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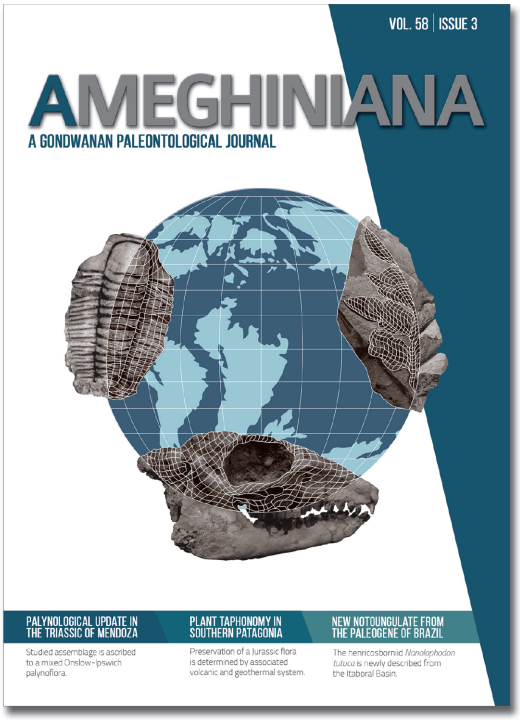

THE EVOLUTION AND FOSSIL RECORD OF PARASITISM. IDENTIFICATION AND MACROEVOLUTION OF PARASITES

Kenneth De Baets and John Warren Huntley (Eds.) 2021. 565 pp. Topics in Geobiology 49. Springer International Publishing. ISBN 978-3-030-42483-1 (paper). ISBN 978-3-030-42484-8 (ebook).

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PALYNOLOGICAL UPDATE IN THE TRIASSIC OF MENDOZA

Studied assemblage is ascribed to a mixed Onslow-Ipswich palynoflora.

PLANT TAPHONOMY IN SOUTHERN PATAGONIA

Preservation of a Jurassic flora is determined by associated volcanic and geothermal system.

NEW NOTOUNGULATE FROM THE PALEOGENE OF BRAZIL

The henricosborniid *Nanolophodon tutuca* is newly described from the Itaboraí Basin.

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THE EVOLUTION AND FOSSIL RECORD OF PARASITISM. IDENTIFICATION AND MACROEVOLUTION OF PARASITES. *Kenneth De Baets and John Warren Huntley* (Eds.). 2021. 565 pp. Topics in Geobiology 49. Springer International Publishing. ISBN 978-3-030-42483-1 (paper). ISBN 978-3-030-42484-8 (ebook).

Although more than 50% of the extant species are at some point parasites, parasitism as a kind of biological interaction is usually overlooked in ecological analysis. In the fossil record, the situation is worse: most parasites are small and soft bodied, many parasitic relations do not leave traces on the host tissues, and even when parasites and their hosts enter in the fossil record it is difficult to certainly assert the parasitic quality of their relationship. Thus, it is understandable that the numerous compilations on current parasitism contain very few mentions about their evolution and their fossil record. However, this biological interaction has a rich fossil record, which is of great value for understanding ancient ecosystems, their evolution and the origin of extant parasitic relationships.

"*The evolution and fossil record of parasitism*", edited by K. De Baets and J.W. Huntley, is volume 49 of Topics in Geobiology. The book comprises eleven chapters produced by 20 authors. Chapters review almost all important group of parasites. Chapter 1 deals with parasites in fossil vertebrates, provides an overview of macroparasites like cestodes, trematodes, nematodes, acanthocephalans, monogeneans, copepods, isopods, pentastomids, ticks, and insects; compares them with their extant counterparts, discuss their relevance for the comprehension of the evolution of parasitism and the ecology of their hosts, and suggests future research directions. Chapter 2 discusses the fossil record, based in direct and indirect evidences, of parasitic viruses, bacteria and protozoa. Chapter 3 provides selected examples of the fossil record of parasitic associations of fungi with plants, algae, other fungi, and animals. Chapter 4 deals with Cnidaria, briefly describes some parasitic Hydrozoa and discusses the parasitic and highly speciose clade Myxozoa, inferring their possible evolution with molecular clocks and cophylogenetic investigations. Chapter 5 studies parasitic bivalves from the marine superfamily Galeommatoidea and the freshwater order Unionida, describing their origins and their adaptations to parasitism. Chapter 6 describes parasitic and carnivorous grazers' gastropods, analyzing their occurrence in extant families and providing clues to recognize possible parasitism in extinct clades. Chapter 7 presents the fossil record of helminths, comprising taxa form Annelida, Pentastomida, Platyhelmithes, Nematoda, Nematomorpha, and Syndermata, and discusses about their origin. Chapter 8 analyzes the ecology and evolution of Acanthocephala, a group of thorny-headed worms that are arthropods and vertebrates parasites. Chapter 9 describes parasitic Chelicerata: Pycnogonida, Acariformes and Parasitiformes, trace their origins and list their fossil record, an also that of chelicerates as hosts of parasites. Chapter 10 summarizes the knowledge of the different groups of extant parasitic crustaceans, their evolutionary history and their fossil record. Finally, Chapter 11 deals with parasitic insects, analyzing all orders in which parasitism is present, describing their fossil record, their evolutionary history and their importance in comprehending the ecology of fossil paleoecosystems.

All chapters have a similar organization and are easy to read and consult, since they are separated in paragraphs by subtopics, have many tables, graphics and high-quality illustrations, and provide a large and up-to-date bibliography. Major issues covered are descriptions of extant host-parasite relationships, their fossil record and the way in which parasites and their effects can fossilize, and the history of parasitism using not only the fossil record but also modern tools as genomics and molecular clock analyses.

Parasitism is a kind of biological interaction very difficult to define, with imprecise limits and intermediate between commensalism and predation. Although the different chapters, in their subject, define their numerous subcategories, as (temporary, ecto-, endo-) parasitism, cleptoparasitism, parasitoidism, parasitic castration or micropredation;

a general definition of parasitism, its scope and its different subcategories would have been desirable as an introduction. Unfortunately, paleobotanists will not find this book useful, as plants as parasites have been excluded, and as hosts they are only mentioned in detail in Chapter 3, which deal with fungi. Furthermore, not all chapters have the same interest from the paleontological point of view, one example of this is Chapter 4 (Cnidaria) which deals with the enigmatic Myxozoa group and other soft bodied cnidarians with no fossil record.

Even so, this welcome compilation provides up-to-date information on the knowledge achieved so far on this important and often neglected topic, underline its relevance in the analysis of extant and fossil ecosystems, and constitutes an indisputable source of consult and a platform for future studies.

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