

Evolutionary Ecology

The development of molecular tools has dramatically increased our knowledge of parasite diversity and the vectors that transmit them. From viruses and protists to arthropods and helminths, each branch of the Tree of Life offers an insight into significant, yet cryptic, biodiversity. Alongside this, the studies of host-parasite interactions and parasitism have influenced many scientific disciplines, such as biogeography and evolutionary ecology, by using comparative methods based on phylogenetic information to unravel shared evolutionary histories. Parasite Diversity and Diversification brings together two active fields of research, phylogenetics and evolutionary ecology, to reveal and explain the patterns of parasite diversity and the diversification of their hosts. This book will encourage students and researchers in the fields of ecology and evolution of parasitism, as well as animal and human health, to integrate phylogenetics into the investigation of parasitism in evolutionary ecology, health ecology, medicine and conservation.

The Evolutionary Ecology of Invasive Species offers new insights into the mechanisms that underlie rapid evolution in these species. The book provides a comprehensive overview of achievements in the field during the boom of information over the past two decades and includes discussions of possible future directions for the study of evolution in invasive species. Written by an international expert in invasion ecology, population genetics, and evolutionary biology, the book

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explores the roles of preadaptation, phenotypic plasticity, selection, and stochastic processes in driving rapid evolution. The book draws insights from a wide spectrum of invasive microbes, plants, and animals, covering many of the planet's biogeographic regions and discusses the evolutionary consequences for native species in response to biological invasions. A valuable resource to researchers and students in evolutionary biology, invasive species biology, and global change biology, this text suggests future research directions related to the evolutionary biology, impacts, and management of invasive species. Highlights the most recent advances and developments in using evolutionary principles to study and manage invasive species Offers new and often overlooked insights in processes that govern rapid evolution Discusses key stages of population demography that underlie rapid evolutionary change in invasive species, including their introduction, naturalisation, and dispersal

This text provides a concise and readable introduction to evolutionary ecology, a field of questions united by the intermix of evolutionary and ecological knowledge.

The first book-length exploration of behavioral mechanisms in evolutionary ecology, this ambitious volume illuminates long-standing questions about cause-and-effect relations between an animal's behavior and its environment. By focusing on biological mechanisms—the sum of an animal's cognitive, neural, developmental, and hormonal processes—leading researchers demonstrate how the integrated study of animal physiology, cognitive processes, and social interaction can yield an enriched

understanding of behavior. With studies of species ranging from insects to primates, the contributors examine how various animals identify and use environmental resources and deal with ecological constraints, as well as the roles of learning, communication, and cognitive aspects of social interaction in behavioral evolution. Taken together, the chapters demonstrate how the study of internal mechanistic foundations of behavior in relation to their ecological and evolutionary contexts and outcomes provides valuable insight into such behaviors as predation, mating, and dispersal. Behavioral Mechanisms in Evolutionary Ecology shows how a mechanistic approach unites various levels of biological organization to provide a broader understanding of the biological bases of behavioral evolution.

The Life of David Lack

Evolutionary Behavioral Ecology

The Evolutionary Ecology of Information Processing and Decision Making

Micromammals and Macroparasites

Cognitive Ecology

This book provides an up-to-date review of the biology of myxozoans, which represent a divergent clade of endoparasitic cnidarians. Myxozoans are of fundamental interest in understanding how early diverging metazoans have adopted parasitic lifestyles, and are also of considerable economic and ecological concern as endoparasites of fish.

Synthesizing recent research, the chapters explore issues such as myxozoan origins; evolutionary trends and diversification; development and life cycles; interactions with hosts; immunology; disease ecology; the impacts of climate change on disease; risk assessment; emerging diseases; and disease mitigation. This comprehensive work will appeal to a wide readership, from invertebrate zoologists, evolutionary biologists and developmental biologists to ecologists and parasitologists. It will also be of great practical interest to fisheries and conservation biologists. The identification of key areas for future research will appeal to scientists at all levels.

