

## Book review

Krantz, G. W. & D. E. Walter (2009) *A Manual of Acarology*. 3rd ed. – Texas Tech University Press, Lubbock. USD 140.00

After 30 years a new edition, the 3rd, of the famous *Manual of Acarology* has finally appeared. Acarologists from all over the world have for years been looking forward to this central book on acarology in an actualised form. In contrast to the two first editions, which were the result of the admirable work of G. W. Krantz alone, the 3rd edition is authored by 10 scientists, all well-known or even leading researchers in acarology (V. Behan-Pelletier, D. R. Cook, M. S. Harvey, J. E. Keirans, G. W. Krantz, E. E. Lindquist, R. A. Norton, B. M. O'Connor, I. M. Smith, D. E. Walter) with G. W. Krantz and D. E. Walter acting as editors.

Acarology has achieved such tremendous progress during the past decades in every respect that a new edition has been urgently anticipated. The increase in acarological knowledge concerning taxonomy, morphology, phylogeny, behaviour and ecology as well as in applied acarology etc. can be easily seen simply from the increased size of the book. Whereas the 2nd edition comprised about 500 pages, the new one has about 800, whereby the text is organised in a more compact form. There are 337 figure plates, which include more than 1300 drawings and, for the first time, a number of excellent scanning electron-micrographs. Fortunately, the drawings, of which a considerable number are new, are again reproduced in a reasonable size so that the relevant details are clearly shown.

The book is organised in a similar way as the 2nd edition, with the exception that there is only one reference list – including more than 4000 entries – at the end of the book and not after each chapter as in the previous editions. A detailed taxonomic and subject index greatly assists the reader when using the book.

The main purpose of the book is again to introduce the interested reader to the diversity of Acari (about 55 000 species are said to be presently known to science). Thus, about 80 % of the text, written by the experienced specialists, is devoted to taxonomy, dealing with 124 superfamilies and providing keys to them as well as to 540 families, with ticks (Ixodida) keyed even to the genus level. A general introduction to the larger main groups is given and diagnoses are presented for each superfamily, and the families are, besides being figured using selected species, shortly characterised with regard to their peculiarities, including ecological, behavioural or other details. Many references to the relevant literature help the reader find the more specialised information. It is assured that this part alone makes the book a new milestone in the development of acarology.

This admirable main part of the book is preceded by several chapters giving a general introduction to acarology and thus serve in providing a fundamental background and facilitating the use of the taxonomic part of the book. Preface and Introduction, elegantly written by G. W. Krantz, give a first indication of the purpose of the book and an overview of Acari as an ecologically and economically important arachnid group of the highest diversity, which has partly been well-known to man since ancient times. The more specific chapters on Origins and Phylogenetic Relationships, Form and Function, Internal Morphology, Reproduction and Embryogenesis, Oviposition and Life Stages, Habitats and Habits written by Krantz and/or Walter serve to lead the reader towards a general knowledge of Acari and provide a wealth of information. They cannot be discussed in detail here. It is evident that writing general texts about a taxon of such outstanding diversity as the Acari is a very difficult

and almost impossible task when only limited space is available. Thus, the reviewer sometimes has the impression that differences among Parasitiformes (Anactinotrichida) and Acariformes (Actinotrichida), which reflect the deep split between both groups, should have been stressed with more emphasis. Also, the text could not overcome one of the most regrettable draw-backs of acarology as a science: its sophisticated terminology (which may be considered even chaotic by the non-acarologists). It is in part the result of and reason for the unfortunate isolation of acarology within zoology or arachnology. Another reason for the difficult terminology is the adherence of acarologists to different scientific schools. Terminological problems thus make these chapters difficult to read and sometimes even problematic, taking other sources into account. It is thus again regrettable that the attempts of Hammen (e.g. 1980, 1989) to elaborate a precise terminology for all Acari, which could also be applied to all Arachnida, has not yet found general acceptance. For example, the use of the term 'capitulum' for ticks or fresh-water mites instead of 'gnathosoma' by some authors is simply anachronistic. The same applies to the term 'ur stigma', which generally should be replaced by 'Claparède's organ' since the structure is evidently not a stigma. The term 'hysterosoma' has been defined as a body region which is separated from the remaining (anterior part) of the mite body by a sejugal furrow between legs II and III. This is a character found only in Acariformes (Actinotrichida). Other terms are used with different meanings in the literature. This applies also to taxonomic names such as Parasitiformes, which is used in this book in the broad sense (as a synonym to Anactinotrichida), but not always. Perhaps it would have been better to follow the use of this term in the strict sense of Lindquist (1984), i.e., restricting it to the non-opilioacarid Anactinotrichida.

