Mathematical Models In Population Biology And Epidemiology

Population BiologyIntroduction to Population BiologyPopulation Biology and EvolutionPopulation BiologyIntegrated Population Biology and Modeling, Part AMathematical Models in Population Biology and EpidemiologyEvolutionary Feedbacks Between Population Biology and Genome ArchitecturePrimer Of Population BiologyThe Evolution of Population BiologyPopulation BiologyApplied Population BiologyApplied Population BiologyIntroduction to Plant Population BiologyIntroduction to Population Biology & EvolutionPopulation BiologyPopulation BiologyPopulation Biology and EvolutionIntroduction to Population BiologyPOPULATION BIOLOGY AND EVOLUTION- PROCEEDINGS OF THE INTERNATIONAL SYMPOSIUM.Population Biology and Evolution Alan Hastings Dick Neal K. Wöhrmann Philip W. Hedrick Fred Brauer Tariq Ezaz Edward O. Wilson Rama S. Singh K. Wöhrmann S.K. Jain S.K. Jain Jonathan Silvertown Otto Thomas Solbrig Simon A. Levin K. Wöhrmann Richard C. Lewontin Dick Neal Population Biology Introduction to Population Biology Population Biology and Evolution Population Biology Integrated Population Biology and Modeling, Part A Mathematical Models in Population Biology and Epidemiology Evolutionary Feedbacks Between Population Biology and Genome Architecture Primer Of Population Biology The Evolution of Population Biology Population Biology Applied Population Biology Applied Population Biology Introduction to Plant Population Biology Introduction to Population Biology & Evolution Population Biology Population Biology Population Biology and Evolution Introduction to Population Biology POPULATION BIOLOGY AND EVOLUTION- PROCEEDINGS OF THE INTERNATIONAL SYMPOSIUM. Population Biology and Evolution *Alan Hastings Dick Neal K. Wöhrmann Philip W. Hedrick Fred Brauer Tariq Ezaz Edward O. Wilson Rama S. Singh K. Wöhrmann S.K. Jain S.K. Jain Jonathan Silvertown Otto Thomas Solbrig Simon A. Levin K. Wöhrmann Richard C. Lewontin Dick Neal*

population biology has been investigated quantitatively for many decades resulting in a rich body of scientific literature ecologists often avoid this literature being put off by its apparently formidable mathematics this textbook provides an introduction to the biology and ecology of populations by

emphasizing the roles of simple mathematical models in explaining the growth and behavior of populations the author only assumes acquaintance with elementary calculus and provides tutorial explanations where needed to develop mathematical concepts examples problems extensive marginal notes and numerous graphs enhance the book s value to students in classes ranging from population biology and population ecology to introductory courses in ecology

provides a quantitative and darwinian perspective on population biology with problem sets simulations and worked examples to aid the student

this volume contains the papers presented at a symposium on popula tion biology sponsored by the deutsche forschungsgemeinschaft it was held at the guest house of the university of ttibingen at oberjoch on may 15 19 1983 prior to this conference a small group of european biologists had met in berlin june 1981 and pavia september 1982 to discuss re search problems on the borderline between population genetics and evolutionary ecology from the contributions and discussions at these meetings it became evident that the unification of approaches to evolutionary problems in population genetics and evolutionary ecology has not yet been suc cessful and requires further efforts it was the consensus that a larger symposium with international participation would be helpful to con front and discuss the different approaches to population biology in order to assess where we are now and where we should be going as a result an organizational committee was formed f christiansen s jayakar v loeschcke w scharloo and k w6hrmann to iden tify topics that seemed at least to them to be fruitful in tackling problems in population biology consequently a number of colleagues were asked to participate in the meeting we have divided this book into chapters corresponding to the eight topics chosen the volume begins with the relation between genotype and phenotype and is followed by a chapter on quantitative genetics and selection in natural populations

integrated population biology and modeling part a offers very complex and precise realities of quantifying modern and traditional methods of understanding populations and population dynamics chapters cover emerging topics of note including longevity dynamics modeling human environment interactions survival probabilities from 5 year cumulative life table survival ratios tx 5 tx some innovative methodological investigations cell migration models evolutionary dynamics of cancer cells an integrated approach for modeling of coastal lagoons a case for chilka lake india population and metapopulation dynamics mortality analysis measures and models stationary

population models are there biological and social limits to human longevity probability models in biology stochastic models in population biology and more covers emerging topics of note in the subject matter presents chapters on longevity dynamics modeling human environment interactions survival probabilities from 5 year cumulative life table survival ratios tx 5 tx and more

the goal of this book is to search for a balance between simple and analyzable models and unsolvable models which are capable of addressing important questions on population biology part i focusses on single species simple models including those which have been used to predict the growth of human and animal population in the past single population models are in some sense the building blocks of more realistic models the subject of part ii their role is fundamental to the study of ecological and demographic processes including the role of population structure and spatial heterogeneity the subject of part iii this book which will include both examples and exercises is of use to practitioners graduate students and scientists working in the field

