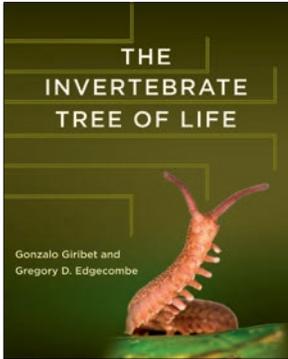




A compendium of zoology



Gonzalo Giribet and Gregory D. Edgecombe 2020. *The Invertebrate Tree of Life*. xvi + 589 pp. Princeton University Press, Princeton and Oxford. ISBN 9780691170251 (hardcover). Price £70.00 / \$85.00.

Palaeozoologists need a zoological reference that would be at the same time more advanced than an undergraduate textbook, but less than an over-detailed (and most often partly unpublished, partly antiquated) multivolume treatise; incorporating modern data and yet treating classical morphological questions

which are most useful when dealing with the fossil record. Such a set of requirements seems nearly impossible to meet, but *The Invertebrate Tree of Life* is a strong candidate.

The book is organised into 55 chapters. Most deal with single phyla, but 13 are about larger taxa, like Deuterostomia. Accounts of phyla always start with a telegraphic style synopsis and end with subchapters on genomics and the fossil record. The book is elegantly edited on good paper and there are very few printing errors.

Figure 2.2 shows the preferred phylogeny of 35 animal phyla, starting with the Ctenophora and the Porifera, recognising subdivisions of the Bilateria into the Xenacoelomorpha and the Nephrozoa, of the Protostomia into the Ecdysozoa and the Spiralia, and of the Platytrichoza into the Rousphozoa and the Lophophorata. Entoprocts and bryozoans are listed among the latter, to cite just a few key points of metazoan interrelationships. In contrast to Erwin et al. (2011), no extinct phylum is recognised.

The “one phylum–one chapter” rule is both the strength and the weakness of the book. It allows a macroevolutionary focus on body plans. But providing similarly-sized listings of subdivisions results in unusual-looking juxtapositions of minor phyla classified down to species (e.g., a complete list for the Xenoturbellida) with the arthropod system stopping mostly at classes.

The illustrations are of good quality, but rather few; this is understandable in our age when pictorial documents can be found online. The phylogenetic trees and interpretative diagrams are clear and visually pleasing. However, several otherwise excellent photographs lack scale bars or even any indication of the size class of the animal. Figure 17.5 (fossils of Cambrian echinoderms) will probably be quite difficult to understand for a neontologist and could profitably be replaced by interpretive drawings, especially because it accompanies an already too concise discussion of the evolution of symmetry in echinoderms.

I particularly appreciated a short, but clear and informative, introduction on methods used to reconstruct phylogenies, including a basic treatment of molecular techniques.

From my point of view the main strength of this book is its being a readable synthesis of a particularly large amount of data.

The bibliography takes over one sixth of the text, and consists chiefly of recent (post-2000, often post-2015) items.

Conversely, I think inconsistencies in the treatment of the fossil record are the main weakness. The hemichordate chapter contains a full list of extinct orders; some of them consist of a single genus and, with apologies to my graptolite colleagues, are of limited interest for a general reader. Among brachiopods, only selected extinct orders are given (for example, the pentamerides are listed, but the more taxa-rich and common orthides are omitted). Tabulate and rugose corals are discussed in the text, but not listed among the subdivisions of the Cnidaria. The classifications of echinoderms and arthropods list only living forms. The arthropod chapter includes the Trigonotarbitida (about ten families), but the trilobites (about ten orders) are absent.

There is some confusion in the account of Precambrian events in the Chapter 1. Figure 1.1 gives 635 Ma for the “first evidence of metazoans”, but in the text the same date is explained as pertaining to acritarchs of unclear affinities (p. 8). The dating of the oldest well preserved red alga *Bangiomorpha* to 1.2 Ga (given in fig. 1.1) has been revised to 1.05 Ga (Gibson et al. 2017), but on the other hand plausible 1.6 Ga old rhodophytes were described (Bengtson et al. 2017).

The authors state that “[a]lthough it is often said that all major animal phyla except bryozoans appear already in the Cambrian (...), this is not true; about half of the currently recognized phyla (...) do not have a confirmed Cambrian fossil record” (p. 13). In view of a published detailed census of 24 phyla present in the Cambrian (Erwin et al. 2011), it would be interesting to have such a firm statement documented in more detail.

In summary, I think a complete presentation of the invertebrate tree of life should include longer discussions about its dead branches, not less important than the living ones. For a palaeontologist, however, this modern, authoritative, concise, and thoroughly documented, even if sometimes too selective, compendium of zoology is a must-have.

References

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Adam T. Halamski [ath@twarda.pan.pl], Institute of Paleobiology, Polish Academy of Sciences, ul. Twarda 51/55, PL 00-818 Warsaw, Poland.