

Sex Color And Mate Choice In Guppies Anne E Houde

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Levels of Selection in Evolution - Laurent Keller
2019-12-31

Ever since the groundbreaking work of George Williams, W. D. Hamilton, and Richard Dawkins, evolutionary biologists have recognized that natural selection generally does not operate for the good of the group, but rather for the good of lower-level units such as the individual, the cell, even the gene. One of the fundamental problems of biology is: what keeps competition between these various levels of natural selection from destroying the common interests to be gained from cooperation? In this volume twelve prominent scientists explore this question, presenting a comprehensive survey of the current theoretical and empirical research in evolutionary biology. Recent studies show that at many levels of biological organization, mechanisms have evolved to prevent potential conflict in natural selection. Editor Laurent Keller's aim in this book is to bring together leading researchers from all biological disciplines to outline these potential conflicts and discuss how they are resolved. A multi-level approach of this kind allows important insights into the evolution of life, as well as bridging the long-standing conceptual chasm between molecular and organismal biologists. The chapters here follow a rigorous theoretical framework, giving the book an overall synergy that is unique to multi-authored books. The contributors, in addition to the editor, are H. Charles J. Godfray, Edward Allen Herre, Dawn M. Kitchen, Egbert Giles Leigh, Jr., Catherine M. Lessells, Richard E. Michod, Leonard Nunney, Craig Packer, Andrew Pomiankowski, H. Kern Reeve, John Maynard Smith, and Eörs Szathmáry.

Social Foraging Theory - Luc-Alain Giraldeau
2018-06-05

Although there is extensive literature in the field of behavioral ecology that attempts to explain foraging of individuals, social foraging--the ways in which animals search and compete for food in groups--has been relatively neglected. This book redresses that situation by providing both a synthesis of the existing literature and a new theory of social foraging. Giraldeau and Caraco develop models informed by game theory that offer a new framework for analysis. Social Foraging Theory contains the most comprehensive theoretical approach to its subject, coupled with quantitative methods that will underpin future work in the field. The new models and approaches that are outlined here will encourage new research directions and applications. To date, the analysis of social foraging has lacked unifying themes, clear recognition of the problems inherent in the study of social foraging, and consistent interaction between theory and experiments. This book identifies social foraging as an economic interaction between the actions of individuals and those of other foragers. This interdependence raises complex questions about the size of foraging groups, the diversity of resources used, and the propensity of group members to exploit each other or forage cooperatively. The models developed in the book will allow researchers to test their own approaches and predictions. Many years in development, Social Foraging Theory will interest researchers and graduate students in such areas as behavioral ecology, population ecology, evolutionary biology, and wildlife management.

Sexual Selection - Malte Andersson 2019-12-31
Bright colors, enlarged fins, feather plumes, song, horns, antlers, and tusks are often highly sex dimorphic. Why have males in many animals evolved more conspicuous ornaments, signals, and weapons than females? How can such traits evolve although they may reduce male survival? Such questions prompted Darwin's perhaps most scientifically controversial idea--the theory of sexual selection. It still challenges researchers today as they try to understand how competition for mates can favor the variety of sex-dimorphic traits. Reviewing theoretical and empirical work in this very active field, Malte Andersson, a leading contributor himself, provides a major up-to-date synthesis of sexual selection. The author describes the theory and its recent development; examines models, methods, and empirical tests; and identifies many unsolved problems. Among the topics discussed are the selection and evolution of mating preferences; relations between sexual selection and speciation; constraints on sexual selection; and sex differences in signals, body size, and weapons. The rapidly growing study of sexual selection in plants is also reviewed. This volume will interest students, teachers, and researchers in behavioral ecology and evolutionary biology.

