

Book review

Treatise on Zoology – Anatomy, Taxonomy, Biology. The Myriapoda, volume 2. Brill, Leiden, Boston 2015, x + 482 pp. + 16 color plates. Hardback.

Edited by Alessandro Minelli
ISBN: 9789004156128

The second volume of the Myriapoda monograph of the series Treatise on Zoology – Anatomy, Taxonomy, Biology by the Koninklijke Brill NV academic publisher, deals with millipedes. It has been edited by the well-known Italian taxonomist and evolutionary biologist, Alessandro Minelli, retired Professor of Zoology at the University of Padova but still a very active scientist. It follows the first volume of the same series (vi + 530 pp. + 8 color plates), dealing with Chilopoda, Symphyla and Pauropoda, published in 2011, edited by Minelli as well.

With 16 orders, 140 families and more than 11,000 known species (more than 80,000 estimated to exist, a number comparable to that of the whole of vertebrates, as Minelli sharply notes in his Preface), Diplopoda are the most biodiverse class of this popular group of arthropods, and the third largest class of terrestrial arthropods, following insects and arachnids. Millipedes occurs on all continent except Antarctica, from the marine littoral to high mountains, through a wide range of habitats and microhabitats. As well known, these anamorphic myriapods are mainly terrestrial decomposers; only some species are semicarnivorous and, unexpectedly, few are secondarily adapted to freshwater habitats. Most are epigeic but many subterranean (troglobiont) species are also known. A large number of millipedes have very small ranges. Their level of endemism is therefore high, especially in mountain and oceanic islands, making Diplopoda good biogeographic indicators. Endemic taxa are known not only at species/subspecies rank, but also at higher taxonomic level as, for instance, the Pachybolidae genus *Aphistogoniulus* Silvestri, a Malgasy group of fire millipedes: the habitus of a large bodied arboreal representative, *A. infernalis* Wesener, is illustrated on the front cover of the book, by Denitsa Peneva.

Twenty-two contributors from all over the world have been involved in this second volume of the monograph, mostly from Europe (Bulgaria, France, Germany, Italy, Russia, Serbia), but also from Australia, Brazil, USA. The volume, organized in a preface, 16 chapters, a taxonomic and a subject index, opens with a brief outline of research history (A. Minelli, 6 pp.). Then, a deep account on general morphology (M. Koch, 60 pp., 13 figs) is given.

Integument, including the repugnatory glands, so characteristic in many millipede orders, is treated in the next chapter (S.E. Makarov, 30 pp., 7 figs). Skeletomuscular system and locomotion (M. Koch, 6 pp.), digestive (C.S. Fontanetti, C. Moreira-De-Souza, T. Gimenez Pinheiro, R. Bastão De Souza, A. Francisco, 18 pp., 10 figs), tracheal (G. Hilken, A. Sombke, C.H.G. Müller, J. Rosenberg, 23 pp., 6 figs), circulatory (C.S. Wirkner, W.E.R. Xylander, 8 pp., 3 figs), nervous and neuroendocrine systems (A. Sombke, J. Rosenberg, 19 pp., 3 figs) are described in details. Sense organs (C.H.G. Müller, A. Sombke, 54 pp., 15 figs), the fine structure of which is currently the most active area of investigation in millipedes morphology, are discussed extensively. Biological traits are the object of two chapters on reproduction (A. Minelli, P. Michalik, 28 pp., 6 figs) and development (A. Minelli, 35 pp., 4 figs) respectively, the latter highlighting the growing interest of *Glomeris marginata* as species model in developmental genetics. Ecology of millipedes, including their role in the litter decomposition processes (J.-F. David, 24 pp.), geographical distribution (H. Enghoff, 7 pp., 2 figs) and fossils (G.D. Edgecombe, 14 pp., 2 figs), are also considered. A chapter on phylogenetic relationships of the millipede orders (G.D. Edgecombe, 9 pp., 1 fig.) is also present, thus completing the picture on phylogenetic relationships of Myriapoda published in the volume 1 of the monograph. Lastly, a taxonomic overview (H. Enghoff, S. Golovatch, M. Short, P. Stoev, T. Wesener, 90 pp.) ends the book. This part is inevitably synthetic and is exhaustive down to the families, additionally mentioning all genera in small orders but only a substantial choice of those belonging to the large orders. A section of sixteen color plates completes the picture of the external morphology of millipedes and gives an account of their amazing mega-diversity. The book is well illustrated with near 300 light, TEM and SEM micrographs and line drawings. Near 15 tables summarize the leading information, including a final large table giving an overview of the suprageneric millipede taxa. Each of the above mentioned chapters is a deep and updated review, fully referenced with a list of references at the end (80 pages in all, about 1,600 titles). All the co-authors are renowned experts, morphologists, ecologists, taxonomists

and biogeographers, leading specialists on the topics they discuss. To conclude, coupled with the first volume of the monograph, this book is an excellent tool of reference not only for myriapodologists, but also for those who are interested in the biology, ecology and evolution of soil arthropods and soil biology in general. We are, therefore, grateful to Sandro Minelli for finally completing his editorial project, planned long time ago, of an updated treatise on

Myriapoda (as he tell us in the preface of the first volume), thus filling a nearly century-long gap in the modern zoological literature about this intriguing group of arthropods.

Price: € 172,00 (available from the publisher: <http://www.brill.com>)

Marzio Zapparoli