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# Intestinal Microorganisms of Termites and Other Invertebrates

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**Teogenes Senna de Oliveira, Richard  
Willian Bell**



## **Intestinal Microorganisms Of Termites And Other Invertebrates:**

Intestinal Microorganisms of Termites and Other Invertebrates Helmut König,Ajit Varma,2005-12-29 Soil microorganisms play a major role in the degradation and recycling of organic material Microbes are involved in the food web and strongly contribute to soil fertility In the past attention was mainly directed towards free living or particle bound microorganisms while the role of intestinal microbes of soil animals has been neglected For the first time Intestinal Microorganisms of Termites and Other Invertebrates focuses on the microbes in gut systems of soil animals It starts with a profound overview of the biology of soil invertebrates A major part deals with the gut microbiota of termites the best investigated gut system of invertebrates Termites are important soil processors in tropical and subtropical regions Insight is given into the intestinal microbiota of further relevant primary litter decomposers such as earthworms springtails millipedes and woodlice Novel techniques for studying intestinal microbes complete the volume

Intestinal Microorganisms of Termites and Other Invertebrates Helmut König,2006 This is the first work to focus on microbes in gut systems of soil animals Beginning with an overview of the biology of soil invertebrates the text turns to the gut microbiota of termites which are important soil processors in tropical and subtropical regions Coverage extends to intestinal microbiota of such other litter decomposers as earthworms springtails millipedes and woodlice Thoroughly illustrated including color photographs *Biology of Termites: a Modern Synthesis* David Edward Bignell,Yves Roisin,Nathan Lo,2010-10-20 Biology of Termites a Modern Synthesis brings together the major advances in termite biology phylogenetics social evolution and biogeography In this new volume David Bignell Yves Roisin and Nathan Lo have brought together leading experts on termite taxonomy behaviour genetics caste differentiation physiology microbiology mound architecture biogeography and control Very strong evolutionary and developmental themes run through the individual chapters fed by new data streams from molecular sequencing and for the first time it is possible to compare the social organisation of termites with that of the social Hymenoptera focusing on caste determination population genetics cooperative behaviour nest hygiene and symbioses with microorganisms New chapters have been added on termite pheromones termites as pests of agriculture and on destructive invasive species

**Recent Advances in Entomological Research** Tong-Xian Liu,Le Kang,2011-12-18 In recent years the field of entomology due in part to the penetration of other disciplines has made rapid progress Recent Advances in Entomological Research From Molecular Biology to Pest Management includes 25 chapters contributed by more than 40 distinguished entomologists and introduces the latest progress in entomology from molecular biology insect plant interactions and insecticide toxicology to emerging technologies in pest management Not only is the book interesting and informative but it provides useful innovative research advances and will serve as a valuable resource for entomologists zoologists botanists and other researchers in the field of plant protection Tong Xian Liu is a professor of entomology at the College of Plant Protection Northwest A F University China Le Kang is a professor of entomology at the Institute of Zoology Chinese Academy of Sciences China