Model Systems in Behavioral Ecology - Lee Alan Dugatkin 2019-12-31

A key way that behavioral ecologists develop general theories of animal behavior is by studying one species or a closely related group of species--"model systems"--over a long period. This book brings together some of the field's most respected researchers to describe why they chose their systems, how they integrate theoretical, conceptual, and empirical work, lessons for the practice of the discipline, and potential avenues of future research. Their model systems encompass a wide range of animals and behavioral issues, from dung flies to sticklebacks, dolphins to African wild dogs, from foraging to aggression, territoriality to reproductive suppression. Model Systems in Behavioral Ecology offers an unprecedented "systems" focus and revealing insights into the confluence of personal curiosity and scientific inquiry. It will be an invaluable text for behavioral ecology courses and a helpful overview--and a preview of coming

developments--for advanced researchers. The twenty-five chapters are divided into four sections: insects and arachnids, amphibians and reptiles, birds, and mammals. In addition to the editor, the contributors include Geoff A. Parker, Thomas D. Seeley, Naomi Pierce, Kern Reeve, Gerald S. Wilkinson, Bert Hölldobler and Flavio Roces, George W. Uetz, Michael J. Ryan and Gil Rosenthal, Judy Stamps, H. Carl Gerhardt, Barry Sinervo, Robert Warner, Manfred Milinski, David F. Westneat, Alan C. Kamil and Alan B. Bond, Paul Sherman, Jerram L. Brown, Anders Pape Møller, Marc Bekoff, Richard C. Connor, Joan B. Silk, Christopher Boesch, Scott Creel, A.H. Harcourt, and Tim Caro and M. J. Kelly. *Sperm Competition and Its Evolutionary Consequences in the Insects* - Leigh W. Simmons 2019-12-31

One hundred years after Darwin considered how sexual selection shapes the behavioral and morphological characteristics of males for acquiring mates, Parker realized that sexual selection continues after mating through sperm competition. Because females often mate with multiple males before producing offspring, selection favors adaptations that allow males to preempt sperm from previous males and to prevent their own sperm from preemption by future males. Since the 1970s, this area of research has seen exponential growth, and biologists now recognize sperm competition as an evolutionary force that drives such adaptations as mate guarding, genital morphology, and ejaculate chemistry across all animal taxa. The insects have been critical to this research, and they still offer the greatest potential to reveal fully the evolutionary consequences of sperm competition. This book analyzes and extends thirty years of theoretical and empirical work on insect sperm competition. It considers both male and female interests in sperm utilization and the sexual conflict that can arise when these differ. It covers the mechanics of sperm transfer and utilization, morphology, physiology, and behavior. Sperm competition is shown to have dramatic effects on adaptation in the context of reproduction as well as far-reaching ramifications on life-history evolution and speciation. Written by a top researcher in the field, this comprehensive, up-to-date review of the evolutionary causes and consequences of

sperm competition in the insects will prove an invaluable reference for students and established researchers in behavioral ecology and evolutionary biology.

Parasites in Social Insects - Paul Schmid-Hempel 2019-12-31

This book analyzes for the first time how parasites shape the biology of social insects: the ants, wasps, bees, and termites. Paul Schmid-Hempel provides an overview of the existing knowledge of parasites in social insects. Current ideas are evaluated using a broad database, and the role of parasites for the evolution and maintenance of the social organization and biology of insects is carefully scrutinized. In addition, the author develops new insights, especially in his examination of the intricate relationships between parasites and their social hosts through the rigorous use of evolutionary and ecological concepts. Schmid-Hempel identifies gaps in our knowledge about parasites in social insects and uses models to develop new questions for future research. In addition, issues that are usually considered separately--such as division of labor, genetics, immunology, and epidemiology--are placed in a common framework to analyze two of the most successful adaptations of life: parasitism and sociality. This work will appeal not only to practitioners in the fields of behavioral ecology and sociobiology, but also to others interested in host-parasite relationships or in social organisms, such as apiculturists struggling to overcome the problems arising from mite infestations of honeybee colonies.

Mating Systems and Strategies - Stephen M. Shuster 2019-12-31

This book presents the first unified conceptual and statistical framework for understanding the evolution of reproductive strategies. Using the concept of the opportunity for sexual selection, the authors illustrate how and why sexual selection, though restricted to one sex and opposed in the other, is one of the strongest and fastest of all evolutionary forces. They offer a statistical framework for studying mating system evolution and apply it to patterns of alternative mating strategies. In doing so, they provide a method for quantifying how the strength of sexual selection is affected by the ecological and life history processes that influence females'

spatial and temporal clustering and reproductive schedules. Directly challenging verbal evolutionary models that attempt to explain reproductive behavior without quantitative reference to evolutionary genetics, this book establishes a more solid theoretical foundation for the field. Among the weaknesses the authors find in the existing data is the apparent ubiquity of condition-dependent mating tactics. They identify factors likely to contribute to the evolution of alternative mating strategies--which they argue are more common than generally believed--and illustrate how to measure the strength of selection acting on them. Lastly, they offer predictions on the covariation of mating systems and strategies, consider the underlying developmental biology behind male polyphenism, and propose directions for future research. Informed by genetics, this is a comprehensive and rigorous new approach to explaining mating systems and strategies that will influence a wide swath of evolutionary biology.

