

GROUP SELECTION IN

# Predator-Prey Communities

MICHAEL E. GILPIN

GRADUATE SCHOOL OF LIFE SCIENCES, UNIVERSITY OF CALIFORNIA, BERKELEY, CALIFORNIA 94720

# Group Selection In Predator Prey Communities

**O García**



## **Group Selection In Predator Prey Communities:**

*Group Selection in Predator-Prey Communities* Michael E. Gilpin, 1975-01-01      *Group Selection in Predator-Prey Communities* Michael E. Gilpin, 2020-03-31 Many animals regulate their population density by patterns of behavior that would be easy to explain if the forces of natural selection acted to optimize group properties. But Darwinian selection acts on individuals, not groups, and most simple theories have shown group selection to be too slow ever to oppose individual selection successfully. In this book, Michael Gilpin presents a model based on predator-prey dynamics wherein nonlinear effects are important so that small advantages to the selfish individual are nonlinearly amplified into disaster for his group. The result is that group selection can be rapid and powerful. Of course, many instances of apparent group selection can be explained by kin selection; in other cases, close examination reveals that seemingly altruistic behavior directly benefits the individual genotype as well as the group. The value of the monograph is that it provides a robust model in which group selection, pure and unadulterated, can be seen to work.

**Predator-prey Communities** Michael E. Gilpin, 1975

## **Group Selection in Predator-prey Communities**

**Social Butterflies** Henry S. Horn, 2021-08-03 An ecologist's investigation of the social lives of butterflies. Throughout his career, Henry Horn took a unique approach to the study of butterflies. This book brings together his findings with recent advances in behavioral ecology to provide an incomparable look at the social lives of butterflies, illuminating for the first time the marvelously diverse range of butterfly behaviors across several species. *Social Butterflies* features in-depth studies of five sympatric species: the Plain Ringlet, the Eyed Brown, the Great Spangled Fritillary, the Viceroy, and the Pearly Eye, showing how their social interactions span much of the range of behaviors observed in vertebrates. Drawing on decades of his own keen observations in the field, Horn describes the natural history and behavioral peculiarities of each species and develops models to explain characteristic aspects of their behaviors. He then emphasizes key departures from these models to challenge the notion that butterflies are simply preconditioned to react to stimuli, showing how some make decisions by observing how other butterflies interact with the landscape and each other. Along the way, he sheds light on butterfly territoriality, mating tactics, vagrancy, feeding strategies, and more. Charting new directions for future research, *Social Butterflies* poses intriguing questions about the complex and sometimes mystifying social behaviors of these marvelous creatures, making it essential reading for lepidopterists, ecologists, and anyone interested in the social behaviors of invertebrate species.

Foraging David W. Stephens, Joel S. Brown, Ronald C. Ydenberg, 2008-09-15 Foraging is fundamental to animal survival and reproduction, yet it is much more than a simple matter of finding food; it is a biological imperative. Animals must find and consume resources to succeed, and they make extraordinary efforts to do so. For instance, pythons rarely eat, but when they do, their meals are large—much as 60 percent larger than their own bodies. The snake's digestive system is normally dormant, but during digestion, metabolic rates can increase fortyfold. A python digesting quietly on the forest floor has the metabolic rate of a thoroughbred in a dead heat. This and related foraging processes have

broad applications in ecology cognitive science anthropology and conservation biology and they can be further extrapolated in economics neurobiology and computer science Foraging is the first comprehensive review of the topic in more than twenty years A monumental undertaking this volume brings together twenty two experts from throughout the field to offer the latest on the mechanics of foraging modern foraging theory and foraging ecology The fourteen essays cover all the relevant issues including cognition individual behavior caching behavior parental behavior antipredator behavior social behavior population and community ecology herbivory and conservation Considering a wide range of taxa from birds to mammals to amphibians Foraging will be the definitive guide to the field      **Parasites and Behaviour** M. V. K. Sukhdeo, Leslie H. Chappell, 1994

This volume of Parasitology takes an in depth look at parasitic behaviour      *Catalog of Copyright Entries. Third Series*  
Library of Congress. Copyright Office, 1977      **Management and Analysis of Biological Populations** B.-S.