Evolutionary Ecology simultaneously unifies conceptual and empirical advances in evolutionary ecology and provides a volume that can be used as either a primary textbook or a supplemental reading in an advanced undergraduate or graduate course. The focus of the book is on current concepts in evolutionary ecology, and the empirical study of these concepts. The editors have assembled a group of prominent biologists who have made significant contributions to this field. They both synthesize the current state of knowledge and identify areas for

future investigation. Evolutionary Ecology will be of general interest to researchers and students in both ecology and evolutionary biology. Researchers in evolutionary ecology that want an overview of the current state of the field, and graduate students that want an introduction the field, will find this book very valuable. This volume can also be used as a primary textbook or supplemental reading in both upper division and graduate courses/seminars in Evolutionary Ecology. Parasites have evolved independently in numerous animal lineages, and they now make up a considerable proportion of the biodiversity of life. Not only do they impact humans and other animals in fundamental ways, but in recent years they have become a powerful model system for the study of ecology and evolution, with practical applications in disease prevention. Here, in a thoroughly revised and updated edition of his influential earlier work, Robert Poulin provides an evolutionary ecologist's view of the biology of parasites. He sets forth a comprehensive synthesis of parasite evolutionary ecology, integrating information across scales from the features of individual parasites to the dynamics of parasite populations and the structuring of parasite

communities. *Evolutionary Ecology of Parasites* presents an evolutionary framework for the study of parasite biology, combining theory with empirical examples for a broader understanding of why parasites are as they are and do what they do. An up-to-date synthesis of the field, the book is an ideal teaching tool for advanced courses on the subject. Pointing toward promising directions and setting a research agenda, it will also be an invaluable reference for researchers who seek to extend our knowledge of parasite ecology and evolution.

In *Alien Species and Evolution*, biologist George W. Cox reviews and synthesizes emerging information on the evolutionary changes that occur in plants, animals, and microbial organisms when they colonize new geographical areas, and on the evolutionary responses of the native species with which alien species interact. The book is broad in scope, exploring information across a wide variety of taxonomic groups, trophic levels, and geographic areas. It examines theoretical topics related to rapid evolutionary change and supports the emerging concept that species introduced to new physical and biotic environments are particularly prone to rapid evolution. The author draws on examples

from all parts of the world and all major ecosystem types, and the variety of examples used gives considerable insight into the patterns of evolution that are likely to result from the massive introduction of species to new geographic regions that is currently occurring around the globe. *Alien Species and Evolution* is the only state-of-the-art review and synthesis available of this critically important topic, and is an essential work for anyone concerned with the new science of invasion biology or the threats posed by invasive species.

Theory of Population Genetics and Evolutionary Ecology

Goldenrods, Gallmakers, and Natural Enemies

Evolutionary Ecology of Parasites

Approaches to Plant Evolutionary Ecology

The Evolutionary Ecology of Ant-Plant Mutualisms

Conceptual Breakthroughs in Evolutionary Ecology Academic Press

This is a reprint of a classic which synthesizes population, genetics, and population genetics to form one of the first books on evolutionary ecology. Written by one of the foremost authorities in the field, it is designed as an introduction useful to readers at various levels from diverse

backgrounds. It features balanced, readable coverage of both elementary and advanced topics that are essential to those interested in evolutionary biology, ecology, animal behavior, sociobiology, and paleobiology. *Ecology and Evolution of Cancer* is a timely work outlining ideas that not only represent a substantial and original contribution to the fields of evolution, ecology, and cancer, but also goes beyond by connecting the interfaces of these disciplines. This work engages the expertise of a multidisciplinary research team to collate and review the latest knowledge and developments in this exciting research field. The evolutionary perspective of cancer has gained significant international recognition and interest, which is fully understandable given that somatic cellular selection and evolution are elegant explanations for carcinogenesis. Cancer is now generally accepted to be an evolutionary and ecological process with complex interactions between tumor cells and their environment sharing many similarities with organismal evolution. As a critical contribution to this field of research the book is important and relevant for the applications of evolutionary biology to understand the origin of cancers, to control neoplastic progression, and to prevent therapeutic failures. Covers all aspects of the evolution of cancer, appealing to researchers seeking to understand its origins and effects of treatments on its progression,

as well as to lecturers in evolutionary medicine Functions as both an introduction to cancer and evolution and a review of the current research on this burgeoning, exciting field, presented by an international group of leading editors and contributors Improves understanding of the origin and the evolution of cancer, aiding efforts to determine how this disease interferes with biotic interactions that govern ecosystems Highlights research that intends to apply evolutionary principles to help predict emergence and metastatic progression with the aim of improving therapies