The African Wild Dog - Scott Creel 2019-12-31

With only 5,000 surviving, the African wild dog (*Lycaon pictus*) is one of the world's most endangered large carnivores--and one of the most remarkable. This comprehensive portrait of wild dogs incorporates previously scattered information with important new findings from a six-year study in Tanzania's Selous Game Reserve, Africa's largest protected area. The book emphasizes ecology, concentrating on why wild dogs fare poorly in protected areas that maintain healthy populations of lions, hyenas, or other top carnivores. In addition to conservation issues, it covers fascinating aspects of wild dog behavior and social evolution. The Creels use demographic, behavioral, endocrine, and genetic approaches to examine how and why nonbreeding pack mates help breeding pairs raise their litters. They also present the largest data set ever collected on mammalian predator-prey interactions and the evolution of cooperative hunting, allowing them to account for wild dogs' prowess as hunters. By using a large sample size and sophisticated analytical tools, the authors step well beyond previous research. Their results include some surprises that will cause even specialists to rethink certain propositions, such as the idea that wild dogs are

unusually vulnerable to infectious disease. Several findings apply broadly to the management of other protected areas. Of clear appeal to ecologists studying predation and cooperation in any population, this book collects and expands a cache of information useful to anyone studying conservation as well as to amateurs intrigued by the once-maligned but extraordinary wild dog.

Dynamic Modeling in Behavioral Ecology - Marc Mangel 2019-12-31

This book describes a powerful and flexible technique for the modeling of behavior, based on evolutionary principles. The technique employs stochastic dynamic programming and permits the analysis of behavioral adaptations wherein organisms respond to changes in their environment and in their own current physiological state. Models can be constructed to reflect sequential decisions concerned simultaneously with foraging, reproduction, predator avoidance, and other activities. The authors show how to construct and use dynamic behavioral models. Part I covers the mathematical background and computer programming, and then uses a paradigm of foraging under risk of predation to exemplify the general modeling technique. Part II consists of five "applied" chapters illustrating the scope of the dynamic modeling approach. They treat hunting behavior in lions, reproduction in insects, migrations of aquatic organisms, clutch size and parental care in birds, and movement of spiders and raptors. Advanced topics, including the study of dynamic evolutionarily stable strategies, are discussed in Part III.

Neural Networks and Animal Behavior - Magnus Enquist 2013-12-03

How can we make better sense of animal behavior by using what we know about the brain? This is the first book that attempts to answer this important question by applying neural network theory. Scientists create Artificial Neural Networks (ANNs) to make models of the brain. These networks mimic the architecture of a nervous system by connecting elementary neuron-like units into networks in which they stimulate or inhibit each other's activity in much the same way neurons do. This book shows how scientists can employ ANNs to analyze animal behavior, explore the general

principles of the nervous systems, and test potential generalizations among species. The authors focus on simple neural networks to show how ANNs can be investigated by math and by computers. They demonstrate intuitive concepts that make the operation of neural networks more accessible to nonspecialists. The first chapter introduces various approaches to animal behavior and provides an informal introduction to neural networks, their history, and their potential advantages. The second chapter reviews artificial neural networks, including biological foundations, techniques, and applications. The following three chapters apply neural networks to such topics as learning and development, classical instrumental condition, and the role of genes in building brain networks. The book concludes by comparing neural networks to other approaches. It will appeal to students of animal behavior in many disciplines. It will also interest neurobiologists, cognitive scientists, and those from other fields who wish to learn more about animal behavior.