Goh, 2012-12-02 Management and Analysis of Biological Populations demonstrates the usefulness of optimal control theory in the management of biological populations and the Liapunov function in simulating an ecosystem model under large perturbations of its initial state and continual disturbances on its dynamics The first chapter of the book introduces the topic by presenting the different models in ecology and discussing the stability concepts the ecological engineering and various relevant functions in ecosystem modeling The next chapter contains a brief survey of static optimization techniques and optimal control theory for systems which are modeled by differential and difference equations Another chapter covers methods that use Liapunov and Liapunov like functions to establish that a given population model is stable relative to finite perturbations of its initial state and that it is non vulnerable relative to large continual disturbances The book also covers fisheries and logistic modeling including a discussion of a few management problems Moreover this reference considers stability in an ecosystem model with complexities due to species richness nonlinearities time delays and spatial heterogeneity Finally it explains how to manage pests and greenhouse crops The book is an excellent reference source for students and professionals in ecology and environmental engineering Research professionals and extended workers in agriculture and agronomy will also find this book invaluable      **Advances in Ecological Research** , 1987-04-14 Advances in Ecological

Research first published in 1962 is one of Academic Press's most successful and prestigious series In 1999 the Institute for Scientific Information released figures showing that the serial has an Impact Factor of 9.6 with a half life of 10.0 years placing it 1st in the highly competitive category of Ecology The Editors have always striven to provide a wide range of top quality papers on all aspects of ecology such as animal plant physiology population community landscape and ecosystem ecology Eclectic volumes in the serial are supplemented by thematic volumes on such topics as Estuaries and Ancient Lakes Now edited by Dr Hal Caswell of Woods Hole Oceanographic Institution Advances in Ecological Research continues to publish topical and important reviews interpreting ecology as widely as in the past to include all material that contributes to our understanding of the field      Predation R. J. Taylor, 2013-06-29 When assuming the task of preparing a book such as this

one inevitably wonders why anyone would want to read it I have always sympathized with Charles Elton's trenchant observation in his 1927 book that we have to face the fact that while ecological work is fascinating to do it is unbearably dull to read about And yet several good reasons do exist for producing a small volume on predation The subject is interesting in its own right no ecologist can deny that predation is one of the basic processes in the natural world And the logical roots for much currently published reasoning about predation are remarkably well hidden if one must do research on the subject it helps not to be forced to start from first principles A student facing predator-prey interactions for the first time is confronted with an amazingly diverse and sometimes inaccessible literature with a ratio of wheat to chaff not exceeding 1:5 A guide to the perplexed in this field does not exist at present and I hope the book will serve that function But apart from these more or less academic reasons for writing the book I am forced to it by my conviction that predators are important in the ecological scheme They play a critical role in the biological control of insects and other pests and are therefore of immediate economic concern

Metapopulation Dynamics: Empirical and Theoretical Investigations Michael Gilpin, 2012-12-02 Metapopulation Dynamics Empirical and Theoretical Investigations covers the 1989 proceedings of a metapopulation dynamics workshop held at Lammi Biological Station Helsinki Finland It is divided into 18 chapters that cover various approaches to spatially structured population and community dynamics After briefly discussing the history of metapopulation ideas and the major conceptual links the book covers types of studies that have been conducted on single species and multispecies metapopulations Then it examines the relationships between metapopulation dynamics the equilibrium theory of island biogeography and the dynamics of populations living in patchy environments It further tackles practical issues and the links between metapopulation dynamics and landscape ecology and between metapopulation dynamics and conservation biology Chapters 4 and 5 present structured models describing changes in the number of individuals within patches and an empirical evaluation of local extinction in metapopulation studies The subsequent chapters discuss several aspects of metapopulation including dispersal and connectivity colonization conspecific attraction extinction and isolation and forest fragmentation The latter chapters describe the concept of habitat fragmentation the diversity and competition in metapopulations the community collapse and the effects of metapopulation studies in predator-prey systems

