

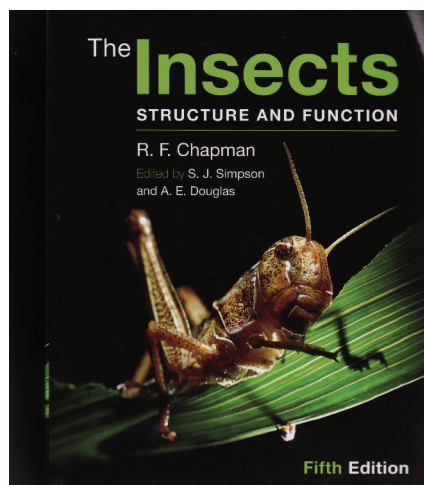
The Insects. Structure and Function

R F Chapman. Edited by S J Simpson & A E Douglas

Cambridge University Press

ISBN 978 0 521 11389 2

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Chapman's *The Insects* has been the acknowledged first port of call for anyone who had a query regarding the physiology of insects. A compendium of authoritative information, it has been the bible of insect function for entomologists from students to professors since 1969. In this new edition each chapter has been revised and updated by an acknowledged leader in their field, providing a synthesis of our current knowledge in that area of research. The list of chapter editors is a role call of international expertise and it is good to see that so many RES Fellows have contributed to this valuable book.

Each chapter now ends with a summary, a list of recommended reading and references. Another new feature is a prologue that introduces an outline of each of the orders that comprise the class Insecta. The biblical length of the book means that few people will sit down and read it cover to cover, but it is a mine of useful and fascinating information in which one can dip and extract the current perspective. This fifth edition is a major revision that brings this book up to date and will ensure that it remains the premier reference in this field.

Peter Smithers

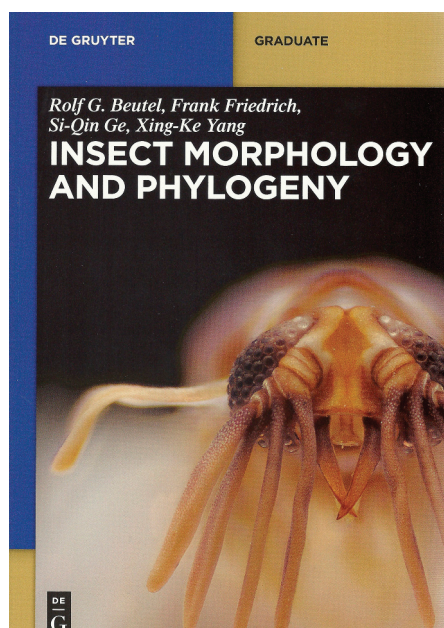
Insect Morphology & Phylogeny

by Rolf G. Beutel, Frank Friedrich, Si-Qin Ge & Xing-Ke Yang

Print ISBN: 9783110262636

Softcover 516 pages, January 2014 (De Gruyter); also available in electronic format

US\$126.00, €89.95



I would like to introduce readers to a new book that tries to cover two broad subject areas and cater to two different audiences: professional entomologists (as a reference work) and undergraduate students (as a textbook, although the subtitle "A textbook for students of entomology" does not appear until the title page). Catering to both these audiences is not easy and requires striking a very careful balance. In some cases I feel this has been achieved whereas in others it has not.

The book consists of the following major headings: Morphology (pp. 1–103), Reproduction, development and immature stages (pp. 104–116), Glossary (pp. 117–142), Traditional and modern techniques in insect morphology (pp. 143–161), Phylogenetic reconstruction based on morphology (pp. 164–173), The orders of Hexapoda (pp. 174–479), Literature (pp. 480–507) and Taxonomic index (pp. 508–516).

In my opinion, the book is more morphology oriented than it is phylogeny oriented. There is excellent coverage of both basic and aspects of advanced morphology (e.g. musculature), with terms explained in the glossary printed in bold. There is a useful section on traditional and modern techniques used in insect morphology, including new technologies such as micro-computed tomography. However, the authors did not differentiate between micro-CT and synchrotron scanning (which are quite different things) despite including a figure of the latter. I also feel they failed to take advantage of the potential 'wow

factors' these new techniques are bringing to the study of insects; for example, revealing the transitional internal development within a butterfly chrysalis (e.g. Lowe et al., 2013). Certainly, additional and stunning images could have been included with regard to these new technologies.

