

Preface

Annelida, the segmented worms, comprise one of the most important taxa of invertebrates. The majority of annelid species occur in the marine environment, but they can be found also in fresh water and terrestrial realms. Especially the marine forms, also known as polychaetes, are one of the most widespread, abundant, and diverse elements of the world benthic fauna. Here, they are present from the upper intertidal down to the deep sea and constitute important members of the respective food chains. In contrast, the mainly terrestrial forms or clitellate oligochaetes are structurally more uniform but nevertheless comparatively speciose and important members in terrestrial decomposer communities. Surprisingly enough, one group of these oligochaetes is closely related to parasitic or carnivorous forms, the leeches.

Although at large comprising somewhat only 21,000 described species, annelids show a remarkable diversity comparable, for instance, with that observed in crustaceans. This diversity could be achieved only by the plasticity of their bauplan constituting prostomium, followed by a number of primarily identical modules, the segments, and the pygidium. Species are usually of median size and do not exceed a few centimeters in length. However, their range is much wider; some of the smallest adult metazoans known belong to this group with body dimensions of less than 0.2 μm – the dwarf male of *Dinophilus* – as well as species exceeding body lengths of more than 3 m, such as *Eunice aphroditois*. The number of segments varies accordingly from less than ten to several hundreds. The marine forms often show broadcast spawning, and primarily, their life cycle comprises a planktonic larva, the trochophore, and a benthic adult. However, there are lots of deviations from this pattern, which inter alia are correlated with life style and body size.

The Annelid volume of the first edition of the *Handbook of Zoology* appeared in the years between 1928 and 1934, edited by W. Kükenthal and T. Krumbach. Especially the anatomical part still serves as a valuable resource of knowledge. However, since then, our knowledge has increased broadly. Although several reviews on annelids have been published, they usually cover only special topics in this group of invertebrates. So around the year 2010, the idea was born that a new edition of this very successful work would be urgently needed. Even more than in former times, today, such a task could not be achieved by a single person or just by a few authorities, and so we began looking for authors who could contribute to such a big effort. Very soon, we had to learn that for many

annelid groups, specialists did not exist in the scientific zoological community or were not available for various reasons. Therefore, it took much longer than originally planned to compile the manuscripts, and in spite of our efforts, there will remain a few gaps of missing chapters. Since all authors have lots of other duties and writing of handbook chapters is rather time-consuming, it took some time to compile the manuscripts from our authors. It was a great advantage that each chapter ready for publication was published electronically in Zoology Online so that the chapters were available for the scientific community quite soon after acceptance. All contributions were peer reviewed and revised prior to publication. For these reasons, and very sadly, the important taxon Clitellata could not be included in the *Handbook of Zoology*. We still hope that it will be possible to supplement this sometime in the future.

This book is the first out of four volumes in the *Handbook of Zoology* series treating the morphology, anatomy, reproduction, development, ecology, phylogeny, and systematics of polychaetes. Polychaetes are seen here as those annelids that do not possess a clitellum. As written above, they comprise one of the most important groups of invertebrates in the marine food web, where they can be found in almost every habitat, often in high abundances. Generally, polychaetes are dominant members of the epi- and endobenthos, but there are also a few holopelagic species. However, a few species managed to colonize even freshwater and terrestrial realms. Moreover, polychaetes may occur in comparatively extreme environments from hydrothermal vents at the ocean floor spreading centers to the terrestrial ground water.

Recent phylogenetic analyses have confirmed that polychaetes constitute nothing else but a paraphyletic assemblage of the more or less plesiomorphic Annelida. Besides a so-called basal radiation, the majority of Annelida, now termed Pleistoannelida, fall into two large monophyletic taxa, Errantia and Sedentaria. In a highly derived position, the latter also comprise Clitellata, the earthworms and leeches. In addition, some taxa that in the past were regarded to represent separate phyla turned out to be nothing else but true Annelida, although being morphologically highly derived especially with respect to one so-called key character, segmentation. These taxa are Sipuncula, Myzostoma, Pogonophora, and Echiura, which are now placed in different positions in the phylogenetic tree of Annelida. This fact impressively demonstrates the adaptive capacity and potential of the annelid bauplan.

This first volume covers members of the so-called basal radiation and the first part of Sedentaria. The chapters are mostly organized treating the families; their arrangement follows the most recent phylogenetic hypotheses. This first volume is supplemented by chapters on the history of annelid research, their fossil record, and an introduction to the phylogeny of annelids and their position in the tree of life. The second volume will be devoted to the remaining Sedentaria, with the exception of Clitellata, and the third volume will treat the Errantia.

All authors that have contributed to the *Handbook of Zoology* have done an excellent job, and we want to

thank them sincerely. We also thank the various reviewers of the sometimes voluminous chapters for their helpful suggestions for improvements, helping to keep the scientific standard as high as possible. Last but not the least, the help of the lectors and employees of our publisher DeGruyter is gratefully acknowledged for their endless help during the publishing process.

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