



Biology And Evolution Of Social Insects

Stefano Turillazzi



Biology And Evolution Of Social Insects:

Biology and Evolution of Social Insects Johan Billen, 1992 **The Biology of Social Insects** Michael D. Breed, Charles D. Michener, Howard E. Evans, 2019-06-25 In this book internationally known experts provide a comprehensive view of current knowledge of social insect biology including much previously unpublished information Particular emphasis is given to the relationships between social insects and humans sections are devoted to economically important social insects pollination foraging and the role of insects in ecosystems and agroecosystems The authors also discuss communication behavior and caste within insect colonies A special section focuses on the neurobiology of social insects A series of papers considers the presocial insects which live in family groups but without caste differences Also well represented are the fields of sociobiology and the origins and evolution of social behavior The book will be valuable to agricultural scientists as well as to entomologists sociobiologists ecologists ethologists and natural historians Endocrinologists and neurobiologists will also find important new material The Evolution of Social Behavior in Insects and Arachnids Jae C. Choe, Bernard J. Crespi, 1997 Social insects and arachnids exhibit complex forms of behavior that involve cooperation in building a nest defending against attackers or rearing offspring This book is a comprehensive up to date guide to sociality and its evolution in a wide range of taxa

Evolution of Social Insect Colonies Rossiter Henry Crozier, Pekka Pamilo, 1996 This book is about the genetics and behaviour of individuals within colonies of social insects bees wasps ants and termites Colonial living is characterized by division of labour and finely coordinated organization by reproductive function being limited to certain individuals by cooperative brood care and by the presence of non reproductive workers Within a colony however many events are the result of conflicts between individuals seeking to maximize their own interests Ever since Darwin this interplay of cooperation and conflict has raised many important questions in evolutionary biology especially about how cooperative behaviour is maintained in the absence of direct reproduction by workers How is the heritable component of this behaviour passed on Crozier and Pamilo s contribution is to analyse the genetic basis of the patterns of reproduction and resource allocation found in social insect colonies This is done more comprehensively and with greater depth and insight than in any previous study and is a significant step forward in the fields of population genetics and social evolution **Social Insects V1** Henry Hermeni, 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

Social Evolution in Ants Andrew F.G. Bourke, Nigel R. Franks, 2019-12-31 Biologists since Darwin have been intrigued and confounded by the complex issues involved in the evolution and ecology of the social behavior of insects The self sacrifice of sterile workers in ant colonies has been particularly difficult for evolutionary biologists to explain In this important new book Andrew Bourke and Nigel Franks not only present a detailed overview of the current state of scientific knowledge about social evolution in ants but also show how studies on ants have contributed to an understanding of many fundamental topics in behavioral ecology and evolutionary biology One of the substantial contributions of *Social Evolution in Ants* is its clear explanation of kin selection theory and sex ratio theory and their applications to social evolution in insects Working to dispel lingering skepticism about the validity of kin selection and more broadly of selfish gene theory Bourke and Franks show how these ideas underpin the evolution of both cooperation and conflict within ant societies In addition using simple algebra they provide detailed explanations of key mathematical models Finally the authors discuss two relatively little known topics in ant social biology life history strategy and mating systems This comprehensive up to date and well referenced work will appeal to all researchers in social insect biology and to scholars and students in the fields of entomology behavioral ecology and evolution

Social Insects Wolf Engels, 2012-12-06 Evolution of Castes in Insects I BERNHARD RENSCH The evolution of organisms in the succession of generations has been primarily achieved through the appearance of new hereditary variants with minor deviations along with the development of stable structures and functions Harmful mutants were eradicated either immediately or in the subsequent generations through the process of natural selection while unharmed or advantageous ones usually survived As this process continued many new races and species developed which possessed structures and functions of a rational nature and which became increasingly independent from their environment These evolutionary tendencies were also promoted through either geographical ecological physiological or genetical isolation of populations In some phylogenetic lines there occurred an increase in the number of cells due to additional cellular divisions in the morphogenesis of structures This opened up the possibility for the development of the division of labour within cellular groups leading to more complicated and consequently more successful functions of tissues and organs A further advancement in the adaptation of a species to its environment was made possible through specialization for certain functions of whole individuals or groups of individuals