At first sight, it would appear that little of the book is devoted to phylogeny as this chapter is only nine pages long. However, the aim here is to set the scene for the systematic discussions that follow in the section, '*The Orders of Hexapoda*'. Nonetheless, in order to be more useful to both groups of readers I would have expected a general cladogram depicting how all the insect

orders are currently considered to be related. Furthermore, specifically for undergraduates, there should have been some worked examples using data matrices to show how cladograms are constructed, and to illustrate mono-, para- and polyphyletic groups, sister taxa etc. There is also no mention of the supertree approach as is increasingly applied in phylogenetics, including to insects (e.g. Davis et al., 2010).

Even in 'The Orders of Hexapoda' section it is not at first apparent where the phylogenetic contributions are to be found. In this section the following subheadings for each extant insect order are used: Diversity and Distribution, Autapomorphies, Taxonomy, Diagnosis, Morphology, Biology, Reproduction and Development, Fossil Record, Economic Importance. The text is rather devoid of cladograms illustrating the relationships that are discussed under the subheading Taxonomy, and hence would probably have been better expressed as Taxonomy and Systematics. I was very pleased to see sections covering autapomorphies and a diagnosis for each order, although the latter would have been better placed immediately after the former rather than being separated by the Taxonomy section. The numbers of known extant species are provided for each order, but in most cases it is unclear from where these have been derived. In some instances there are considerable discrepancies with other values cited elsewhere in the literature. For example, the authors cite beetle diversity as 31,500 species fewer than that proposed by Slipinski et al. (2011).

As a palaeontologist I was also very happy to see a Fossil Record section, but was disappointed that this was based mainly on Grimaldi & Engel (2005), which despite being an excellent volume is now almost a decade old. There have been significant advances in palaeoentomology since this work was published, and although some are included several important papers are not cited, e.g. for Ephemeroptera, Plecoptera, Embioptera, Phasmatodea and Phthiraptera to name a few. There is also no mention of some of the strictly fossil insect orders. Some are referred to in the text, but it would have been useful to have at least listed these in an appendix, but preferably in a chapter devoted to the immense diversity of the insect fossil record, in order that new students can gain an insight into this important branch of entomology, which has the potential to provide useful insights into phylogenetic questions regarding the modern taxa.

The volume concludes with an extensive reference section and a taxonomic index, with entries limited to family level and above. There is no subject index and so I expect some readers, especially students, will find this rather frustrating. The text reads well and is well illustrated throughout with clear line illustrations, photographs and SEM micrographs. However, there are rather a lot of typos and consistency errors. These are particularly prevalent in the references, where it is easy to find mistakes on every page. The overall physical quality of production of the volume is good.

Despite the above relatively minor quibbles this volume has made a very good impression on me. It is certainly a work I will refer to (and hence I consider it more than just a textbook). Would I recommend it as a textbook for undergraduate student entomology courses? Not necessarily as a stand alone resource, but I would certainly put it on my reading list of recommended works.

References cited

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David Penney

Hymenoptera and Conservation

By T. R. New. 2012.

230 pages. Hard-cover

Published by Wiley-Blackwell, UK

ISBN 978-0-470-67180-1 Price £60

This is another book in Professor New's growing collection of conservation-focused tomes. The book comprises 10 chapters. The first introduces Hymenoptera and their Conservation, explaining their classification and diversity, their importance for conservation and the implications of social life for conservation. From the off, it is clear that the book attempts a global perspective, with lots of coverage of Parasitica as well as bees and ants, and a big emphasis on the impacts of species that have been artificially or accidentally introduced to new parts of the world. 150,000 species of Hymenoptera have been formally described, yet as many as a million species are predicted, with DNA studies showing that many traditional 'species' are in fact species complexes (the author cites the example of *Apanteles leucostigma*, which had been divided into 36 microspecies at the time of writing).

Chapters 2 and 3 concentrate on the use of Hymenoptera in biological control, highlighting the dilemma of accurate screening of host specificity and what can happen when introduced parasites decide to go off-piste and attack non-target, sometimes very restricted, indigenous hosts e.g. in Hawaii. The importance of high quality taxonomy is emphasised.