Saproxyllic Insects Michael D. Ulyshen, 2018-05-21 This volume offers extensive information on insect life in dying and dead wood. Written and reviewed by leading experts from around the world, the twenty-five chapters included here provide the most global coverage possible and specifically address less studied taxa and topics. An overarching goal of this work is to unite literature that has become fragmented along taxonomic and geographic lines. A particular effort was made to recognize the dominant roles that social insects, e.g., termites, ants, and passalid beetles, play in saproxyllic assemblages in many parts of the world without overlooking the non-social members of these communities. The book is divided into four parts. Part I, Diversity, includes chapters addressing the major orders of saproxyllic insects: Coleoptera, Diptera, Hymenoptera, Hemiptera, Lepidoptera, and Blattodea, broadly organized in decreasing order of estimated global saproxyllic diversity. In addition to order-level treatments, some chapters in this part discuss groups of particular interest, including pollinators, hymenopteran parasitoids, ants, stag and passalid beetles, and wood-feeding termites. Part II, Ecology, discusses insect-fungal and insect-insect interactions, nutritional ecology, dispersal, seasonality, and vertical stratification. Part III, Conservation, focuses on the importance of primary forests for saproxyllic insects, offers recommendations for conserving these organisms in managed forests, discusses the relationships between saproxyllic insects and fire, and addresses the value of tree hollows and highly decomposed wood for saproxyllic insects. Utilization of non-native wood by saproxyllic insects and the suitability of urban environments for these organisms are also covered. Lastly, Part IV, Methodological Advancements, highlights molecular tools for assessing saproxyllic diversity. The book offers an accessible and insightful resource for natural historians of all kinds and will especially appeal to entomologists, ecologists, conservationists, and foresters. *Endospore-forming Soil Bacteria* Niall A. Logan, Paul De Vos, 2011-07-06 Aerobic endospore-forming bacteria are found in soils of all kinds, ranging from acid to alkaline, hot to cold, and fertile to desert. It is well known that endospores confer special properties upon their owners and play dominant parts in their life cycles and dispersal, and much has been written about the spores' genetics and economic importance of these organisms. Much has also been written about soil ecology, but there is a relative dearth of literature that brings together different aspects of the behaviour and characters of endospore formers with their contributions to soil ecosystems. This Soil Biology volume fills that gap. Following chapters that describe the current classification of these organisms, that review methods for their detection and for studying their life cycles in soils, and that examine their dispersal, other chapters show that they are active and dynamic members of soil floras that interact widely with other soil inhabitants, with roles in nitrogen fixation, denitrification, and soil remediation. *Invertebrate Bacteriology* Aurelio Ciancio, 2016-09-06 This compendium reviews different processes acting on bacterial groups that evolved one or more relationships with members of the most important invertebrate phyla. Starting from principles of basic bacteriology, the book provides data on bacteria interactions with pests, animal or human diseases. Being present in all environments, from deep sea to crops, animals, or plants, invertebrates represent the most significant and ancient fraction of the eukaryotic biomass on earth. Their evolutive

adaptations and links with bacteria established over time scales of ages range from vectored diseases to speciation within a wide range of environmental niches and biocenosis including oceanic hydrothermal vents Main functional processes include pathogenicity parasitism transmission immunity symbiosis and speciation A review about recent advances achieved in these research topics is given focussing on one or more aspects concerning significant evolutive paths of bacteria and underlying functional links Rather than proceeding through the order and structure of taxonomies the volume is organized by processes examining their functional role in different lineages including but not limited to insects or nematodes Processes involved in parasitism focus at a finer level on examples from many taxa Molecular aspects underpinning these and other functional processes include the effects of horizontal gene transfer the mechanisms active in immune defense and vectoring and the antibacterial peptides Finally the effects of climate warming biological invasions and agriculture are examined with particular attention to farming and environment

Termites and Sustainable Management Md. Aslam Khan, Wasim Ahmad, 2017-12-01 This termite Volume 2 comprises 13 chapters in an attempt to bring all available information on sustainable and eco friendly termite management The previous Volume considered the biology social behaviour and economic importance of these insects Chapters in this book dealing with damage and specific management of fungus growing termites provide a review on most recent methodologies used for management Termite damage crops from sowing till harvest As it is difficult to detect damages in field usually it is too late when the symptoms are noticed A separate chapter on issues related to Indian agriculture and the contemporary practices being followed by majority of the Indian farmers is quite informative Similarly a case study for termites infesting Malaysian forests constitutes an important contribution Various issues related to integrated and eco friendly termite management in tropical conditions have been addressed comprehensively Potential role of microbes has also been discussed in detail in other chapters The information contained under these chapters should help termite management in a way that natural resources can be used and maintained for the generations to come Similarly the chapter on physical barriers contributes a wealth of information that can be useful all over the world where termite is a problem Emphasis has been laid on reviewing contribution of synthetic chemical insecticides in termite management A separate chapter dealing with standard norms in wood protection constitute a significant step in this direction A further chapter throws light on the potential of biotechnology as a tool in management