Foundations of Social Evolution - Steven A. Frank 2019-12-31

This is a masterly theoretical treatment of one of the central problems in evolutionary biology, the evolution of social cooperation and conflict. Steven Frank tackles the problem with a highly original combination of approaches: game theory, classical models of natural selection, quantitative genetics, and kin selection. He unites these with the best of economic thought: a clear theory of model formation and comparative statics, the development of simple methods for analyzing complex problems, and notions of information and rationality. Using this unique, multidisciplinary approach, Frank makes major advances in understanding the foundations of social evolution. Frank begins by developing the three measures of value used in biology--marginal value, reproductive value, and kin selection. He then combines these measures into a coherent framework, providing the first unified analysis of social evolution in its full ecological and demographic context. Frank also extends the theory of kin selection by showing that relatedness has two distinct meanings. The first is a measure of information about social partners, with close affinity to theories of correlated equilibrium and Bayesian rationality

in economic game theory. The second is a measure of the fidelity by which characters are transmitted to future generations--an extended notion of heritability. Throughout, Frank illustrates his methods with many examples, including a complete reformulation of the theory of sex allocation. The book also provides a unique "how-to" guide for constructing models of social behavior. It is essential reading for evolutionary biologists and for economists, mathematicians, and others interested in natural selection.

The Evolution of Animal Communication - William A. Searcy 2010-01-01

Gull chicks beg for food from their parents. Peacocks spread their tails to attract potential mates. Meerkats alert family members of the approach of predators. But are these--and other animals--sometimes dishonest? That's what William Searcy and Stephen Nowicki ask in *The Evolution of Animal Communication*. They take on the fascinating yet perplexing question of the dependability of animal signaling systems. The book probes such phenomena as the begging of nesting birds, alarm calls in squirrels and primates, carotenoid coloration in fish and birds, the calls of frogs and toads, and weapon displays in crustaceans. Do these signals convey accurate information about the signaler, its future behavior, or its environment? Or do they mislead receivers in a way that benefits the signaler? For example, is the begging chick really hungry as its cries indicate or is it lobbying to get more food than its brothers and sisters? Searcy and Nowicki take on these and other questions by developing clear definitions of key issues, by reviewing the most relevant empirical data and game theory models available, and by asking how well theory matches data. They find that animal communication is largely reliable--but that this basic reliability also allows the clever deceiver to flourish. Well researched and clearly written, their book provides new insight into animal communication, behavior, and evolution.

Female Control - William Eberhard 2019-12-31
A growing body of evidence has begun to reveal flaws in the traditional assumption of female passivity and lack of discrimination after copulation has begun. William Eberhard has compiled an impressive array of research on the ability of females to shape the outcome of

mating. He describes studies of many different cryptic mechanisms by which a female can accept a male for copulation but nevertheless reject him as a father. Evidence from various fields indicates that such selectivity by females may be the norm rather than the exception. Because most post-copulatory competition between males for paternity is played out within the bodies of females, female behavior, morphology, and physiology probably often influence male success in these contests. Eberhard draws examples from a diversity of organisms, ranging from ctenophores to scorpions, nematodes to frogs, and crickets to humans. Cryptic female choice establishes a new bridge between sexual selection theory and reproductive physiology, in particular the physiological effects of male seminal products on female reproductive processes, such as sperm transport, oviposition, and remating. Eberhard interweaves his review of previous studies with speculation on the consequences of this theoretical development, and indicates promising new directions for future research.

Sexual Conflict - Göran Arnqvist 2013-11-28
The past decade has seen a profound change in the scientific understanding of reproduction. The traditional view of reproduction as a joint venture undertaken by two individuals, aimed at replicating their common genome, is being challenged by a growing body of evidence showing that the evolutionary interests of interacting males and females diverge. This book demonstrates that, despite a shared genome, conflicts between interacting males and females are ubiquitous, and that selection in the two sexes is continuously pulling this genome in opposite directions. These conflicts drive the evolution of a great variety of those traits that distinguish the sexes and also contribute to the diversification of lineages. Göran Arnqvist and Locke Rowe present an array of evidence for sexual conflict throughout nature, and they set these conflicts into the well-established theoretical framework of sexual selection. The recognition of conflict between the sexes is transforming our theories for the evolution of mating systems and the sexes themselves. Written by two top researchers in the field, *Sexual Conflict* is the first book to describe this transformation. It is a must read for all scholars

and students interested in the evolutionary biology of reproduction.

