

# antenna

## review

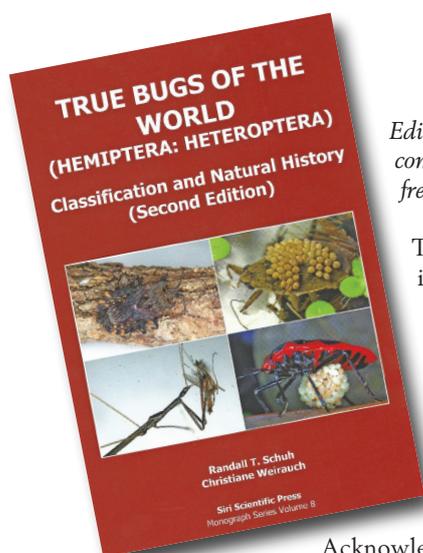
### *True Bugs of the World (Hemiptera: Heteroptera) Classification and Natural History (2nd edition)*

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*Editor's note: This volume was the winner of the Society's 2021 J.O. Westwood Medal for the best comprehensive taxonomic work on a group of insects or related arthropods (including terrestrial and freshwater hexapods, myriapods, arachnids and their relatives).*

This is a new edition of the famous *True bugs of the world* by R.T. Schuh & J.A. Stater, published in 1995. The book is dedicated to Prof. James Alexander Slater (1920–2008), the eminent heteropterist who co-authored the first edition. Despite the authors clearly positioning their book as the second edition of the 1995 manual, the upgrade is so massive that, in my opinion, it would be fair to consider the new edition as a brand-new treatise. It aims to provide a durable tool “to disseminating accumulated knowledge to professionals, students, and teachers”. Every effort has been made to integrate information available both in digital and printed formats.

The book follows the structure and organizational approach of the first edition, with some alterations. It starts with a Table of Contents, followed by a Preface and Acknowledgements. The introductory chapters 1–8 cover: (1) ‘A History of the Study of the Heteroptera’), presenting an overview of attempts at higher classification of true bugs, with particular attention being paid to modern, molecular and combined morphological-molecular hypotheses; (2) ‘Major Historical Workers on the Heteroptera’, presenting short biographic accounts on 116 most notable, deceased heteropterists from the time of Linnaeus onwards; (3) ‘Sources of Information’, including a list of the world zoological museums containing significant holdings of the Heteroptera; (4) ‘Collecting, Preserving and Documenting’; (5) ‘Natural History and Evolutionary Biology of True Bugs’, presenting a succinct overview of heteropteran natural history, including habitat preferences, feeding and reproductive behaviour, nutritional microbial associations, wing polymorphism, and defensive mechanisms; (6) ‘Invasive and Economically Important Heteroptera’, giving a brief summary on the economic importance of true bugs which is organized alphabetically by family and is better read in conjunction with the book on ‘Heteroptera of Economic Importance’ edited by Schaefer & Panizzi (2000); (7) ‘Historical Biogeography’, after a brief overview of the methodology (i.e., ‘pattern-based’ *vs.* ‘event-based’ approaches), documenting general distributional patterns of the Heteroptera based on phylogenetic relationships coupled with tectonic data or areas of endemism; and (8) ‘General Morphology’, providing a useful and well-illustrated (51 B/W drawings) account of external and internal morphology of all life stages of the Heteroptera – a must-read before starting to use the identification keys that follow. The short chapter 9 ‘Heteroptera’ gives a taxonomic diagnosis of the suborder Heteroptera and a key to the seven infraorders according to which chapters 11–131 are organised and presented.

Some of the introductory chapters (e.g., on Historical Biogeography) could hardly be called exhaustive and truly objective overviews, being somewhat biased towards the theoretical framework and methodological approaches personally adopted by the authors. This is also evident in chapter 10 devoted to ‘Fossil Heteroptera’. This chapter presents an extensive survey of fossil true bugs based on the literature published in the last 40 years; over 300 published papers. Indeed, it is a very important addition compared to the first edition of the book. As the authors mentioned themselves their literature review and interpretation are biased by their personal knowledge of western European languages and “inability to read Russian and Chinese”; is it really an excuse? Two tables provide reasonably complete but not exhaustive lists of described fossil taxa: Table 10.1 lists family-group names (i.e., tribes to families; 61 names in total), and Table 10.2 lists senior synonyms of over 600 fossil species; a good deal of species described from compression fossils (e.g., those by Scudder & Cockerell and those by Heer) were not included at all. In the interpretation of fossil taxa, the authors are strictly in favour of cladistic methodology based on extant groups, rejecting, for instance, the notion of ancestor-descendent relationships or such terms as ‘basal’ and ‘primitive’, which “should be abandoned completely in favour of terminology such as *chronologically older* or *lacking the diagnostic features of other groups on the cladogram*”. This approach cannot but cause confusion, because diagnostic features and phylogenetically informative characters are not always the same. Yet, this chapter is truly useful as a starting point in advancing our knowledge of fossil Heteroptera.

The bulk of the volume (chapters 11–131) is devoted to the systematics of all taxonomic groups of the Heteroptera, from infraorders to subfamilies (in some cases to tribes). Each systematic account consists of sections on General Information, Diagnosis, Systematics (most recent data on phylogenetic relationships), Key to (sub)families (and tribes in some cases), Specialized Morphology, Natural History, and Distribution and Faunistics. As a small flaw, the information on distribution and faunistics is not particularly detailed, sometimes even without references cited. All systematic accounts are nicely illustrated by B/W drawings and SEM micrographs. A small drawback of all systematic accounts is that they are focused almost exclusively on extant groups of the Heteroptera, which is hardly surprising because, as evident from the fossil chapter, the authors are rather skeptical about the informative value of fossils.

The rest of the volume contains the following self-explanatory sections: 'Literature Cited', a substantial reference list with 3020 papers, which is a 230% increase over the first edition; 'Glossary' of the morphological terms used in heteropteran studies; 'Index'; and finally, 32 colour plates with 362 photographs.

There is no doubt that this fundamental volume will appeal to anybody interested in Heteroptera, both experts and beginners alike, as a most updated reference book or a tool to family-group identification. Despite the rather high price, it is worth every penny, and it is a must-have for libraries of any natural history museums or universities. The high quality of the book has already been officially recognised: the book was awarded the highly prestigious Westwood Medal for 2021 issued by the Royal Entomological Society for excellence in taxonomy. I am confident that every reader of this book will immediately appreciate its clear style and deep, well thought-out content. Finally, I wish to congratulate the author and publisher for such fine work, which could serve as a model for specialists wishing to write up similar treatises on other groups of organisms.

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