Ecology of wildlife diseases

P. J. Hudson, A. P. Rizzoli, B. T. Grenfell, J. A. P. Heesterbeek, and A. P. Dobson

For real progress, the modeller as well as the epidemiologist must have mud on their boots. (David Bradley 1982)

1.1 Historical background to this book

The majority of living organisms are parasitic in one form or another, be they a virus invading a sea coral, a tapeworm within the guts of your dog, a cuckoo chick in a reed warbler's nest or a lion stealing a hyaena's kill on the African plain. The parasites are intimately linked with their host in a trophic interaction that has fascinating implications for both parasite and host. Most of the more traditional parasite species interact with their hosts at a range of organizational scales that stretches from the miniscule—the molecular battle between the host's immune response and the evading action of the parasite—through to the extensive—the structuring of communities and a driving force in the evolution of biodiversity and sex. These interactions also range over many orders of temporal scale, ranging from short time-scales of the history of an individual infection and an epidemic outbreak to time-scales of endemic co-existence and co-evolution. Few disciplines cover such breadth and few disciplines have developed so rapidly over the past 30 years.

Research areas evolve at different rates, at times needing periods of intense empirical work to set a foundation of understanding so that at other times, novel approaches and new theories can be formulated, and the discipline can expand rapidly. Modern epidemiology is such a discipline. For many years parasitologists focused on unravelling the complex and intriguing life cycles of parasites, describing in detail the stages of the life cycle, the parasitic mode of life, and banking the data in journals and texts, some of which were rather dry and repetitive descriptive lists. Then a series of workers started to realize that parasitology was not just a descriptive science but there were parallels with other disciplines, and the time had come to start synthesizing such disciplines. In our minds, an essential step was taken when Anderson and May (1978) synthesized our understanding of parasitology with the quantitative discipline of population biology. They pointed out that the parasite-host relationship was not simply the impact a parasite had on an individual, but an integral of these interactions at the population level, and at the same time a dynamic process where parasites were flowing from one host to the next; the rate at which this took place was determined by bost behaviour and abundance. Where the hosts were suffering from the parasite insult with reduced survival and fecundity, they were also fighting back in terms of innate resistance and acquired immunity, leading to an evolutionary arms race where both were fighting for their lives and their fitness. They followed in the footsteps of major theoretical figures such as Ross, Macdonald, and Bartlett-but Anderson and May ignited the discipline at the right time. This was consolidated and extended in a meeting held in Dahlem in 1981 (Anderson and May 1982a). In many respects the Dahlem meeting was inspirational—the group of workers produced detailed group reports on what they felt needed to be done

Ecology Of Wildlife Diseases

Michael Thrusfield

Ecology Of Wildlife Diseases:

Wildlife Disease Ecology Kenneth Wilson, Andy Fenton, Dan Tompkins, 2019-11-14 Introduces readers to key case studies that illustrate how theory and data can be integrated to understand wildlife disease ecology **Diseases in the Neotropics** Gerardo Acosta-Jamett, Andrea Chaves, 2024-03-06 This contributed volume focuses on the Neotropical region and explores the environmental ecological and socio economic components that facilitate the emergence of zoonotic diseases This book highlights the primary ecological environmental social and economic variables associated with the risk of maintenance transmission and dissemination of emerging re emerging and neglected infectious diseases in which Neotropical vertebrates are involved It compiles up to date knowledge and research for the neotropical region as well as discusses the current needs of knowledge improvement The chapters include various examples of the cycles of infectious diseases all with world wide relevance where neotropical wild vertebrates are affected or involved Wildlife Diseases Peter Hudson, Annapaola Rizzoli, Bryan Grenfell, Hans Heesterbeek, Andy Dobson, 2002-01-03 The study of epidemiology is an essential part of understanding how infectious diseases emerge and how they affect humans wildlife and wildlife conservation The integration of modelling techniques with parasitology and population dynamics has been hugely significant for our understanding of disease dynamics This book on wildlife epidemiology brings the subject right up to date covering the most recent empirical and theoretical developments in the field Disease in Wild Animals Gary A. Wobeser, 2007-04-03 This book arose out of teaching graduate and undergraduate classes in wildlife diseases It in some ways chronicles my involvement in the investigation and diagnosis of diseases in free ranging wildlife primarily in western and northern Canada since the 1960s It also perhaps reflects the devel ment of wildlife disease study as a discipline Much of the earlier work in this field was purely descriptive documenting the occurrence of various diseases in wild animals I have chosen to retain references to some older and obscure information in this second edition because this body of work provides the foundation for a more analytical approach The literature on health problems in free ranging animals is expanding rapidly I am gratified that the theor ical and quantitative aspects of wildlife disease are receiving more attention than in the past and that role of disease as a factor in population biology is being analyzed My hope for the first edition of this book was that it would serve as an overview of the study of disease in wild animals and of methods that might be used to manage health problem It was and is not intended to be a how to book or an encyclopedic reference to the literature on disease rather it is intended as a seed crystal around which the reader can build The inquiries I have received about a second edition suggest that it has been useful Foundations of Wildlife Diseases Richard G. Botzler, Richard N. Brown, 2014-08-12 Foundations of Wildlife Diseases is a comprehensive overview of the basic principles that govern the study of wildlife diseases The authors integrate theoretical foundations with a thorough examination of the factors that can affect the health and fitness of animals They include specific information on a wide array of infectious agents such as bacteria viruses arthropods fungi protista and

