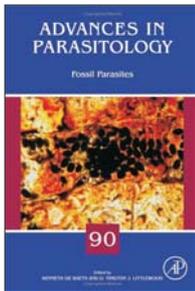




## The natural history of parasites



**Kenneth De Baets and D. Timothy J. Littlewood 2015. *Fossil Parasites. Advances in Parasitology* 90, 458 pp. Academic Press, Elsevier. ISBN: 978-0-12-804001-0. Price EUR 140.25; eBook EUR 140.25; print book + eBook EUR 198.00.**

Parasites are organisms of notoriously bad reputation. This is not surprising, as they benefit at the expense of their host organisms. Today, parasites are everywhere (living on both land and in water) and diverse (having representatives among bacteria, animals and plants). They have roamed on the Earth for

hundreds of millions of years, adapting to various invertebrate and vertebrate hosts, including hominids and modern humans later on in the Cenozoic era. This indicates that parasites have achieved great evolutionary and ecological success. However, many issues concerning parasites and parasitism—such as its origin, evolution, co-evolutionary patterns, geographical dispersion, and even how to recognize it in the fossil record—are still problematic.

The problems outlined above are presented in the new book entitled *Fossil Parasites*, edited by Kenneth De Baets and Timothy Littlewood. The book contains ten, independent chapters concerning different problems of parasites and their hosts both in the fossil record and (pre)historic times, written by renowned and respected authors. I must say that I like such books because I am sure that the information provided on a particular problem is authoritative and up-to-date. Chapter 1 is an introduction by Kenneth De Baets and Timothy Littlewood which provides an outline of the fossil record of parasite-host associations, shows different research techniques used to study ancient parasites, and emphasizes the importance of molecular methods in deciphering and calibrating parasite phylogeny and evolution. In Chapter 2, a specialist on palaeontomology and palaeobiology of amber, George Poinar Jr., shows what is currently known about the fossil record of parasitic nematodes, as evidenced from amber, sedimentary rocks and coprolites. In Chapter 3, Kenneth De Baets and colleagues thoroughly review the origin and evolution of parasitic flatworms not only based on fossil material, but also on molecular data. It is followed by a large Chapter 4 in which Christina Nagler and Joachim Haug present insects as both parasites and hosts. In Chapter 5, John Huntley and Kenneth De Baets show us how to recognise and how old are trace fossils evidencing parasitic trematode-host bivalve interactions. Adiël Klompmaker and Geoff Boxshall present the crustaceans as both parasites and hosts in Chapter 6. Then, in Chapter 7, Stephen Donovan, on the basis of fossil crinoid and echinoid hosts, indicates that not all preserved traces may be confidently interpreted as induced by parasites. In Chapter 8, Paul Taylor discusses the problems of parasitism in colonial organisms (stromatoporoids, corals, bryozoans, graptolites), stressing that many symbiotic associations lack convincing evidence of parasitism. The authors also present the current, best methods for parasitological research on archaeological material.

The next chapter, Chapter 9 by Adauto Araújo and colleagues, concerns the records of human parasites found in archaeological materials, as mummies, coprolites and associated sediments, and the interesting problem of geographic dispersal of various disease-induced parasites. The last chapter, Chapter 10 by Piers Mitchell, focuses on human parasites during the medieval times in Europe, outlining the problems of lifestyle, sanitation, medical treatment and infection spreading in the populations.

As I shortly summarized above, the book contains a variety of interesting topics related to parasites from both deep-time and historic periods. The chapters are well-written, very informative and supplemented with up-to-date references which is very useful for anybody who wants to reach every important source on a given problem. Because the authors not only provided information derived from the fossil record, but also from modern environments, the book can actually be treated as a compendium on the natural history of parasites. Importantly, the authors not only provide and discuss examples of preserved fossil parasites, but also emphasize how it is often difficult to recognize true parasitic relationships to the host. This is primarily due to the very low fossilization potential of the majority of parasites and thus the equivocal nature of the traces (e.g., borings, galls) left in the host's skeleton. And even if the skeletonised symbiont is preserved within the host's skeleton we are still not sure whether we have a parasitic or commensal relationship, simply due to the lack of any data concerning the potential benefits and losses in this symbiotic association. Regardless, despite such general difficulties, the problem of parasitism in the fossil record is still fascinating and worth of exploration using different, complementary techniques, what is clearly emphasized in the book.

I think it is an important book for all palaeobiologists interested in ancient symbiotic relationships, as well as for those archaeologists who are interested in parasites and parasite-induced diseases in prehistoric times. By showing the current knowledge and future perspectives on the study of fossil parasites, the book serves as an impetus and a “road-sign” towards further works in order to better understand the problem, especially nowadays when various, sophisticated research techniques and methods are widely available and may be used for different kinds of fossils and sedimentary rocks. This, for example, concerns the fossil faeces (coprolites) from Palaeozoic and Mesozoic eras. These fossils may be locally very abundant in both terrestrial and marine sedimentary rocks of various ages, and although known for good preservation of plant and animal remains, they haven't been investigated in detail with respect to potential preservation of parasites. I hope that thanks to this book, the thorough study of such fossils will begin soon and provide new, exciting information.

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