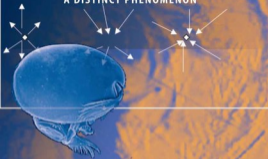


Ashraf M.T. Elewa

Editor

Predation in Organisms

A DISTINCT PHENOMENON



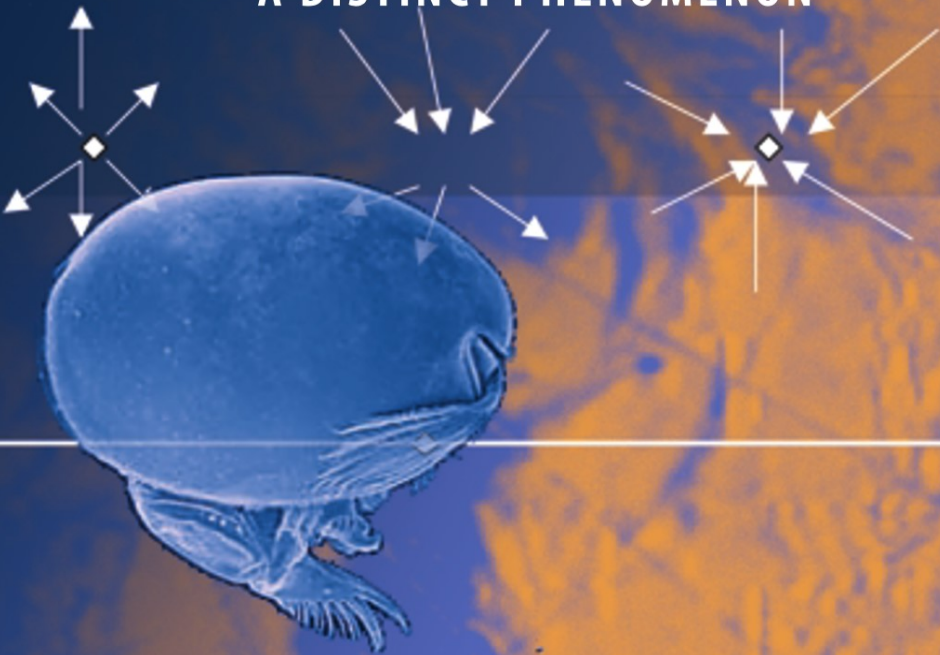
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with 48 Figures and 9 Tables

 Springer

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Dedication

This book is dedicated to my advisor:

Prof. Dr. Richard Arthur Reyment of the Swedish Natural History Museum

Actually, he is one of many Christians who could understand Islam in its right way as a great religion inviting all peoples to **PEACE**

Foreword

André J. Veldmeijer

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When Professor Ashraf Elewa asked me to start this volume on predator-prey interactions, I felt privileged. As a palaeontologist, I came in contact with Professor Ashraf Elewa when corresponding on his previous book on morphometry. Currently, Professor Ashraf Elewa works at Minia University in Egypt, as president of the Palaeontology Group of the Geology Department of the Faculty of Science. Egypt, including Amarna at the opposite side of the river Nile of Minya, also happens to be the focus of my archaeological research on ancient Egyptian leatherworks. It's a small world....

The science of palaeontology has changed considerably over the last few decades. The use of powerful techniques and high tech tools such as X-rays and CT-scanning enables the palaeontologist access to information previously not within reach. Furthermore, scientists look more and more at other sciences, borrowing whatever may give new impulse to their research. These developments have, for instance, resulted in the extensive use of cladistics, but also provoked a shift in palaeontology from the more descriptive way of the early pioneers towards a more 'experimental' approach nowadays. More and more, palaeontologists focus on the animals itself, trying to reconstruct their way of life: behaviour, reproduction, food gathering etc. rather than regard the taxonomy as the ultimate goal. Ideally, a holistic approach could follow, combining data from other disciplines such as palaeobotany and (palaeo)geology but also biological sciences of the present-day fauna. To get insight in a complex system as predator-prey interactions, this is an absolute necessity or, as Richard K. Bambach put it in his foreword to Kelley's et al. 'Predator-Prey Interactions in the Fossil Record'(2003): "It will only be by compiling and evaluating data on predator-prey relations as they are recorded in the fossil record that we can hope to tease apart their role in the tangled web of evolutionary interaction over time."

The present volume is just such a work in its totality but within the various chapters as well. The myriad of topics discusses predation in both invertebrates and vertebrates, in a variety of ways and on various levels.

Examples of studies that combine fossil and modern-day animals are the study on feeding strategies of fossil Ostracoda compared to modern analogues, and a paper in which modern and fossil shells as indicator of biotic interactions are compared. A paper on biological control of mosquito populations shows that the focus is not entirely on the fossil record. A more theoretical paper deals with the evolutionary consequences of predation. Due to a biased fossil record, which favours fossilization of invertebrates, as remarked by Carpenter et al. (2005: 325): “Unequivocal evidence of predator-prey relationships in the vertebrate fossil record is rare owing to the vagaries of preservation and the difficulties of interpretation.” This comes not entirely as a surprise given the better fossilization changes of invertebrates such as shells and the larger number of individuals. Nevertheless, the present volume includes various chapters in which feeding and predation in vertebrates are being discussed with a remarkable variety in topics, ranging from a study on predation in fossil eggs, predation tactics in flightless birds and non-avian dinosaurs to an overview of predator-prey interaction in pterosaurs. Not only will this book be of great value to invertebrate palaeontologist, it will also provide a challenge for those working in the field of vertebrate palaeontology.

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1 An introduction to predation in organisms

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Predation is considered as one of the distinct phenomena related to relations between species to each other on the Earth. According to the Wikipedia, the free encyclopedia, predation is an interaction between organisms (animals) in which one organism captures and feeds upon another called the prey. Some others consider predation as an interaction between two species in which one of them gains and the other loses. As to me, I define predation as a phenomenon of “Antagonism”.

There are several predators living on the Earth, ranging in size from micro-creatures, like ostracods, to big mammals like lions and tigers. Of course, we, humans, think of these big cats as well as reptiles, like crocodiles and snakes, as typical predators. However, spiders, centipedes, most lizards and turtles, and frogs are also voracious predators, some of them are dangerous to humans (see the Wikipedia: <http://en.wikipedia.org/wiki/Predation>). In general, predation is widespread not only in wildlife but also in marine environments where big fishes eat small fishes and other small organisms of the sea.

Anyhow, some important questions arise to mind when discussing this subject: what is behind predation? Why some predators do not benefit from their prey after killing them? Are there genetic origins of this antagonism between organisms? Why some female organisms kill their males after completion of sex? How can we avoid predation? We, editor and contributors, tried to answer these questions through the study of many aspects of predation as well as some relations between species to each other.

In the following I am presenting a summary of the most important books on predation in the last forty years.

Since 1969, when James Frederick Clarke published his book “Man is the prey”, predation has taken a substantial consideration by many scientists on different groups of organisms. Chimpanzees (Teleki 1973), arthropods (Hassell 1978), fishes (Noakes 1983), red foxes and breeding ducks (Sargeant et al. 1984), coyote (Leydet 1988), wolves and black-tailed deers (Atkinson and Janz 1994), reptiles (Cloudsley-Thompson