Chemistry and Biology of Social Insects International Union for the Study of Social Insects. Congress, 1987

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

The Convergent Evolution of Agriculture in Humans and Insects Ted R Schultz, Richard Gawne, Peter N Peregrine, 2022-02-22 Contributors explore common elements in the evolutionary histories of both human and insect agriculture resulting from convergent evolution During the past 12 000 years agriculture originated in humans as many as twenty three times and during the past 65 million years agriculture also originated in nonhuman animals at least twenty times and in insects at least fifteen times It is much more likely that these independent origins represent similar solutions to the challenge of growing food than that they are due purely to chance This volume seeks to identify common elements in the evolutionary histories of both human and insect agriculture that are the results of convergent evolution The goal is to create a new synthetic field that characterizes quantifies and empirically documents the evolutionary and ecological mechanisms that drive both human and nonhuman agriculture The contributors report on the results of quantitative analyses comparing human and nonhuman agriculture discuss evolutionary conflicts of interest between and among farmers and cultivars and how they interfere with efficiencies of agricultural symbiosis describe in detail agriculture in termites ambrosia beetles and ants and consider patterns of evolutionary convergence in different aspects of agriculture comparing fungal parasites of ant agriculture with fungal parasites of human agriculture analyzing the effects of agriculture on human anatomy and tracing the similarities and differences between the evolution of agriculture in humans and in a single relatively well studied insect group fungus farming ants

Social Insects and the Environment C.A. Viraktamath, G.K. Veeresh, B. Mallik, 2023-10-09 This volume includes 370 papers presented by leading scientists at the 11th International Congress of IUSSI at Bangalore from August 5 11 1990 The papers which have been classified into 30 sections relate to the symposia papers of the Congress These cover various frontiers of research on social insects such as evolution of sociality polygyny social polymorphism kin recognition kin selection foraging strategies reproductive strategies biogeography and phylogenetics of bees and ants pollination ecology and management of pestiferous social insects The most important feature about these papers in this publication is that the results are presented in a crisp brief and precise manner Because of the brevity it has been possible to bring together in one publication almost all aspects of research on social insects from all parts of the world The time between presentation of papers at a Congress and publication has been avoided by publishing

this volume on the eve of the Congress and this enables scientists to refer to the results immediately

Social evolution and the what, when, why and how of the major evolutionary transitions in the history of life Peter Nonacs, Heikki Helanterä, Karen Marie Kapheim, 2023-01-27

Advances in Genomics and Epigenomics of Social Insects Greg J. Hunt, Juergen R. Gadau, 2017-01-27

Social insects are among the most successful and ecologically important animals on earth. The lifestyle of these insects has fascinated humans since prehistoric times. These species evolved a caste of workers that in most cases have no progeny. Some social insects have worker sub castes that are morphologically specialized for discrete tasks. The organization of the social insect colony has been compared to the metazoan body. Bees, ants, and wasps are haploid, a situation which results in higher relatedness between female siblings. Sociality evolved many times within the Hymenoptera, perhaps spurred in part by increased relatedness that increases inclusive fitness benefits to workers cooperating to raise their sisters and brothers rather than reproducing themselves. But epigenetic processes may also have contributed to the evolution of sociality. The Hymenoptera provide opportunities for comparative study of species ranging from solitary to highly social. A more ancient clade of social insects, the termites (infraorder Isoptera), provide an opportunity to study alternative mechanisms of caste determination and lifestyles that are aided by an array of endosymbionts. This research topic explores the use of genome sequence data and genomic techniques to help us explore how sociality evolved in insects, how epigenetic processes enable phenotypic plasticity, and the mechanisms behind whether a female will become a queen or a worker.