*Energetic Food Webs* John C. Moore, Peter C. de Ruiter, 2012-05-31 In ecosystems with many species food webs form highly complex networks of resource-consumer interactions At the same time the food web as itself needs sufficient resources to develop and survive So in fact food web ecology is about how natural resources form the basis of biological communities in terms of species richness and abundances as well as how species are organised in communities on the basis of the resource availability and use The central theme of this book is that patterns in the utilisation of energy result from the trophic interactions among species and that these patterns form the basis of ecosystem stability The authors integrate the latest work on community dynamics ecosystem energetics and stability and in so doing attempt to dispel the categorisation of the field into the separate subdisciplines of

population community and ecosystem ecology Energetic Food Webs represents the first attempt to bridge the gap between the energetic and species approaches to ecology      **The Cayo Santiago Macaques** Richard G. Rawlins, Matt J.

Kessler, 1986-01-01 This volume presents a broad spectrum of research on the Cayo Santiago macaques a unique free ranging colony of rhesus macaques in Puerto Rico It includes thirteen scientific studies on the behavior and biology of the Cayo Santiago macaques as well as a detailed history of the colony and a complete bibliography of over 260 scientific publications based on work at Cayo Santiago from 1938 through 1984 The chapters represent examples of both short and long term research conducted on the island over the past several years Some are reviews providing a synopsis of complex longitudinal studies of behavior vocal communication functional morphology genetics and population dynamics Others document the results of opportunistic studies of behavior or biological surveys The chapters cover a broad range of topics but all share a common dependence on the detailed life history and genealogical data which make the Cayo Santiago macaque colony an important international research resource      **Individual Behavior and Community Dynamics** John Fryxell, Per

Lundberg, 2012-12-06 A book blending evolution and trophic dynamics taking into account recent advances in both behavioral and population ecology is long overdue A central objective of this book is to consider whether adaptive behavioral decisions on the individual organism level might tend to stabilize trophic interactions A second major goal of the book is to explore the implications of presumably adaptive behaviors on trophic dynamics and the implications of trophic dynamics for the evolution of adaptive behaviors All evolutionary biologists ecologists and behavioral ecologists should find this exciting volume essential reading      **Food Webs** S. Pimm, 2012-12-06 Often the meanings of words are changed subtly for

interesting reasons The implication of the word community has changed from including all the organisms in an area to only those species at a particular trophic level and often a taxonomically restricted group for example bird community If this observation is correct its probable cause is the dramatic growth in our knowledge of the ecological patterns along trophic levels I call these horizontal patterns and the processes that generate them This book deals with vertical patterns those across trophic levels and tries to compensate for their relative neglect In cataloging a dozen vertical patterns I hope to convince the reader that species interactions across trophic levels are as patterned as those along trophic levels and demand explanations equally forcefully But this is not the only objective A limited number of processes shape the patterns of species interaction to demonstrate their existence is an essential step in understanding why ecosystems are the way they are To achieve these aims I must resort to both mathematical techniques to develop theories and statistical techniques to decide between rival hypotheses The level of mathematics is likely to offend nearly everyone Some will find any mathematics too much while others will consider the material to be old familiar ground and probably explained with a poor regard for rigour and generality      **Social Insects V1** Henry Hermani, 2012-12-02 Social Insects Volume I is a part of a four volume discourse

and collection of research on insect sociobiology This volume covers the modern theory with certain concepts of insect

sociality particularly through genetic behavioral and evolutionary pathways This book consists of eight chapters which mostly deal with the sociality of insects and other aspects The first chapter provides an introduction to the subject of insect sociality Topics in this chapter include definition of sociality types of social insects and insect sociobiology The next chapter focuses on the origin and evolution of insect sociality and discusses the theories of origin of sociality The following chapters discuss the aspects of social insects in terms of antiquity and territoriality Caste differentiation and division of labor is also emphasized as well as the genetics of sociality The last two chapters deal with the larvae of the social hymenoptera and the social and evolutionary significance of social insect symbionts This volume is a good reference for students and teachers in the study of entomology zoology and biology