""à required reading for anyone interested in the economy, ecology, and demography of human societies."" --American Journal of Human

Biology ""This excellent book can serve both as a text¹/₄book and as a scholarly reference."" --American Scientist

Discovering Evolutionary Ecology

Parasitoids

Evolutionary Ecology and Human Behavior

Evolutionary Ecology, Behaviour, and

Conservation

From Individuals to Communities

Predator-prey interactions are ubiquitous, govern the flow of energy up trophic levels, and strongly influence the structure of ecological systems. They are typically quantified using the functional response - the relationship between a predator's foraging rate and the availability of food. As such, the functional response is central to how all ecological communities function - since all communities contain foragers - and a principal driver of the abundance, diversity, and dynamics of ecological communities. The functional response

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also reflects all the behaviors, traits, and strategies that predators use to hunt prey and that prey use to evade predation. It is thus both a clear reflection of past evolution, including predator-prey arms races, and a major force driving the future evolution of both predator and prey. Despite their importance, there have been remarkably few attempts to synthesize or even briefly review functional responses. This novel and accessible book fills this gap, clearly demonstrating their crucial role as the link between individuals, evolution, and community properties, representing a highly-integrated and measurable aspect of ecological function. It provides a clear entry point for students, a refresher for more advanced researchers, and a motivator for future research. *Predator Ecology* is an advanced textbook suitable for graduate students and researchers in ecology and evolutionary biology seeking a broad, up-to-date, and authoritative coverage of the field. It will also be of relevance and use to mathematical ecologists, wildlife biologists, and anyone interested in predator-prey interactions.

From the ancient origins of the proboscideans to the crisis of the living elephants, this book synthesizes the behavior, ecology and conservation of elephants, while covering also the history of human interactions with elephants. It is useful for biologists, field ecologists, wildlife administrators, historians, and conservationists. *Evolutionary Behavioral Ecology* presents a comprehensive treatment of the evolutionary and ecological processes shaping behavior across a wide array of organisms and a diverse set of behaviors and is suitable as a graduate-level text and as a sourcebook for professional scientists.

Text suitable for a variety of courses at the advanced undergraduate and beginning graduate levels explores the questions at the heart of evolutionary ecology: the origin and maintenance of the diversity of organisms, the pressures that determine their form and shape their behavior, and the way in which they interact. With some 140 illustrations and drawings, and some 1,100 references. Annotation

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Second Edition

The Trinidadian Guppy

Evolutionary Ecology of Freshwater Animals

Alien Species and Evolution

The Evolutionary Ecology of Animals

Plant-herbivore interactions are a central topic in evolutionary ecology. Historically, their study has been a cornerstone for coevolutionary theory. Starting from classic ecological studies at the phenotypic level, it has since expanded to molecular and genomic approaches. After a historical perspective, the book's subsequent chapters cover a wide range of topics: from populations to ecosystems; plant- and herbivore-focused studies; in natural and in man-modified ecosystems; and both micro- and macro-evolutionary levels. All chapters include valuable background information and empirical evidence. Given its scope, the book will be of interest to both students and researchers, and will hopefully stimulate further research in this exciting field of evolutionary biology.

