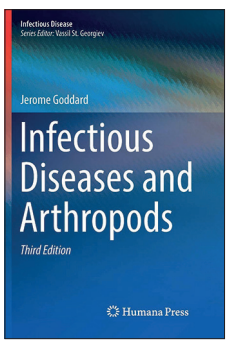
Arthropods and infectious diseases



Published **Online**
November 5, 2019
https://doi.org/10.1016/S1473-3099(19)30639-5

Infectious Diseases and Arthropods Paperback
Jerome Goddard
Humana, 2018
pp 296, £119·99
ISBN 978-3030093464

Arthropods are vectors of many emerging infectious diseases, so the third edition of *Infectious Diseases and Arthropods* by Jerome Goddard is a good starting point for the basic knowledge that medical professionals should have on this topic. The textbook is richly illustrated with maps and drawings of arthropod morphology. The inclusion of several personal anecdotes from the author, such as his investigations of the transmission of Eastern equine encephalitis, makes it a lively read. However, the book is somewhat biased toward case descriptions from the USA. For example, Rocky Mountain spotted fever transmission by ticks and the mosquito-transmitted encephalitis viruses (Saint Louis, La Crosse, and West Nile) are discussed in detail, with much less reference to the epidemiological situation elsewhere, such as the emergence of West Nile virus in southern Europe and the possible risks for northern Europe. For further reference, the reader is often directed to the US Centers for Disease Control and Prevention. As prevention and treatment guidelines differ across countries, the readers should be aware that the situation could be different in their location.

The book is structured in three main parts, starting with general information on arthropod identification and transmission routes in Part 1. This part also contains a discussion on the incrimination of vectors, an area that is often overlooked by people with no background in medical entomology. Finding a pathogen in an arthropod collected from the field does not imply that this arthropod contributes to disease transmission. Laboratory and further epidemiological evidence is needed to support such claims. Part 2 discusses diseases transmitted by different arthropod groups (mosquitoes, ticks, fleas, sand flies). The part ends with a chapter on miscellaneous vector-borne diseases, including Chagas disease, African sleeping sickness, and onchocerciasis. Given their impact on public health and the economies of affected countries, these diseases deserve a more important status than miscellaneous, for example as neglected vector-borne diseases. One group of arthropods that was not considered in Part 2 are the biting midges (family Ceratopoginidae). Although mostly known for their nuisance biting and disease transmission to livestock (bluetongue, Schmallenberg, and African horse sickness viruses), they do transmit Oropouche fever virus to humans. This virus is thought to cause the second most common febrile disease in Brazil after dengue fever, so certainly warrants attention. The book concludes with Part 3 that discusses the contribution of arthropods to illness other than by pathogen transmission, such as stings, bites, allergies, and myasis.

In my view, the book would benefit from an introduction on some basic epidemiological concepts, most notably the basic reproductive number for arthropod-borne diseases and how estimates of this number relate to estimates for other airborne or contact-borne diseases. The basic reproductive number also provides insight into the drivers of vector-borne diseases, such as vector population abundance, host preference, and the time it takes for the pathogen to complete its development inside the vector (extrinsic incubation rate). An appreciation of the basic reproductive number in the context of vector-borne diseases would provide the reader with several tangible options for control of vector-borne diseases, such as with insecticides or sterile insect techniques, and for bite prevention, such as through the use of bednets and repellents.

As the field is evolving rapidly, the third edition of the book definitely benefited from the inclusion of recent examples of emerging diseases (Zika and chikungunya viruses), as well as of novel insights into certain conditions, such as red-meat allergy triggered by tick bites and the subsequent consumption of red meat. Additionally, the book points out that some paradigms from older textbooks in medical science might not be so clear-cut. For example, the classic division of the Old World and New World forms of leishmaniasis is probably not realistic, and a whole spectrum of disease manifestations, from cutaneous to visceral, probably exists.

The author himself is an experienced entomologist with an extensive track record in the field of vector-borne diseases. Although the preface mentions that "the text obviously leans heavily towards the organismal side of each disease, with, in some cases, less emphasis on clinical aspects", the chapters are sometimes full of medical jargon that might not be directly understood by a novice reader. The signs and symptoms of arthropod-borne diseases, included as Appendix 1 in the book, deserve to be expanded. Including definitions or explanations of several frequently occurring disease symptoms, such as myalgia, arthralgia, and thrombocytopenia, could help the non-medical reader to appreciate the complexity of disease diagnosis.

In conclusion, the book can be used as a quick reference guide to the most important diseases caused by arthropods and to other impacts that result from the (blood)feeding nature of these creatures. After finishing the book, you might least think twice before smashing that pesky mosquito that bothers you during the night.

Constantianus J M Koenraadt

Constantianus J M Koenraadt, Associate Professor of Medical and Veterinary Entomology, University of Wageningen, Wageningen, Netherlands