This leads to an important point regarding the book: the classification the authors have decided to adopt. It is appreciated that they have divided Acari into two main groups only: Parasitiformes (s.l.) (= Anactinotrichida) and Acariformes (= Actinotrichida). The subgroups composing Parasitiformes are Opilioacarida (Opilioacariformes is unfortunately still present in the text), Holothyrida, Ixodida, Mesostigmata (= Gamasida) and have been as such accepted over decades by many authors. In Acariformes (= Actinotrichida) more rearrangement has occurred. This has been done – on the one hand – in accordance mainly with the work of OConnor (e.g. 1984), who suggested that the early derivative so-called Endeostigmata are paraphyletic and have in part more bonds with Prostigmata, whereas another part is more related to Oribatida. This in the end results in a split into two major groups within Acariformes: Trombidiformes, comprising Sphaerolichida (part of the former Endeostigmata) and Prostigmata, and Sarcoptiformes, comprising Endeostigmata (the former Endeostigmata except for Sphaerolichida) and Oribatida. This leaves us (like with the term Parasitiformes) with the problem of two meanings of Endeostigmata: s. lato (old meaning, paraphyletic group) and s. stricto (new meaning as in this book). For the sake of clarity it would probably have been better to create a new term, e.g. Alycida (corresponding to Sphaerolichida). A similar problem concerns – on the other hand – the Oribatida. Based on good morphological and biochemical arguments (but not yet molecular ones), it has been suggested that the Astigmatina (= Astigmata or Acaridida) have evolved from within the Oribatida (Norton 1998). This makes Oribatida a paraphyletic group. To avoid this, the authors have expanded the Oribatida to include the Astigmatina. This again is problematic leaving us with s. lato (new meaning) and s. stricto (old meaning) problems. Creating a new term, e.g. Cryptacarida (or something similar), would perhaps have been better. This is similarly relevant for Desmonomata. Instead of using the slightly modified term

Desmonomatides including Astigmatina, a term – perhaps referring to a taxonspecific character – would probably be more distinctive. Of course the same problems also occur when dealing with other parts of the animal kingdom as a consequence of Hennig's demand to discard paraphyletic taxa. For example, doing the same with vertebrates, Mammalia (including man) would have to be included within Osteichthyes (bony fish) as was indeed done by some authors. However, more elegant is the use of the new term Osteognathostomata, including all Gnathostomata with bones. Other examples are Sauropsida instead of Reptilia s. lato. or Ectognatha instead of Thysanura s. lato. Likely, the authors have discussed these problems and they may have refrained from further increasing terminology in acarology, also taking into account that there are still many questions open with regard to acarine taxonomy. Hence, remarkably, they present only one cladogram (on Astigmatina).

The finer taxonomic details cannot be discussed here. Of course, the authors have tried to establish a concise terminology, which consequently leads to a number of modifications in terminology, a problem that cannot be avoided in taxonomy.

The book further gives a broad introduction to techniques that are recommended when practicing acarology: collection, preservation, preparation, maceration, mounting, slide preparation, digital imaging, electron microscopy, molecular analysis, working with live mites are all more or less extensively described taking the diversity of mites into account.

This book, as were the first editions, will certainly be a main reference for all who are interested in acarology, whether representing pure or applied research. It will hopefully help to close the gap between acarology and the remaining arachnology, which is needed to approach a better understanding of the entire group.

Technical production of the book is of high quality. As apparently unavoidable in a book of such scale, there are also some errors or simplifications as indicated above, which also include some inconsistencies between text and figures. But these are few and may be discovered easily through careful reading or by consulting the richly referenced original literature.

The book is a must for all studying Acari on a broader scale as pure or applied researchers and should be available in every scientific library. It is certainly worth its price and it is a pleasure to recommend it.

## References

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