The Insects P. J. Gullan, P. S. Cranston, 2009-02-05

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This established and popular textbook is the definitive guide to the study of insects, a group of animals that represent over half of the planet's biological diversity. Completely updated and expanded, this new edition examines all aspects of insect biology, including anatomy and physiology, ecology and evolution of insects, insect behaviours such as sociality, predation, parasitism, and defense, medical and veterinary entomology, and methods of collection, preserving, and identifying insects. Features new chapters on the methods and results of studies of insect phylogeny and a new review of insect evolution and biogeography. Includes expanded sections on species diversity, social behaviour, pest management, aquatic entomology, parasitology, and medical entomology. Successful strategies in insect conservation are also covered for the first time, reflecting the increasing threat to natural ecosystems from environmental changes. Boxes highlighting key themes, suggestions for further reading, and illustrations including specially commissioned drawings and colour plates are included throughout. The artwork from the text is available for instructors either via CD ROM or by visiting www.blackwellpublishing.com/gullan

Human Evolution Beyond Biology and Culture Jeroen C. J. M. van den Bergh, 2018-10-18

A complete account of evolutionary thought in the social, environmental, and policy sciences, creating bridges with biology.

Developmental Plasticity and Evolution Mary Jane West-Eberhard, 2003-03-13

The first comprehensive synthesis on development and evolution, it applies to all aspects of development at all levels of organization.

and in all organisms taking advantage of modern findings on behavior genetics endocrinology molecular biology evolutionary theory and phylogenetics to show the connections between developmental mechanisms and evolutionary change This book solves key problems that have impeded a definitive synthesis in the past It uses new concepts and specific examples to show how to relate environmentally sensitive development to the genetic theory of adaptive evolution and to explain major patterns of change In this book development includes not only embryology and the ontogeny of morphology sometimes portrayed inadequately as governed by regulatory genes but also behavioral development and physiological adaptation where plasticity is mediated by genetically complex mechanisms like hormones and learning The book shows how the universal qualities of phenotypes modular organization and plasticity facilitate both integration and change Here you will learn why it is wrong to describe organisms as genetically programmed why environmental induction is likely to be more important in evolution than random mutation and why it is crucial to consider both selection and developmental mechanism in explanations of adaptive evolution This book satisfies the need for a truly general book on development plasticity and evolution that applies to living organisms in all of their life stages and environments Using an immense compendium of examples on many kinds of organisms from viruses and bacteria to higher plants and animals it shows how the phenotype is reorganized during evolution to produce novelties and how alternative phenotypes occupy a pivotal role as a phase of evolution that fosters diversification and speeds change The arguments of this book call for a new view of the major themes of evolutionary biology as shown in chapters on gradualism homology environmental induction speciation radiation macroevolution punctuation and the maintenance of sex No other treatment of development and evolution since Darwin s offers such a comprehensive and critical discussion of the relevant issues Developmental Plasticity and Evolution is designed for biologists interested in the development and evolution of behavior life history patterns ecology physiology morphology and speciation It will also appeal to evolutionary paleontologists anthropologists psychologists and teachers of general biology

Life History Evolution
Michal Segoli, Eric Wajnberg, 2025-03-10 Provides a timely and authoritative account of Life History Evolution by a multidisciplinary team of scholars and researchers from around the world Life History Evolution Traits Interactions and Applications presents a cutting edge synthesis of the mechanisms driving life history strategies that span the breadth of taxa from bacteria to humans Integrating classical and contemporary perspectives this comprehensive volume addresses how organisms evolve traits in response to diverse ecological pressures Editors Michal Segoli and Eric Wajnberg bring together leading experts to explore the intersection of evolutionary biology ecology and applied research focusing on the evolving complexity of life history traits and their implications In depth yet accessible chapters cover a broad spectrum of life history traits from classical traits of lifespan and reproduction to more complex interactions like social behaviour predator prey dynamics and human induced evolutionary processes The contributing authors explain essential concepts identify critical knowledge gaps discuss future research directions and demonstrate the relevance of life history evolution in addressing