helminths as well as immunity to these agents Also provided is a foundation for the study of noninfectious diseases cancers and prion diseases that affect wildlife Supporting students faculty and researchers in areas related to wildlife management biology and veterinary sciences this volume fills an important gap in wildlife disease resources focusing on mammalian and avian wildlife while also considering reptiles and amphibians Foundations of Wildlife Diseases provides students with a structure for thinking about and understanding infective agents and their interactions with wildlife Each chapter includes an outline select definitions and concepts an overview and summary and literature cited **Ecology of Wildlife Host-Parasite** Interactions Bryan T. Grenfell, 1995 This new collection of articles edited by Bryan T Grenfell includes Factors affecting the evolution of virulence nematode parasites of fig wasps Maintenance of a microparasite infecting several host species in the Seregeti Wildlife disease and conservation in Hawaii pathogenicity of avian malaria Plasmodium relictum in experimentally infected Iiwi Vestiaria coccinia Wildlife Disease and Health in Conservation David A. Jessup, Robin W. Radcliffe, 2023-09-15 Provides wildlife professionals with cutting edge scientific information on the most damaging and newly emerging wildlife diseases Wildlife diseases and their implications are at the forefront of many sectors of scientific endeavor especially in the wake of the COVID 19 pandemic Nearly 60 percent of all human diseases and 75 percent of all emerging infectious diseases are zoonotic Edited by pioneering wildlife veterinarians David A Jessup and Robin W Radcliffe Wildlife Disease and Health in Conservation explores the origins and impacts of as well as the responses to the most damaging and persistent diseases currently threatening wildlife conservation Focusing mainly on newer invasive and controversial wildlife health challenges this book also reexamines classic diseases that provide warnings and important lessons for wildlife professionals and policy makers Each chapter offers cutting edge scientific information and extensive references to help readers plan for respond to and conduct research on these serious health challenges This book Reports crucial findings on newly emerging diseases and how to recognize and manage them Explores the health of critical but often neglected aquatic ecosystems including both vertebrate and invertebrate examples Covers a vast diversity of wildlife health threats from epizootic bighorn sheep pneumonia and African swine fever to sea star wasting disease avian influenza and rabbit hemorrhagic disease Explains zoonotic dangers to humans including coronaviruses Includes information on marine and aquatic species wild ungulate species carnivores and omnivores birds and more Provides insight into the social legal financial and political factors that may override or influence conservation priorities in response to biomedical challenges Featuring detailed and attractive field notes style illustrations by Laura Donohue and essential essays from experts in the field Wildlife Disease and Health in Conservation combines theory and practice to inform and inspire wildlife health and conservation

