subkingdom, seven phyla, and ten subphyla. Recent advances in molecular mycology have opened the way for researchers to identify and characterize novel fungal species from unique environments. Mycology is concerned with the systematic study of fungi, including their genetic and biochemical properties, their use to humans as a source of medicine and food, as well as their dangers, such as poisoning and infections. In the 21st century with the development of DNA sequencing technologies and phylogenetic analysis based on molecular markers, new insights into fungal taxonomy were provided. This book contains a thorough discussion of molecular characterization and detection of different groups of fungi by using PCR-based markers and provides a comprehensive view of the applications and uses of different molecular markers in molecular mycology. It also addresses the recent molecular markers employed to solve the problems of identification and discusses current approaches used in molecular characterization and detection of fungi.

DNA Barcoding in Marine Perspectives

The genomics revolution has expanded from its origins in molecular biology to impact upon every discipline in the life sciences, including ecology. This new edition incorporates a balance of plant, animal, and microbial examples, and continues to define the new and exciting field of ecological genomics.

Nematology

DNA barcoding is a taxonomic method that uses a short genetic marker in an organism's DNA to identify it as belonging to a

particular species. It differs from molecular phylogeny in that the main goal is not to determine classification but to identify an unknown sample in terms of a known classification. Applications include, for example, identifying plant leaves even when flowers or fruit are not available, identifing the diet of an animal based on stomach contents or feces and identifying products in commerce (for example herbal supplements or wood).

Seafood Authenticity and Traceability

DNA technology is evolving rapidly, with new methods and a fast-growing vocabulary. This unique dictionary offers current, detailed and accessible information on DNA technology to lecturers, researchers and students throughout the biomedical and related sciences. The third edition is a major update, with over 3000 references from mainstream journals and data from the very latest research – going well beyond the remit of most science dictionaries. It provides clear explanations of terms, techniques, and tests, including commercial systems, with detailed coverage of many important procedures and methods, and includes essay-style entries on many major topics to assist newcomers to the field. It covers topics relevant to medicine (diagnosis, genetic disorders, gene therapy); veterinary science; biotechnology; biochemistry; pharmaceutical science/drug development; molecular biology; microbiology; epidemiology; genomics; environmental science; plant science/agriculture; taxonomy; and forensic science.

Molecular Pharmacognosy

DNA barcoding has become a well-accepted and popular tool for the identification of species and the detection of cryptic taxonomic diversity. As such, it has a tremendous potential for a wide variety of applications in taxonomy, agronomy, conservation biology, forensics etc. Therefore, several countries, institutions and organizations have launched DNA barcoding projects in the context of the international ?Consortium for the Barcode of Life? (CBOL) initiative. Also Belgium has done so with the establishment of the FWO research community ?Belgian Network for DNA barcoding?. In 2012, this network organized the ?Third European Conference for the Barcode of Life? (ECBOL3) in Brussels. During this event a call was made to publish a collection of papers under the thematic title ?DNA barcoding: a practical tool for fundamental and applied biodiversity research?. With the financial support of the EC project ?ViBRANT? (Virtual Biodiversity Research and Access Network for Taxonomy), 21 papers were bundled to form this special ?ZooKeys? issue with the aim to present various applications, advantages and limitations of DNA barcoding. Hence, it is the editors? hope that this issue provides a modest, but timely, contribution to the already vast literature on DNA barcoding.

New Horizons in Insect Science: Towards Sustainable Pest Management

Textbook of Molecular Biotechnology covers an amazing range of topics from the basic structure of the cell and diversity of microorganisms to the latest techniques in the field of biotechnology. Various topics have been included for the benefit of graduate and postgraduate students. In addition, the book will be of immense help for the researchers and can be used as a laboratory manual for various biotechnological techniques. A number of reputed subject experts, scientists, academicians, and researchers have contributed their chapters to this volume. This book describes the role of basic biotechnological tools in various spheres of human society, namely, agriculture, nutraceuticals, pharmaceuticals, nanobiotechnology, proteomics, metagenomics and Intellectual Property rights.

Insect Molecular Genetics

"Molecular Pharmacognosy" discusses the application of molecular biology in resource science and authentication of traditional Chinese medicine (TCM). This book reviews the latest developments in pharmacognosy, introduces a series of new views and insights, presents the hotspots and focus of the field of study on molecular pharmacognosy, and predicts a new direction of study on the resource science of TCM. Furthermore, the book also provides an open communications platform for the development of molecular pharmacognosy. This book is intended for biomedical scientists and researchers in the fields of molecular biology, traditional medicine and natural pharmaceutics. Professor Lu-qi Huang is Director of the Collaborating Centre of the World Health Organization for Traditional Medicine (Chinese Materia Medica) and Vice-Chairman of the Australia Chinese Association for Biomedical Sciences Inc.

Plant Genotyping

Advances in Food Authenticity Testing covers a topic that is of great importance to both the food industry whose responsibility it is to provide clear and accurate labeling of their products and maintain food safety and the government agencies and organizations that are tasked with the verification of claims of food authenticity. The adulteration of foods with cheaper alternatives has a long history, but the analytical techniques which can be implemented to test for these are ever advancing. The book covers the wide range of methods and techniques utilized in the testing of food authenticity, including new implementations and processes. The first part of the book examines, in detail, the scientific basis and the process of how these techniques are used, while other sections highlight specific examples of the use of these techniques in the testing of various foods. Written by experts in both academia and industry, the book provides the most up-to-date and comprehensive coverage of this important and rapidly progressing field. Covers a topic that is of great importance to both the food industry and the governmental agencies tasked with verifying the safety and authenticity of food products Presents a wide range of methods and techniques utilized in the testing of food authenticity, including new implementations and processes Highlights specific examples of the use of the emerging techniques and testing strategies for various foods