Evolutionary Community Ecology develops a unified framework for understanding the structure of ecological communities and the dynamics of natural selection that shape the evolution of the species inhabiting them. All species engage in interactions with many other species, and these interactions regulate their abundance, define their trajectories of natural selection, and shape their movement decisions. Mark McPeck synthesizes the ecological and evolutionary dynamics generated by species interactions that structure local biological communities and regional metacommunities. McPeck explores the ecological performance characteristics needed for invasibility and coexistence of species in complex networks of species interactions. This species interaction framework is then extended to examine the ecological dynamics of natural

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selection that drive coevolution of interacting species in these complex interaction networks. The models of natural selection resulting from species interactions are used to evaluate the ecological conditions that foster diversification at multiple trophic levels. Analyses show that diversification depends on the ecological context in which species interactions occur and the types of traits that define the mechanisms of those species interactions. Lastly, looking at the mechanisms of speciation that affect species richness and diversity at various spatial scales and the consequences of past climate change over the Quaternary period, McPeck considers how metacommunity structure is shaped at regional and biogeographic scales. Integrating evolutionary theory into the study of community ecology, Evolutionary Community Ecology provides a new framework for predicting how communities are organized and how they may change over time.

How does the environment shape the ways an animal processes information and makes decisions? How do constraints imposed on nervous systems affect an animal's activities? To help answer these questions, Cognitive Ecology integrates evolutionary ecology and cognitive science, demonstrating how studies of perception, memory, and learning can deepen our understanding of animal behavior and ecology. Individual chapters consider such issues as the evolution of learning and its influence on behavior; the effects of cognitive mechanisms on the evolution of signaling behavior; how neurobiological and evolutionary processes have shaped navigational activities; functional and mechanical explanations for altered behaviors in response to changing environments; how foragers make decisions and how these decisions are influenced by the risks of predation; and how cognitive mechanisms affect partner choice. Cognitive Ecology will

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encourage biologists to consider how animal cognition affects behavior, and will also interest comparative psychologists and cognitive scientists.

This important work is the first broad and thorough treatment of the subject of ant-plant mutualisms.

Myxozoan Evolution, Ecology and Development

The Evolutionary Ecology of Exotic Plants, Animals, Microbes, and Interacting Native Species

Evolutionary Ecology of Plant-Herbivore Interaction

Predator Ecology

While translating this book, I was in close communication with the author, S. S. Shvarts (Schwarz), who read and commented on the entire translated manuscript. In particular, any ambiguities as to the identity of organisms described only by common names in the original text were removed, because the author kindly supplied the Latin names in all such cases. Common names are retained in the translation, but the Latin names are also added where needed. Some of the terminology used in the Russian is a transliteration from English words employed now more by European workers than Americans. I have defined these terms or noted their more common equivalents used in current American literature where it seemed useful in the text. A final chapter, "Recent Work on the Evolutionary Ecology of Ani

mals," is presented as Appendix II to the translation of the original text. I have written this chapter in order to update the material presented in the original edition published in 1969. The chapter discusses important recent contributions relevant to the subject matter presented by Shvarts. I would like to thank W. Z. Lidicker, Jr., and Y. B. Linhart for reading this final chapter and providing very helpful suggestions and comments. I am particularly grateful to the author, S. S. Shvarts, for his careful reading of the translated manuscript. Cognitive Ecology lays the foundations for a field of study that integrates theory and data from evolutionary ecology and cognitive science to investigate how animal interactions with natural habitats shape cognitive systems, and how constraints imposed on nervous systems limit or bias animal behavior. Using critical literature reviews and theoretical models, the contributors provide new insights and raise novel questions about the adaptive design of specific brain capacities and about optimal behavior subject to the computational capabilities of brains.

In a work that will interest researchers in ecology, genetics, botany, entomology, and parasitology, Warren Abrahamson and Arthur Weis present the results of more than twenty-

*five years of studying plant-insect interactions. Their study centers on the ecology and evolution of interactions among a host plant, the parasitic insect that attacks it, and the suite of insects and birds that are the natural enemies of the parasite. Because this system provides a model that can be subjected to experimental manipulations, it has allowed the authors to address specific theories and concepts that have guided biological research for more than two decades and to engage general problems in evolutionary biology. The specific subjects of research are the host plant goldenrod (*Solidago*), the parasitic insect *Eurosta solidaginis* (Diptera: Tephritidae) that induces a gall on the plant stem, and a number of natural enemies of the gallfly. By presenting their detailed empirical studies of the *Solidago-Eurosta* natural enemy system, the authors demonstrate the complexities of specialized enemy-victim interactions and, thereby, the complex interactive relationships among species more broadly. By utilizing a diverse array of field, laboratory, behavioral, genetic, chemical, and statistical techniques, Abrahamson and Weis present the most thorough study to date of a single system of interacting species. Their interest in the*

evolutionary ecology of plant-insect interactions leads them to insights on the evolution of species interactions in general. This major work will interest anyone involved in studying the ways in which interdependent species interact.