The Wildlife Techniques Manual Nova J. Silvy,2012-03 A standard text in a variety of courses the Techniques Manual as it is commonly called covers every aspect of modern wildlife management and provides practical information for applying the hundreds of methods described in its pages To effectively incorporate the explosion of new information in the wildlife

profession this latest edition is logically organized into a two volume set Volume 1 is devoted to research techniques and Volume 2 focuses on management methodologies Diseases at the Wildlife - Livestock Interface Joaquín Vicente, Kurt C. Vercauteren, Christian Gortázar, 2021-04-29 Shared diseases among wildlife livestock and humans often transboundary are relevant to public health and global economy as being highlighted currently relative to the global COVID19 pandemic Diseases at these interfaces also impact the conservation of biodiversity and must be considered when managing wildlife While wildlife and domestic livestock have coexisted in dynamic systems for thousands of years spillover disease risks are higher today than in the past due to global patterns of increasing close contact and interactions among wildlife livestock and humans in the context of complex diverse and numerous circumstances Multidisciplinary studies of animal interfaces especially those involving wildlife therefore must be brought to the forefront so that knowledge gaps can be realized and filled to inform managers and policy makers In the first part of the book authors illustrate and discuss ecological and epidemiological concepts related to the interfaces with a vision towards socio ecological system health In addition the history of past animal interfaces provides the necessary perspective to focus current questions better understand present situations and informs how we can best approach the future The second part discusses the myriad of similar and differing wildlife livestock interfaces found around the world from a regional point of view The third part focuses on how to assess the spatial and temporal overlap between livestock and wildlife and authors present new technical innovations about how inter transmissions between wild and domestic populations can be quantified An overview of main modeling approaches available to quantify multi host disease transmission at the wildlife livestock interface illustrated with specific case studies is also presented Finally the need for interdisciplinary approaches and a dedicated thematic field to approach the wildlife livestock interfaces and create opportunities to promote wildlife livestock coexistence is emphasized. The concluding chapter presents perspectives and directions to better understanding disease dynamics at the wildlife livestock interface global change and implications for the future The changing distribution of interfaces ongoing human and environmental changes e g climate warming changes in animal production systems etc and their likely impacts and consequences for the interfaces and disease transmission processes are all discussed Modelling the Effects of Ecology on Wildlife Disease Surveillance Laura Walton.2014 Infectious Disease Ecology and Conservation Johannes Foufopoulos, Gary A. Wobeser, Hamish McCallum, 2022 Integrates the theoretical principles underlying disease transmission with the practical health considerations involved in helping wildlife professionals and conservation biologists to manage disease outbreaks and conserve biodiversity <u>Critical Needs for Research in Veterinary Science</u> National Research Council, Division on Earth and Life Studies, Board on

Agriculture and Natural Resources, Committee on the National Needs for Research in Veterinary Science, 2005-11-18
Research in veterinary science is critical for the health and well being of animals including humans Food safety emerging infectious diseases the development of new therapies and the possibility of bioterrorism are examples of issues addressed by

veterinary science that have an impact on both human and animal health However there is a lack of scientists engaged in veterinary research Too few veterinarians pursue research careers and there is a shortage of facilities and funding for conducting research This report identifies questions and issues that veterinary research can help to address and discusses the scientific expertise and infrastructure needed to meet the most critical research needs The report finds that there is an urgent need to provide adequate resources for investigators training programs and facilities involved in veterinary research