The Social Biology of Microbial Communities Institute of Medicine, Board on Global Health, Forum on Microbial Threats, 2013-01-10 Beginning with the germ theory of disease in the 19th century and extending through most of the 20th century microbes were believed to live their lives as solitary unicellular disease causing organisms This perception stemmed from the focus of most investigators on organisms that could be grown in the laboratory as cellular monocultures often dispersed in liquid and under ambient conditions of temperature lighting and humidity Most such inquiries were designed to identify microbial pathogens by satisfying Koch's postulates 3 This pathogen centric approach to the study of microorganisms produced a metaphorical war

against these microbial invaders waged with antibiotic therapies while simultaneously obscuring the dynamic relationships that exist among and between host organisms and their associated microorganisms only a tiny fraction of which act as pathogens Despite their obvious importance very little is actually known about the processes and factors that influence the assembly function and stability of microbial communities Gaining this knowledge will require a seismic shift away from the study of individual microbes in isolation to inquiries into the nature of diverse and often complex microbial communities the forces that shape them and their relationships with other communities and organisms including their multicellular hosts On March 6 and 7 2012 the Institute of Medicine's IOM's Forum on Microbial Threats hosted a public workshop to explore the emerging science of the social biology of microbial communities Workshop presentations and discussions embraced a wide spectrum of topics experimental systems and theoretical perspectives representative of the current multifaceted exploration of the microbial frontier Participants discussed ecological evolutionary and genetic factors contributing to the assembly function and stability of microbial communities how microbial communities adapt and respond to environmental stimuli theoretical and experimental approaches to advance this nascent field and potential applications of knowledge gained from the study of microbial communities for the improvement of human animal plant and ecosystem health and toward a deeper understanding of microbial diversity and evolution The Social Biology of Microbial Communities Workshop Summary further explains the happenings of the workshop

*Biological Conversion of Biomass for Fuels and Chemicals* Jianzhong Sun, Shi-You Ding, Joy Doran-Peterson, 2014 This book covers biomass modification to facilitate the industrial degradation processing and other characteristics of feedstocks and new technologies for the conversion of lignocelluloses into biofuels and other products

**Assessing the Microbiological Health of Ecosystems** Christon J. Hurst, 2022-11-04 Assessing the Microbiological A timely exploration of the coordinated functions of microbiological communities and the impacts of global climate change on microbial life Ecosystems function like interlocking puzzles and ultimately the health of an ecosystem depends upon the niche activities of its microbial communities Assessing the Microbiological Health of Ecosystems summarizes our understanding of how microbial community processes are organized and the mechanisms by which activities of their constituent species are coordinated The authors collectively present a basis for understanding what produces healthy microbial components of an ecosystem thereby supplying a foundation for achieving one of the eventual future goals of environmental microbiology to diagnose and correct the integrative nature of microbial activities when ecosystems fail Assessing the Microbiological Health of Ecosystems will prove to be a valuable resource to environmental microbiologists ecologists and integrative biologists The book will help researchers and students to understand the commonalities of processes techniques and discoveries in the study of microbial communities contribute to understandings of how microbial communities coordinate their function discussing how the relative rates and effective integration of community microbial processes are currently measured provide insights into the composition of a healthy microbial ecosystem By learning to

recognize what constitutes and produces a healthy microbial ecosystem we gain significant ground on the path towards being able to diagnose and correct the health of ailing microbial ecosystems Assessing the Microbiological Health of Ecosystems will help new generations of scientists discern new ways to carry these efforts forward Biology and Biotechnology of Actinobacteria Joachim Wink, Fatemeh Mohammadipanah, Javad Hamedi, 2017-10-19 This book provides in depth insights into the biology taxonomy genetics physiology and biotechnological applications of Actinobacteria It especially focuses on the latter reviewing the wide variety of actinobacterial bioactive molecules and their benefits for diverse industrial applications such as agriculture aquaculture biofuel production and food technology Actinobacteria are one of the most promising sources of small bioactive molecules and it is estimated that only a small percentage of actinobacterial bioactive chemicals have been discovered to date Identifying new diverse gene clusters of biotechnological relevance in the genome of Actinobacteria will be crucial to developing advanced applications for pharmaceutical industrial and agricultural purposes The book offers a unique resource for all graduate students researchers and practitioners in the fields of microbiology microbial biotechnology and the genetic engineering of Actinobacteria *(Endo)symbiotic Methanogenic Archaea* Johannes H.P.

