25. Carrier J. C., J. A. Musick & M. R. Heithaus (eds.): Biology of sharks and their relatives. – CRC Press (CRC Marine Biology Series), Boca Raton, London, New York and Washington, 2004. 596 pp. ISBN 0-8493-1514-X.

Sharks, skates, and rays (the Elasmobranchii) are a well-defined monophyletic group and are united with holocephalans (chimeras, ratfishes) in the class Chondrichthyes (cartilaginous fishes). Living represents are mere remnants of a much older and extremely successful group of fishes with many different lineages that became extinct long ago. Sharks and their relatives are a charismatic group of vertebrates and the immense interest is certainly related to their long evolutionary history, their ability to survive mass extinction events of the last 400 million years, and their anatomical and physiological adaptations. But living sharks and their relatives also present unique challenges for conversation assessment. The peculiar reproductive biology renders it difficult for elasmobranchs to compensate for the fishing mortality they are currently experiencing, and a number of elasmobranch species are probably already on the brink of extinction.

The book edited by Carrier and colleagues represents the latest synopsis of our current knowledge of the evolution, ecology, behaviour, and physiology of elasmobranchs. Thirty-eight highly regarded authorities in elasmobranch research contributed with 19 articles to this outstanding survey. The book itself is divided into three parts: "Phylogeny and Zoogeography", "Form, Function, and Physiological Processes" and "Ecology and Life History".

The first part encompasses 135 pages and begins with an analysis of the origin and phylogeny of early, mainly Palaeozoic chondrichthyans, which provides a substantial summary of the current knowledge of the different groups and discussion on their synapomorphies. In addition, the authors present a phylogenetic analysis of the interrelationships of Elasmobranchii and Euchondrocephali to which the holocephalans belong. Unfortunately, the authors did not provide the data matrix so that it is not possible to reflect their interpretations. The next article presents a detailed review of the historical zoogeography of modern sharks supplying a substantial amount of information on their diversity, distribution, and relationships. The first part of the book concludes with two sections on the phylogeny and classification of batoids (rays and skates) and holocephalans respectively.

The second part covers half of the book and contains nine articles on functional and physiological aspects. Given the wide areas that are covered by this part and the rather limited space available, the articles provide the most profound summary possible. The first article deals with the mechanics of the locomotor system in sharks, rays, and holocephalans. Most of this contribution covers functional aspects of sharks; skates, rays, and holocephalans are conversely considered only briefly. But this is not caused by a lack of interest but by insufficient data. Nevertheless, based on their analyses, the authors present a new model of overall force balance during swimming of sharks. It is evident, that priority of future studies of locomotion in elasmobranchs should be the inclusion of more taxa to develop general models not only for sharks, but also for their relatives. The next article deals with the mechanics of prey capture, not only summarizing those of living elasmobranchs but also considering ancestral forms and tracing so the evolution of feeding mechanics within elasmobranchs. The energetic demands and feeding habits of elasmobranchs are reflected in the following chapters. The remaining articles of this part deal with reproductive and physiological characteristic such as osmo- and hormonal regulation, sensory biology, and the immune system. All contributions in this section of the book exemplify the immense advances that have been accomplished in the last decades but also that there are still big gaps in our knowledge and understanding of the physiology and function of elasmobranchs.

The last part (197 pages) focuses with six articles on the ecology and life history of elasmobranchs. It starts with a review of age estimate possibilities and continues with contributions regarding the life history and population dynamics, the genetic code, predator-prey interactions, host-parasite relationships, and habitat use and migration patterns. The reviews presented in this part of the book show that although there have been many studies we are only starting to gain an understanding of the processes and interactions shaping elasmobranch populations and habitat use. Interestingly, there seems to be an evolutionary trend to chromosome number reduction and a simultaneously increase in chromosome size (article 16). There is also evidence of significant stock structure of genomes in several species despite that fact that many elasmobranchs live in environments with few barriers, which is expected to result in homogenize gene frequencies across wide distances.

Overall, Carrier and colleagues have produced a book that provides fundamental insight into key topics of elasmobranch evolution and biology, but also shows that there are still many gaps in our knowledge of elasmobranch biology. The book will certainly be used over and over again by professionals as well as students. It is a thorough, concise, readable, and highly useful synopsis. Although the book is rather expensive, I recommend it for those working in this area and university libraries will want to obtain it, if for no other reason than enabling graduate students to make use of it. J. Kriwet