Essentials of Disease in Wild Animals Gary A. Wobeser, 2013-05-07 The interrelationship between wild animal domestic animals and human health is appreciated now more than ever before This is because of the recognition of the involvement of wild animals in diseases of humans and domestic animals the impact of disease on wildlife management and conservation biology recognition of new forms of environmental contamination and academic interest in disease as an ecological factor This is the first introductory level book about disease in wild animals that deals with basic subjects such as the nature of disease what causes disease how disease is described and measured how diseases spread and persist and the effects of disease on individual animals and populations In contrast to authors of many other veterinary books Gary A Wobeser takes a more general approach to health in wild animals recognizing that disease is one ecological factor among many and that disease can never be considered satisfactorily in isolation Rather than focus on individual causative agents and their effect on the individual animal the emphasis is on why disease occurred and on the complex interactions that occur among disease agents the environment and host populations Written by a leading researcher in wildlife diseases this book will fill a knowledge gap for those called to work with disease in wild animals who lack experience or training in the general features of disease as they relate to wild animals Veterinarians ecologists wildlife biologists population biologists and public health Fowler's Zoo and Wild Animal Medicine Current Therapy, Volume 7 R. Eric workers will find this book invaluable Miller, Murray E. Fowler, 2011-07-11 With coverage of current issues and emerging trends Fowler's Zoo and Wild Animal Medicine Volume 7 provides a comprehensive all new reference for the management of zoo and wildlife diseases A Current Therapy format emphasizes the latest advances in the field including nutrition diagnosis and treatment protocols Cutting edge coverage includes topics such as the One Medicine concept laparoscopic surgery in elephants and rhinoceros amphibian viral diseases and advanced water quality evaluation for zoos Editors R Eric Miller and Murray E Fowler promote a philosophy of animal conservation bridging the gap between captive and free ranging wild animal medicine with chapters contributed by more than 100 international experts The Current Therapy format focuses on emerging trends treatment protocols and diagnostic updates new to the field providing timely information on the latest advances in zoo and wild animal medicine Content ranges from drug treatment nutrition husbandry surgery and imaging to behavioral training Coverage of species ranges from giraffes elephants lions and orangutans to sea turtles hellbenders bats kakapos and more An extensive list of contributors includes recognized authors from around the world offering expert information with chapters focusing on

the latest research and clinical management of captive and free ranging wild animals A philosophy of animal conservation helps zoo and wildlife veterinarians fulfill not only the technical aspects of veterinary medicine but contribute to the overall biological teams needed to rescue many threatened and endangered species from extinction All content is new with coverage including coverage of cutting edge issues such as white nose disease in bats updates on Ebola virus in wild great apes and chytrid fungus in amphibians Full color photographs depict external clinical signs for more accurate clinical recognition Discussions of the One Medicine concept include chapters addressing the interface between wildlife livestock human and ecosystem health New sections cover Edentates Marsupials Carnivores Perrissodactyla and Camelids Over 100 new tables provide a quick reference to a wide range of topics An emphasis on conserving threatened and endangered species globally involves 102 expert authors representing 12 different countries **Key Topics in Conservation Biology David** Macdonald, Katrina Service, 2009-03-12 This important new book addresses key topics in contemporary conservation biology Written by an internationally renowned team of authors Key Topics in Conservation Biology explores cutting edge issues in modern biodiversity conservation including controversial subjects such as rarity and prioritization conflict between people and wildlife the human aspect of conservation the relevance of animal welfare and the role of nongovernment organizations Key Topics also tackles the management of wildlife diseases and examines the impact of bushmeat extraction and the role of hunting in the conservationist's toolbox Other essays explore basic tools of conservation biology such as computer modeling conservation genetics metapopulation processes and the ingenious use of hi tech equipment Each topic is explored by three top international experts assembled to bring their cross cutting knowledge to a penetrating synthesis of the issues from both theoretical and practical perspectives The interdisciplinary nature of biodiversity conservation is reflected throughout the book Each essay examines the fundamental principles of the topic the methodologies involved and crucially the human dimension In this way Key Topics in Conservation Biology embraces the issues from cutting edge ecological science to policy environmental economics governance ethics and the practical issues of implementation Key Topics in Conservation Biology will be a valuable resource in universities and colleges government departments and conservation agencies It is aimed particularly at senior undergraduate and graduate students in conservation biology and wildlife management and those taking Masters degrees in any field relevant to conservation Conservation practitioners policy makers and the wider general public eager to understand more about important environmental issues will also find this book invaluable Veterinary Epidemiology Michael Thrusfield, 2018-02-15 A comprehensive introduction to the role of epidemiology in veterinary medicine This fully revised and expanded edition of Veterinary Epidemiology introduces readers to the field of veterinary epidemiology The new edition also adds new chapters on the design of observational studies validity in epidemiological studies systematic reviews and statistical modelling to deliver more advanced material This updated edition begins by offering an historical perspective on the development of veterinary medicine It then addresses the full scope of epidemiology