*Changing Scenes in the Natural Sciences, 1776-1976* Clyde E. Goulden, 2008 This book is the result of a symposium held in Phila PA in April 1976 on the bicentennial of Amer independence It reviewed the contributions of evolution systematics quantitative genetics ecology The Influence of the New World on the Study of Natural History Evolution Population Genetics Terrestrial Ecology Aquatic Ecology Behavior Sociobiology Illustrations

Ecological Genetics Leslie Real, 2017-03-14 This volume represents work by five distinguished ecological geneticists offering an up to date source for theoretical concepts and experiments in an exciting field Combining ecological fieldwork and laboratory genetics ecological genetics examines the adjustments and adaptations of wild populations to their environments Articles focus on important interactions between genetics and population ecology delving into issues like gene flow and migration population differentiation the maintenance of genetic variation and the demographic and spatial structure of populations The contributors Janis Antonovics Michael Lynch Montgomery Slatkin Joseph Travis and Sara Via emphasize the importance of population size and structure interaction between local selection and genetic drift and an expanded phenotype including quantitative as well as qualitative characters This new form of ecological genetics focuses on large scale geographic variation in demographic and genetic dynamics among small partially isolated populations and will prove extremely valuable in natural resource management and in rare or endangered species conservation Originally published in 1994 The Princeton Legacy Library uses the latest print on demand technology to again make available previously out of print books from the distinguished backlist of Princeton University Press These editions preserve the original texts of these important books while presenting them in durable paperback and hardcover editions The goal of the Princeton Legacy Library is to vastly increase access to the rich scholarly heritage found in the thousands of books published by Princeton University Press since its founding in 1905

Geographical Genetics Bryan K. Epperson, 2003-08-11 Population genetics has made great strides in applying statistical analysis and mathematical modeling to understand how genes mutate and spread through populations over time But real populations also live in space Streams mountains and other geographic features often divide populations limit migration or otherwise influence gene flow This book rigorously examines the processes that determine geographic patterns of genetic variation providing a comprehensive guide to their study and interpretation

Geographical Genetics has a unique focus on the mathematical relationships of spatial statistical measures of patterns to stochastic processes. It also develops the probability and distribution theory of various spatial statistics for analysis of population genetic data, detailing exact methods for using various spatial features to make precise inferences about migration, natural selection, and other dynamic forces. The book also reviews the experimental literature on the types of spatial patterns of genetic variation found within and among populations. And it makes an unprecedented strong connection between observed measures of spatial patterns and those predicted theoretically. Along the way, it introduces readers to the mathematics of spatial statistics, applications to specific population genetic systems, and the relationship between the mathematics of space-time processes and the formal theory of geographical genetics. Written by a leading authority, this is the first comprehensive treatment of geographical genetics. It is a much needed guide to the theory, techniques, and applications of a field that will play an increasingly important role in population biology and ecology.

Population Ecology of the Cooperatively Breeding Acorn Woodpecker Walter D. Koenig, Ronald L. Mumme, 2020-03-31

Ever since the acorn woodpecker was observed and described by Spanish explorers, its behavior, particularly the unique habit of caching acorns in specialized storage trees or granaries, has impressed observers. Acorn woodpeckers are also one of the few temperate zone species in which young are reared communally in family groups. This demographic study investigates the complexities of acorn storage and group living in acorn woodpeckers at Hastings Reservation in central coastal California. It is one of the most thorough studies of any avian social system to date.



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