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An elegant new synthesis of invertebrate life

The invertebrate tree of life by Gonzalo Giribet and Gregory D. Edgecombe 2020, Princeton University Press, Princeton and Oxford, 589 pp., ISBN: 978-0-691-17025-1.

What do you get when two prolific scientists, one an expert in living animals and the other a paleontologist, coauthor a book on invertebrate zoology? A great book! Yes, *The invertebrate tree of life* is a great book, full of details on the biology, phylogenetics, genomics and fossils of the 35 phyla of the Animal kingdom or Metazoa. Gonzalo Giribet and Gregory Edgecombe have digested an enormous amount of literature (the book has more than 3,000 references!) and organized all this knowledge according to a phylogenetic approach.

After an introduction to the origin of Metazoa, their phylogenetic placement within Opisthokonta, their Precambrian and Cambrian fossils, and the phylogeny of the animal phyla, Gonzalo and Gregory navigate through invertebrate diversity in chapters dealing with all the animal phyla, as well as the major clades, such as Planulozoa, Bilateria, Nephrozoa, Deuterostomia, Ecdysozoa and Lophotrochozoa, among others. Let me be clear: the book does not deal “only” with animal phylogenetics. It is about understanding invertebrate animals in the light of their evolution, placing the discussions of particular morphological features or other traits in a phylogenetic context that allows us to speculate on how they evolved. For each phylum, the authors introduce the systematics of the phylum, provide a synopsis of its most important characteristics, discuss relevant biological data (reproductive biology, development, life cycles, ecology, etc.), refer to the most recent analyses based on genomic data and present the known fossils. Details about fascinating characteristics are abundant, each chapter shows some interesting fact about a particular phylum.

The book provides a wonderful work of synthesis of classic and most recent analyses, incorporating genomic data and the new technologies that led to modern phylogenomics, exploring current debates and contrasting previous phylogenetic hypotheses. But, at the same time, it is a textbook that undergraduate students could use in their courses and a reference for researchers looking for some specific matter. I was impressed as to how clearly the book is written (an old friend used to tell me “writing difficult is easy, the difficult thing is writing easy”), because it is simple enough to be understood by a wide audience but at the same time it is elegant and not pedantic. The most complex details of an organ, reproductive biology, behavior, fossil records or any biological trait are explained clearly and concisely.

In addition, the book is illustrated with schematic drawings, phylogenetic trees of several groups, microscope photographs of anatomical features and beautiful color photographs of the external morphology.

The authors praise Nielsen’s (2012) *Animal evolution* and Brusca et al.’s (2016) *Invertebrates* as their models. I still recall having read the first edition of Nielsen’s book and felt enthusiastic about the possibility of teaching zoology from a phylogenetic perspective. Two decades and a half later I feel the same while reading this book. Maybe I will have to alternate my courses on Biogeography and Systematics with a new one.

Finally, why should biogeographers care about invertebrates? As a cursory examination of the *Journal of Biogeography* can show, biogeography is almost exclusively devoted to vertebrates, vascular plants and some arthropods, chiefly from terrestrial habitats. But the vast majority of the animal phyla are marine and marine biogeography is one of the less explored areas. I hope young (and old) biogeographers can find some marine taxon that deserves to be studied from a biogeographic viewpoint. I hope this book helps them exploring this issue!

Juan J. Morrone

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