This book introduces the rapidly growing field of plant evolutionary ecology. It summarizes and synthesizes much primary literature, providing a historical context for the study of populations. It also examines both traditional (common gardens, reciprocal transplants) and modern (molecular genetic) approaches used to address questions about adaptation to abiotic and biotic factors.

Evolutionary Ecology of the Functional Response

Theoretical Evolutionary Ecology

Evolutionary Ecology Meets Phylogenetics

Avoiding Attack

Ecology and Evolution of Cancer

This classic text presents a unique evolutionary approach to ecology. The entire text has been improved, updated, and extensively reorganized and a new chapter (16) has been added. The Sixth Edition reflects the extent to which humans now dominate ecosystems, with anthropogenic (human) effects

interwoven into every chapter.

Evolutionary ecology is the study of how natural selection has moulded the major adaptive ecological and behavioural traits of plants and animals. This book covers the topics of major interest in contemporary research - life-history evolution, optimal foraging, kin selection and inclusive fitness, the evolution of sex, the sex ratio, sexual selection and the application of game theory to evolutionary problems. It provides an account of the theoretical models underpinning our understanding of evolutionary adaptation.

Parasites evolve under selective pressures which are different from those acting on free-living organisms. The aim of this textbook is to present these pressures and to show how they have shaped the ecology of parasites over evolutionary time. Broad theoretical concepts are explained simply and clearly and illustrated throughout with example organisms. The book will be an invaluable text for advanced undergraduate biologists who are studying evolutionary biology,

ecology, population biology, parasitology and evolutionary ecology. It will also prove to be a valuable reference to postgraduate students and researchers in the same fields.

This book presents a broad view of contemporary research in evolutionary plant ecology. It illustrates the broad spectrum of life history stages which affect plant reproductive success in some fashion.

**From Evolutionary Ecology to Management
An Introduction**

**Behavioral and Evolutionary Ecology
Parasite Diversity and Diversification
The Evolutionary Ecology of Crypsis,
Warning Signals and Mimicry**

This book provides a comprehensive survey of the diversity and biology of metazoan parasites affecting small mammals, of their impact on host individuals and populations, and of the management implications of these parasites for conservation biology and human welfare. Designed for a broad, multidisciplinary audience, the book is an essential resource for researchers, students, and practitioners alike.

Evolutionary ecology includes aspects of community structure, trophic interactions,

life-history tactics, and reproductive modes, analyzed from an evolutionary perspective. Freshwater environments often impose spatial structure on populations, e.g. within large lakes or among habitat patches, facilitating genetic and phenotypic divergence. Traditionally, freshwater systems have featured prominently in ecological research and population biology. This book brings together information on diverse freshwater taxa, with a mix of critical review, synthesis, and case studies. Using examples from bryozoans, rotifers, cladocerans, molluscs, teleosts and others, the authors cover current conceptual issues of evolutionary ecology in considerable depth. The book can serve as a source of critically evaluated ideas, detailed case studies, and open problems in the field of evolutionary ecology. It is recommended for students and researchers in ecology, limnology, population biology, and evolutionary biology. Although biologists recognize evolutionary ecology by name, many only have a limited understanding of its conceptual roots and historical development. Conceptual Breakthroughs in Evolutionary Ecology fills that knowledge gap in a thought-provoking and readable format. Written by a world-

renowned evolutionary ecologist, this book embodies a unique blend of expertise in combining theory and experiment, population genetics and ecology. Following an easily-accessible structure, this book encapsulates and chronologizes the history behind evolutionary ecology. It also focuses on the integration of age-structure and density-dependent selection into an understanding of life-history evolution. Covers over 60 seminal breakthroughs and paradigm shifts in the field of evolutionary biology and ecology Modular format permits ready access to each described subject Historical overview of a field whose concepts are central to all of biology and relevant to a broad audience of biologists, science historians, and philosophers of science

The Trinidadian guppy represents a uniquely tractable vertebrate system, which has raised key questions in evolutionary ecology and supplied many of the answers. This work discusses this study and incorporates significant new findings and insights.