Species Concepts and Phylogenetic Theory

The ability to produce vast amounts of DNA sequence data has enabled the discovery of molecular markers in model organisms, crops, as well as orphan species making genotyping the rate limiting factor, and this volume focuses on the different markers available and the low to high throughput genotyping of these markers. Given the diverse nature of some of these systems, an overview is provided on the identification of markers from sequence data, as well as data analysis with example applications once the genotyping data has been generated. Written in the successful Methods in Molecular Biology series format, chapters include introductions to their respective topics, lists of the necessary materials and reagents, step-by-step, readily reproducible protocols, and notes on troubleshooting and avoiding known pitfalls. Authoritative and easily accessible, Plant Genotyping: Methods and Protocols is aimed at plant molecular biologists, geneticists, plant breeders and ecologists who have a target question and need to know the most suitable markers and genotyping system to use.

DNA barcoding: a practical tool for fundamental and applied biodiversity research

More than two third of the surface area of our planet is covered by oceans and assessment of the marine biodiversity is a challenging task. With the increasing global population, there is a tendency to exploit marine recourses for food, energy and other requirements. This puts pressure on the fragile marine environment and needs sustainable conservation efforts. Marine species identification using traditional taxonomical methods are often burdened with taxonomic controversies. Here in this book we will discuss the comparatively new concept of DNA barcoding and its significance in marine perspective. This molecular technique can be helpful in the assessment of cryptic species which are widespread in marine environment, and can also be used to link the different life cycle stages to the adult which is difficult to accomplish in marine ecosystems. Other advantages of DNA barcoding include authentication and safety assessment of seafood, wildlife forensics, conservation genetics and detection of invasive alien species (IAS). Global DNA barcoding efforts in the marine habitat include MarBOL, CeDAMar, CMarZ, SHARK-BOL, etc. DNA barcoding of different marine groups ranging from the microbes to mammals is to be revealed. In conjugation with newer and faster techniques like high throughput sequencing, DNA barcoding is serving as an effective modern tool in marine biodiversity assessment and conservation.

DNA Barcoding and Molecular Phylogeny

Invasion ecology is the study of the causes and consequences of the introduction of organisms to areas outside their native range. Interest in this field has exploded in the past few decades. Explaining why and how organisms are moved around the world, how and why some become established and invade, and how best to manage invasive species in the face of global change are all crucial issues that interest biogeographers, ecologists and environmental managers in all parts of the world.

This book brings together the insights of more than 50 authors to examine the origins, foundations, current dimensions and potential trajectories of invasion ecology. It revisits key tenets of the foundations of invasion ecology, including contributions of pioneering naturalists of the 19th century, including Charles Darwin and British ecologist Charles Elton, whose 1958 monograph on invasive species is widely acknowledged as having focussed scientific attention on biological invasions.

Molecular Ecology

A DNA barcode in its simplest definition is one or more short gene sequences taken from a standardized portion of the genome that is used to identify species through reference to DNA sequence libraries or databases. In DNA Barcodes: Methods and Protocols expert researchers in the field detail many of the methods which are now commonly used with DNA barcodes. These methods include the latest information on techniques for generating, applying, and analyzing DNA barcodes across the Tree of Life including animals, fungi, protists, algae, and plants. Written in the highly successful Methods in Molecular BiologyTM series format, the chapters include the kind of detailed description and implementation advice that is crucial for getting optimal results in the laboratory. Thorough and intuitive, DNA Barcodes: Methods and Protocols aids scientists in continuing to study methods from wet-lab protocols, statistical, and ecological analyses along with guides to future, large-scale collections campaigns.

DNA Barcodes

Molecular Markers in Plants surveys an array of technologies used in the molecular analysis of plants. The role molecular markers play in plant improvement has grown significantly as DNA sequencing and high-throughput technologies have matured. This timely review of technologies and techniques will provide readers with a useful resource on the latest molecular technologies. Molecular Markers in Plants not only reviews past achievements, but also catalogs recent advances and looks forward towards the future application of molecular technologies in plant improvement. Opening chapters look at the development of molecular technologies. Subsequent chapters look at a wide range of applications for the use of these advances in fields as diverse as plant breeding, production, biosecurity, and conservation. The final chapters look forward toward future developments in the field. Looking broadly at the field of molecular technologies, Molecular Markers in Plants will be an essential addition to the library of every researcher, institution, and company working in the field of plant improvement.

Phylogenetic Diversity

Tumor Immunology and Immunotherapy – Molecular Methods, Volume 629, the latest release in the Methods in Enzymology series, continues the legacy of this premier serial with quality chapters authored by leaders in the field. Chapters in this release include Droplet digital PCR for measuring circulating tumor-derived DNA, Detection and quantification of cytosolic DNA, Methods to detect endogenous dsRNA induction and recognition, Quantification of eIF2alpha phosphorylation during immunogenic cell death, Assessment of annexin A1 release during immunogenic cell death, Luciferase-assisted detection of extracellular ATP in the course of ICD, The P2X7 receptor: structure and function, and much more. Contains the authority of authors who are leaders in their field Provides a comprehensive source on new methods and research in enzymology

Encyclopedia of Evolutionary Biology

This handbook covers the broad scope of nanomedicine. Starting with the basics, the subject is developed to potential clinical applications, many of which are still at an experimental stage. The book features extensive coverage of nanodiagnostics and nanopharmaceuticals, which are two important components of nanomedicine. Written by a physician-scientist author who blends his clinical experience and scientific expertise in new technologies, this book provides a definitive account of nanomedicine. It offers more up-to-date and comprehensive coverage of nanomedicine than any other comparable work.