Hormones and Animal Social Behavior -

Elizabeth Adkins-Regan 2013-12-03

Research into the lives of animals in their natural environments has revealed a rich tapestry of complex social relationships and previously unsuspected social and mating systems. The evolution of this behavior is increasingly well understood. At the same time, laboratory scientists have made significant discoveries about how steroid and peptide hormones act on the nervous system to shape behavior. An exciting and rapidly progressing hybrid zone has developed in which these two fields are integrated, providing a fuller understanding of social behavior and the adaptive functions of hormones. This book is a guide to these fascinating connections between animal social behavior and steroid and peptide hormones--a synthesis designed to make it easier for graduate students and researchers to appreciate the excitement, engage in such integrative thinking, and understand the primary literature. Throughout, Elizabeth Adkins-Regan emphasizes concepts and principles, hypothesis testing, and critical thinking. She raises unanswered questions, providing an unparalleled source of ideas for future research. The chapter sequence is by levels of biological organization, beginning with the behavior and hormones of individuals, proceeding to social relationships and systems, and from there to development, behavioral evolution over relatively short time scales, life histories and their evolution, and finally evolution over longer time scales. The book features studies of a wide variety of wild and domestic vertebrates along with some of the most important invertebrate discoveries.

Biodiversity Dynamics - Michael L. McKinney

2001-04-12

How will patterns of human interaction with the earth's eco-system impact on biodiversity loss over the long term--not in the next ten or even fifty years, but on the vast temporal scale be dealt with by earth scientists? This volume brings together data from population biology, community ecology, comparative biology, and paleontology to answer this question.

A Most Interesting Problem - Jeremy DeSilva

2021-01-12

"In 1859, Charles Darwin proposed a mechanism for biological evolution in his most famous work, *On the Origin of Species*. However, *Origin* makes little mention of humans. Despite this, Darwin thought deeply about humans and in 1871 published *The Descent of Man*, his influential and controversial book in which he applied evolutionary theory to humans and detailed his theory of sexual selection. February 2021 will mark the 150th anniversary of its publication. In [this book], twelve leading anthropologists, biologists, and journalists revisit *The Descent*. Following the same organization as the first edition of *Descent*--less the large section on sexual selection--each author reviews what Darwin wrote in *Descent*, comparing his words to what we now know"--

Evolutionary Ecology - Anne E. Magurran

2005-08-25

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.

Sex, Color, and Mate Choice in Guppies -

Anne Houde 2019-12-31

The Trinidadian guppy (*Poecilia reticulata*) is well known to biologists and home aquarium enthusiasts alike. Scientists have studied guppies for most of the twentieth century. Some of the most intensive recent research has been conducted by behavioral ecologists, who have found that the guppy mating system makes guppies especially useful in the study of sexual selection and mate choice. By observing guppy behavior in aquaria, researchers hope to obtain new insights into how selection operates in natural populations. Here Anne Houde summarizes and synthesizes the scientific work done to date, relates the empirical findings on guppies to current themes in sexual selection theory, and suggests new directions for future research. This book describes the sexual behavior of guppies and examines how mate choice by females leads to the evolution of the conspicuous colors and the courtship displays for which guppies are widely recognized. The author shows that female guppies prefer males with bright color patterns, especially those with

orange spots, and that the mating preferences of females lead to sexual selection on both color patterns and courtship displays of males. Houde's work addresses a number of areas that are of interest in sexual selection, including the remarkable degree of plasticity and evolutionary lability of sexual behavior in guppies, geographic variation in mating preferences, possible mechanisms for the evolution of female mating preferences, and the role of sexual selection in speciation. In conclusion, the author explores the implications of her findings for behavioral ecologists who study sexual selection in other species.

Chemical Signals in Vertebrates 11 - Jane Hurst 2007-10-26

This volume contains the proceedings of the conference of the same name held in July 2006 at the University of Chester in the United Kingdom. It includes all the latest research on chemical communication relevant to vertebrates, particularly focusing on new research since the last meeting in 2003. Topics covered include the chemical ecology, biochemistry, behavior, olfactory receptors, and the neurobiology of both the main olfactory and vomeronasal systems of vertebrates.

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