this ebook presents all 10 articles published under the frontiers research topic evolutionary feedbacks between population biology and genome architecture edited by scott v edwards and tariq ezaz with the rise of rapid genome sequencing across the tree of life challenges arise in understanding the major evolutionary forces influencing the structure of microbial and eukaryotic genomes in particular the prevalence of natural selection versus genetic drift in shaping those genomes additional complexities in understanding genome architecture arise with the increasing incidence of interspecific hybridization as a force for shaping genotypes and phenotypes a key paradigm shift facilitating a more nuanced interpretation of genomes came with the rise of the nearly neutral theory in the 1970s followed by a greater appreciation for the contribution of nonadaptive forces such as genetic drift to genome structure in the 1990s and 2000s the articles published in this ebook grapple with these issues and provide an update as to the ways in which modern population genetics and genome informatics deepen our understanding of the subtle interplay between these myriad forces from intraspecific to macroevolutionary studies population biology and population genetics are now major tools for understanding the broad landscape of how genomes evolve across the tree of life this volume is a celebration across diverse taxa of the contributions of population genetics thinking to genome studies we hope it spurs additional research and clarity in the ongoing search for rules governing the evolution of genomes

how to learn population biology population genetics ecology biogeography species equilibrium theory

this collection of essays considers the foundation and historical development of population biology and its relationship to population genetics and population ecology it also considers its relationship to the rapidly growing fields of molecular quantitative genetics genomics and bioinformatics although set in historical context the volume s up to date coverage of relevant material reveals the central role of population biology in all aspects of its connection to population genetics and population ecology

fascinated by the diversity of living organisms humans have always been curious about its origin darwin was the first to provide the scholary and persuasive thesis for gradual evolution and speciation under natural selection although we now have much information on evolution we still don t understand it in detail many questions still remain open due to the complexity and multiplicity of interacting factors several approaches mainly arising from population ecology and genetics are presented in this book in order to help understand genetic variation and evolution

an increasing variety of biological problems involving resource management conservation and environmental quality have been dealt with using the principles of population biology defined to include population dynamics genetics and certain aspects of community ecology there appears to be a mixed record of successes and failures and almost no critical synthesis or reviews that have attempted to discuss the reasons and ways in which population biology with its remarkable theoretical as well as experimental advances could find more useful application in agriculture forestry fishery medicine and resource and environmental management this book provides examples of state of the art applications by a distinguished group of researchers in several fields the diversity of topics richly illustrates the scientific and economic breadth of their discussions as well as epistemological and comparative analyses by the authors and editors several principles and common themes are emphasized and both strengths and potential sources of uncertainty in applications are discussed this volume will hopefully stimulate new interdisciplinary avenues of problem solving research

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this completely revised fourth edition of introduction to plant population biology continues the approach taken by its highly successful predecessors ecological and genetic principles are introduced and theory is made accessible by clear accurate exposition with plentiful examples models and theoretical arguments are developed gradually requiring a minimum of mathematics the book emphasizes the particular characteristics of plants that affect their population biology and evolutionary questions that are particularly relevant for plants wherever appropriate it is shown how ecology and genetics interact presenting a rounded picture of the population biology of plants topics covered include variation and its inheritance genetic markers including molecular markers plant breeding systems ecological genetics intraspecific interactions population dynamics regional dynamics and metapopulations competition and coexistence and the evolution of breeding systems and life history an extensive bibliography provides access to the recent literature that will be invaluable to students and academics alike effective integration of plant population ecology population genetics and evolutionary biology the new edition is thoroughly revised and now includes molecular techniques the genetics chapters have been completely rewritten by a new co author deborah charlesworth

the lecture notes contained in this volume were presented at the ams short course on population biology held august 6 7 1983 in albany new york in conjunction with the summer meeting of the american mathematical society these notes will acquaint the reader with the mathematical ideas that pervade almost every level of thinking in population biology and provide an introduction to the many applications of mathematics in the field research mathematicians college teachers of mathematics and graduate students all should find this book of interest population biology is probably the oldest area in mathematical biology but remains a constant source of new mathematical problems and the area of biology best integrated with mathematical theory the need for mathematical approaches has never been greater as evolutionary theory is challenged by new interpretations of the paleontological record and

new discoveries at the molecular level as world resources for feeding populations become limiting as the problems of pollution increase and as both animal and plant epidemiological problems receive closer scrutiny a background of advanced calculus introduction to ordinary and partial differential equations and linear algebra will make the book accessible all of the papers included have high research value a list of the contents follows

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how do plant and animal populations change genetically to evolve and adapt to their local environments how do populations grow and interact with one another through competition and predation how does behaviour influence ecology and evolution this second edition of dick neal s unique textbook on population biology addresses these questions and offers a comprehensive analysis of evolutionary theory in the areas of ecology population genetics and behaviour taking a quantitative and darwinian perspective neal uses mathematical models to develop the basic theory of population processes key features in this edition include new chapters on inbreeding and species interactions and community structure a modified structure in part ii more recent empirical examples to illustrate the application of theoretical models to the world around us and end of chapter problems to help students with self assessment a series of spreadsheet simulations have also been conveniently located online for students to further improve their understanding of such models

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