



MARSHALL S.A. 2023: HYMENOPTERA. THE NATURAL HISTORY & DIVERSITY OF WASPS, BEES & ANTS. Firefly Books, Richmond Hill, ON, 638 pp. ISBN 978-0228103714. Hardback. Price CDN 95.00.

Stephen A. Marshall is a very respected specialist on the insect order Diptera, in which his research activities are connected with several families, especially their taxonomy and natural history. Besides this group, he also works with parasitoids of the order Hymenoptera. He has also published several scientific and popular papers on this group, as well as larger studies (he is a co-author of the identification key of the Vespidae of the northeastern Nearctic region). Hymenoptera are his love rather than his work, which is wonderfully clear in his new book, "Hymenoptera: The Natural History & Diversity of Wasps, Bees & Ants", which I was delighted to receive for review.

This book is a modern colourful book of a large format, which is full of beautiful photographs of many species. It is mainly focused on the Nearctic fauna, but includes information on species from all regions of the world, including modern problems (e.g., invasion of Europe by *Vespa velutina*). This is clearly indicated by the number of studies cited, which is quite large (nine pages and about 260 references) and includes insects from all biogeographical regions. The book is heavy and has 638 pages.

Following the short introduction, the book consists of three parts. The first part is focused on ecology and has the title "Life Histories, Habits and Habitats of Hymenoptera". Marshall explains the morphology, life strategies, plant-insect interactions, interactions with vertebrates including humans, and many other interesting aspects of the biology of wasps, bees and ants. The reader will find many topics usually omitted from other similar books, like morphology of eggs and larvae, feeding strategies of Hymenoptera, galling, use of Hymenoptera by people and a comprehensive account of the mimics of Hymenoptera and insects that use Hymenoptera as prey or hosts. Especially the parts on mimicry of wasps, bees and ants by insects belonging to other orders, on myrmecophily or on fungi attacking wasps, bees and ants are very interesting, informative and hard to find in other books on insects.

Hymenoptera is a huge insect order and the second part of the book deals with the diversity of bees, wasps and ants. It starts with chapter on phylogeny and then deals with all groups of the order. Every group is characterized by its morphology, ecology and natural history. Large parts of the text consist of legends of the photographs of representatives of each group. Although the book consists of only one volume, the author attempted to include all important groups of this large order. This fact can be thought of as an advantage as the reader is provided with knowledge on a large number of genera and species. However, sometimes it seems the length of the text is restricted by the space available for the descriptions of the photographs, which are a little chaotic.

Last part is shorter and is about the methods used to study wasps, bees and ants. It includes information on collecting, photographing insects or preparing an identification key, and also provides identification tool to families divided into separate keys for Symphyta, Aculeata and Parasitica. This is the widely used division of Hymenoptera and also corresponds with the phylogeny of the group.

I expected much from this book and can confirm I am satisfied. The book is beautiful and full of very good photographs. I prefer a smaller format, but the great number of photographs could not have been included in format A5. For me, the best is the text of the book. Currently, even popular books often use only scientific terms and are difficult to understand for a non-specialist. Marshall's language is simple and more like telling a story than a scientific text. As it is understandable for experts on Hymenoptera and the public alike, the scientific value does not suffer from this fact and it is possible to present scientific problems as an interesting tale. Marshall is certainly more interested in the life history of wasps, bees and ants than most specialists of this group, which is a big advantage. There are many barely understandable books on the ecology of insects, which focus more on mathematical application than the science of living creatures. This book is like a very colourful flower in a green meadow. My thanks to the author for this book and I recommend to other authors that popular-scientific texts should look and read like Marshall's "Hymenoptera".

P. Bogusch
University of Hradec Kralove