with chapters covering causality disease occurrence determinants disease patterns disease ecology and much more Veterinary Epidemiology Fourth Edition Features updates of all chapters to provide a current resource on the subject of veterinary epidemiology Presents new chapters essential to the continued advancement of the field Includes examples from companion animal livestock and avian medicine as well as aquatic animal diseases Focuses on the principles and concepts of epidemiology surveillance and diagnostic test validation and performance Includes access to a companion website providing multiple choice questions Veterinary Epidemiology is an invaluable reference for veterinary general practitioners government veterinarians agricultural economists and members of other disciplines interested in animal disease It is also essential reading for epidemiology students at both the undergraduate and postgraduate levels **Urban Biodiversity and Equity** Max R. Lambert, Christopher Schell, Christopher J. Schell, 2023 Urban systems have a long history and continued legacy of social inequality that govern how cities are both built and managed This novel text not only highlights these connections but also illustrates the interdisciplinary approaches needed for advancing a new justice centred approach to Infectious Diseases of Wild Mammals Elizabeth S. Williams, Ian K. Barker, 2008-02-28 Infectious nature conservation Diseases of Wild Mammals Third Edition presents the latest information on the diagnosis and treatment of infectious disease in both free ranging and captive wild mammals Editors Elizabeth Williams and Ian Barker have recruited 71 contributors all noted experts in their fields to update this new edition This reference provides valuable information on each disease including Etiology History Distribution Epidemiology Clinical signs Pathology Immunity Diagnosis Treatment Control This latest edition is a leading reference book for Wildlife biologists managers and rehabilitators Biology students Conservationists Public health workers **Infectious Disease Ecology and Conservation** Johannes Foufopoulos, Gary A. Wobeser, Hamish McCallum, 2022-02-10 Emerging infectious diseases pose an increasingly serious threat to a number of endangered or sensitive species and are increasingly recognized as one of the major factors driving species extinction Despite the significant impact of pathogens on conservation no single book has yet integrated the theoretical principles underlying disease transmission with the practical health considerations for helping wildlife professionals and conservation biologists to manage disease outbreaks and conserve biodiversity This novel and accessible book starts with a foundational section focusing on the role of pathogens in natural ecosystems the dynamics of transmission in different environments and the factors driving wildlife disease outbreaks It then moves on to more applied issues concerned with the acquisition of field data including sampling experimental design and analysis as well as diagnostic analyses in both the laboratory and field Guidelines for effective modelling and data analysis follow before a final section is devoted to disease prevention and control including the prevention of novel outbreaks the use of diseases as biocontrol agents and the associated issues of ethics public communication and outreach Infectious Disease Ecology and Conservation is primarily aimed at advanced undergraduates graduate students and established researchers in the fields of conservation biology disease ecology population ecology and

veterinary science It will also be a valuable reference for conservation practitioners land managers and wildlife professionals who are required to deal with disease outbreak problems Behavioural Responses to a Changing World Bob B. M. Wong, Ulrika Candolin, 2025-04-23 For many animals behavioural adjustments represent the first response to human modified conditions By improving reproduction and survival such adjustments can play the lead in maintaining viable populations in the face of rapid environmental change Behavioural responses however can also be maladaptive and reduce individual fitness particularly if favourable reaction norms have not yet evolved because animals are encountering conditions that they have never experienced before Clearly behaviour matters But how can we capitalise on our understanding of animal behaviour to improve conservation and management outcomes Behavioural Responses to a Changing World Challenges and Applications a companion volume to the first edition published in 2012 examines wildlife behavioural responses to human induced environmental change through a translational lens Despite considerable and growing interest in research on the topic the predictive value and practical application of what has been learned remains underappreciated and underutilized in the context of developing real world solutions To redress this the current book builds upon the foundations of the original volume but with a more applied perspective that focuses on highlighting how different forms of environmental challenges from climate change to urbanisation influence animal behaviour and how we can effectively harness knowledge of animal behaviour to effect practical solutions to predicting and mitigating the weighty impacts of a radically changed and changing world

The book delves into Ecology Of Wildlife Diseases. Ecology Of Wildlife Diseases is an essential topic that needs to be grasped by everyone, ranging from students and scholars to the general public. The book will furnish comprehensive and in-depth insights into Ecology Of Wildlife Diseases, encompassing both the fundamentals and more intricate discussions.

- 1. This book is structured into several chapters, namely:
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