climate change species invasion pollution and more Providing a well balanced understanding of life history traits and their implications Life History Evolution Incorporates recent advances in evolutionary theory including eco evolutionary feedback loops and anthropogenic impacts Offers diverse perspectives and original research from leading experts in fields such as evolutionary biology ecology entomology zoology agriculture and veterinary medicine Discusses life history evolution in the context of co evolved interactions such as predator prey parasite host plant herbivore and endosymbiont host relationships Provides an overview of the foundational theory recent developments and current thinking in the field Features numerous case studies that highlight real world applications in biological control wildlife management climate change adaptation and others Revealing how life history traits shape the evolutionary strategies of organisms Life History Evolution Traits Interactions and Applications is an essential resource for undergraduate and graduate students researchers industry professionals and policymakers in ecological science It is an ideal textbook for courses in evolutionary ecology evolutionary biology conservation biology environmental science and environmental management **The Evolution of Social Wasps**

James H. Hunt,2007-03-27 Publisher description The Biology of Hover Wasps Stefano Turillazzi,2013-01-29 This book represents the culmination of the author s lifetime work on a single fascinating group of insects the hover wasps Stenogastrinae The author explores the biology of these little known wasps at the threshold of sociality presenting an ambitious survey of ideas about their evolution and an assessment of the current standing of controversial concepts Following taxonomic and morphological descriptions the behaviour colonial dynamics social communication and especially the remarkably diverse nests of wasps are discussed Compared to the better known species of paper wasps hornets and yellow jackets the hover wasps show various peculiarities such as characteristics of immature brood rearing nest defence and mating systems The nest architecture probably presents the most variable solutions in social wasps and is characterized by an astonishing level of camouflage making these insects an interesting example of special adaptation to forest environments

Social Insects M. V. Brian,2012-12-06 Here is a guide to the ecology of social insects It is intended for general ecologists and entomologists as well as for undergraduates and those about to start research on social insects even the experienced investigator may find the comparison between different groups of social insects illuminating Most technical terms are translated into common language as far as can be done without loss of accuracy but scientific names are unavoidable Readers will become familiar with the name even though they cannot visualize the animal and could reflect that only a very few of the total species have been studied so far References too are essential and with these it should be possible to travel more deeply into the vast research literature still increasing monthly When I have cited an author in another author s paper this implies that I have not read the original and the second author must take responsibility for accuracy Many hands and heads have helped to make this book I thank all my colleagues past and present for their enduring though critical support and I thank with special pleasure E M Evesham who fashioned the diagrams Free D J Stradling and P E C Darlington who

supplied photographs D Y Brian and R A Weller who were meticulous on the linguistic side and G Frith and R M Jones who collated the references List of plates 1 Fungus combs of *Acromyrmex octospinosus* and *Macrotermes michaelsoni* 13 2 Mouthparts of larval *Myrmica*

Unveiling the Power of Verbal Art: An Mental Sojourn through **Biology And Evolution Of Social Insects**

In a global inundated with screens and the cacophony of quick communication, the profound energy and psychological resonance of verbal artistry frequently diminish in to obscurity, eclipsed by the continuous barrage of sound and distractions. Yet, situated within the musical pages of **Biology And Evolution Of Social Insects**, a captivating work of literary elegance that pulses with organic feelings, lies an remarkable journey waiting to be embarked upon. Written by a virtuoso wordsmith, that exciting opus instructions readers on a psychological odyssey, lightly exposing the latent possible and profound influence stuck within the complex web of language. Within the heart-wrenching expanse with this evocative examination, we can embark upon an introspective exploration of the book is central themes, dissect its fascinating writing model, and immerse ourselves in the indelible impression it leaves upon the depths of readers souls.

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