Hackstein, 2010-09-08 This updated monograph deals with methanogenic endosymbionts of anaerobic protists in particular ciliates and termite flagellates and with methanogens in the gastrointestinal tracts of vertebrates and arthropods Further chapters discuss the genomic consequences of living together in symbiotic associations the role of methanogens in syntrophic degradation and the function and evolution of hydrogenosomes hydrogen producing organelles of certain anaerobic protists Methanogens are prokaryotic microorganisms that produce methane as an end product of a complex biochemical pathway They are strictly anaerobic archaea and occupy a wide variety of anoxic environments Methanogens also thrive in the cytoplasm of anaerobic unicellular eukaryotes and in the gastrointestinal tracts of animals and humans The symbiotic methanogens in the gastrointestinal tracts of ruminants and other methanogenic mammals contribute significantly to the global methane budget especially the rumen hosts an impressive diversity of methanogens This makes this updated volume an interesting read for scientists and students in Microbiology and Physiology **Biodeterioration of Wooden Cultural**

**Heritage** Anastasia Pournou, 2020-10-27 Since prehistoric times and throughout the course of human evolution wood has been an integral part of all civilizations Wooden Cultural Heritage can be found worldwide providing valuable information on the social and economic context of human history Nonetheless as a natural cellulosic material wood shows low resistance to biodeterioration and thus wooden Cultural Heritage often fails to escape decomposition in both aquatic and terrestrial ecosystems This book provides a comprehensive overview on the biodeterioration of wooden Cultural Heritage and describes the decay mechanisms of key organisms and microorganisms encountered in aquatic and terrestrial ecosystems Cultural Heritage professionals researchers and academics may explore within this book the associations between detritogens habitats and decay which will assist them to understand wood biodeterioration and design effective prevention mitigation

and remediation strategies The book presents case studies around the world to demonstrate the impact of biogenic deterioration on wooden Cultural Heritage and illustrates mechanisms and patterns in order to be a useful handbook of decay diagnosis Lastly by adopting a holistic approach to wood decay basic concepts of wood technology ecology and deteriogens biology are introduced permitting readers of different scientific backgrounds to easily comprehend wood biodeterioration

Methane and Climate Change Dave Reay,Pete Smith,2010-08-12 Methane is a powerful greenhouse gas and is estimated to be responsible for approximately one fifth of man made global warming Per kilogram it is 25 times more powerful than carbon dioxide over a 100 year time horizon and global warming is likely to enhance methane release from a number of sources Current natural and man made sources include many where methane producing micro organisms can thrive in anaerobic conditions particularly ruminant livestock rice cultivation landfill wastewater wetlands and marine sediments This timely and authoritative book provides the only comprehensive and balanced overview of our current knowledge of sources of methane and how these might be controlled to limit future climate change It describes how methane is derived from the anaerobic metabolism of micro organisms whether in wetlands or rice fields manure landfill or wastewater or the digestive systems of cattle and other ruminant animals It highlights how sources of methane might themselves be affected by climate change It is shown how numerous point sources of methane have the potential to be more easily addressed than sources of carbon dioxide and therefore contribute significantly to climate change mitigation in the 21st century

Subsoil Constraints for Crop Production Teogenes Senna de Oliveira,Richard Willian Bell,2022-08-03 This book will address the major subsoil physical and chemical constraints and their implications to crop production Plant growth is often restricted by adverse physical and chemical properties of subsoils yet these limitations are not revealed by testing surface soils and hence their significance in crop management is often overlooked The major constraints can be physical or chemical Physical limitations such as poor soil structure sandy subsoils that do not provide adequate water or gravelly subsoils and etc On the other hand chemical constraints include acidity alkalinity high extractable Al or Mn low nutrient availability salts boron toxicity and pyritic subsoils Some of these constraints are inherent properties of the soil profile while others are induced by crop and soil management practices This aim of this book is to define the constraints and discuss amelioration practices and benefits for crop production This book will be of interest to readers involved with agriculture and soil sciences in laboratory applied or classroom settings