The Living Elephants

Behavioral Mechanisms in Evolutionary Ecology

The Evolutionary Ecology of Invasive Species

An Introduction to Evolutionary Ecology

Conceptual Breakthroughs in Evolutionary Ecology

Parasitoids lay their eggs on or in the bodies of other species of insect, and the parasitoid larvae develop by feeding on the host, causing its eventual death. Known for a long time to applied biologists for their importance in regulating the population densities of economic pests, parasitoids have recently proven to be valuable tools in testing many aspects of evolutionary theory. This book synthesizes the work of both schools of parasitoid biology and asks how a consideration of evolutionary biology can help us understand the behavior, ecology, and diversity of the approximately one to two million species of parasitoid found on earth. After a general introduction to parasitoid natural history and taxonomy, the first part of the book treats the different components of the reproductive strategy of parasitoids: searching for a host, host selection, clutch size, and the sex ratio. Subsequent chapters discuss pathogens and non-Mendelian genetic elements that affect sexual reproduction; evolutionary aspects of the physiological interactions between parasitoid and host; mating strategies; life history theory and community ecology. A special effort is made to discuss the theoretical background to the subject, but

without the use of mathematics.

Most people who have taken a biology course in the past 50 years are familiar with the work of David Lack, but few remember his name. Almost all general biology texts produced during that period have a figure showing the beak size differences among the finches of the Galapagos Islands from Lack's 1947 classic, Darwin's Finches. Lack's pioneering conclusions in Darwin's Finches mark the beginning of a new scientific discipline, evolutionary ecology. Tim Birkhead, in his acclaimed book, The Wisdom of Birds, calls Lack the 'hero of modern ornithology.' Who was this influential, yet relatively unknown man? The Life of David Lack, Father of Evolutionary Ecology provides an answer to that question based on Ted Anderson's personal interviews with colleagues, family members and former students as well as material in the extensive Lack Archive at Oxford University.

This book discusses the evolution of the mechanisms by which prey avoid attack by their potential predators and questions how such defences are maintained through natural selection. Topics covered include camouflage, warning signals and mimicry. This book celebrates the guppy's unique contribution to evolutionary ecology. Ever since Caryl Haskins described guppy

populations as a 'natural experiment' because of the way predation pressure varies over a small geographical area, generations of researchers have been drawn to Trinidad to investigate evolution in the wild. The species continues to provide classic examples of natural selection in action and elegantly illustrates how ecology, evolution, and behaviour are interlinked. Anne Magurran's account of the evolutionary ecology of the guppy integrates historical breakthroughs with new research in this fast-moving field. She reveals how guppies provided some of the first evidence of sperm competition and sexual selection, and how they continue to inform scientific thought on mating systems and cryptic choice. The consequences of variation in predation risk—as well as a host of other biotic and abiotic factors—are described and evaluated at all life stages from conception to death. The book discusses behavioural responses to ecological conditions alongside life history patterns. It examines the potential for ecological speciation and discusses new research into how reproductive isolating mechanisms become established in promiscuous mating systems. Conservation issues are also considered, both in terms of protecting the irreplaceable Trinidadian guppy system and in the context of invasion

ecology. This timely synthesis of research into a species that has raised key questions in evolutionary ecology will be of great interest to graduate level students as well as professional researchers in the fields of behavioural ecology and evolutionary biology.

Father of Evolutionary Ecology

Concepts and Case Studies

The Evolutionary Ecology Of Plants

Evolutionary Ecology

Evolutionary Community Ecology