Beneficial Microorganisms in Multicellular Life Forms Eugene Rosenberg,Uri Gophna,2011-08-30 All animals and plants form associations with hundreds or thousands of different beneficial microorganisms These symbiotic microbes play an important role in the development adaptation health and evolution of their hosts This book brings together a group of diverse biologists to discuss microbial interactions with multicellular life forms including insects corals plants and mammals including humans The various mechanisms by which microorganisms benefit their hosts are discussed including providing essential nutrients preventing disease inducing the

immune system and combating stress Since the microbiota can be transferred from parent to offspring it plays an important role in the origin and evolution of animal and plant species This book should be of interest to the widest range of biological scientists merging the studies of host and microbial physiology symbiosis and the ecology and evolution of symbiotic partners

**Advances in the Evolutionary Ecology of Termites** Alberto Arab, Solange Del Carmen Issa Ponce, Daniel Aguilera-Olivares, 2023-08-16 Termites are eusocial insects that live in colonies composed of hundreds to millions of individuals Their colonies are mainly organized into reproductive and non reproductive castes which have specific tasks such as nest construction foraging reproduction brood care and colony defense The evolution of the symbiotic association between termites and microorganisms allows them to decompose ingested lignocellulose from plant substrates such as wood including herbivore dung and soil humus making them important insect decomposers that play a crucial role in ecosystem functioning by contributing to litter decomposition soil formation and nutrient cycling On the other hand termites have recently been classified as eusocial cockroaches which have gained increasing attention in evolutionary studies to understand the transition to eusociality from subsocial wood roaches This current growing interest in termite research calls for a collection dedicated to these fascinating insects

**Area-wide Integrated Pest Management** Jorge Hendrichs, Rui Pereira, Marc J.B.

Vreysen, 2021-02-01 Over 98% of sprayed insecticides and 95% of herbicides reach a destination other than their target species including non target species air water and soil The extensive reliance on insecticide use reduces biodiversity contributes to pollinator decline destroys habitat and threatens endangered species This book offers a more effective application of the Integrated Pest Management IPM approach on an area wide AW or population wide AW IPM basis which aims at the management of the total population of a pest involving a coordinated effort over often larger areas For major livestock pests vectors of human diseases and pests of high value crops with low pest tolerance there are compelling economic reasons for participating in AW IPM This new textbook attempts to address various fundamental components of AW IPM e g the importance of relevant problem solving research the need for planning and essential baseline data collection the significance of integrating adequate tools for appropriate control strategies and the value of pilot trials etc With chapters authored by 184 experts from more than 31 countries the book includes many technical advances in the areas of genetics molecular biology microbiology resistance management and social sciences that facilitate the planning and implementing of area wide strategies The book is essential reading for the academic and applied research community as well as national and regional government plant and human animal health authorities with responsibility for protecting plant and human animal health

*Bioremediation and Phytoremediation Technologies in Sustainable Soil Management* Junaid Ahmad Malik, Megh R. Goyal, 2022-06-30 Phytoremediation has evolved into an important tool to improve the bioremediation process since it is an innovative green technology that uses a wide variety of plants to remediate radioactive metals and elements organics and chemicals from soil sediment surface water and groundwater environmental pollutants Together bioremediation and

phytoremediation technologies provide an effective approach to contaminant abatement Volume 3 of the four volume set identifies and draws a fresh image of existing developments in theoretical and functional implementation systems from recent scientific research studies that consider different facets of bioremediation It also discusses the latest technology and prospects of new soil bioremediation technology and analyzes their domains along with their associated challenges and consequences Other volumes in the 4 volume set Volume 1 Fundamental Aspects and Contaminated Sites Volume 2 Microbial Approaches and Recent Trends Volume 4 Degradation of Pesticides and Polychlorinated Biphenyls Together these four volumes provide in depth coverage of the mechanisms advantages and disadvantages of the bioremediation and phytoremediation technologies for safe and sustainable soil management The diverse topics help to arm biologists agricultural engineers environmental and soil scientists and chemists with the information and tools they need to address soil toxins that are a dangerous risk to plants wildlife humans and of course the soil itself

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