

KRANTZ, G. W., AND WALTER, D. E. (EDS.) 2009. *A Manual of Acarology*. Third Edition. Texas Tech University Press; Lubbock, Texas, 807 pp, ISBN 978-0-89672-620-8. \$175.00.

The third edition of *A Manual of Acarology* has been a long time coming and took 10 years to produce! The second edition was published in 1978, but the third edition just arrived after 10 years of labor by the authors. Contributing authors include Valerie Behan-Pelletier, David R. Cook, Mark S. Harvey, James E. Keirans, Gerald W. Krantz, Evert E. Lindquist, Roy A. Norton, Barry M. O'Connor, Ian M. Smith, and David E. Walter. In the Preface, the editors acknowledge the extensive assistance of Marilyn Houck during 1999-2003 in the planning and preparation of this edition.

Earlier editions of this book have long been a mainstay in acarology courses, especially when a laboratory is offered and students are taught how to use keys to identify mites to family. Like the previous editions, this hefty volume includes a brief introduction to acarine biology, phylogeny, morphology, ecology, and behavior. A chapter provides detailed information on how to collect and rear mites, as well as how to preserve and slide-mount mites. There is an extensive bibliography (114 pages) as well as a systematic (19 pages) and a subject (12 pages) index.

The bulk of the book contains up-to-date information on the classification of mites and keys. Individual chapters with diagnoses and keys are provided for the orders, suborders, and a cohort, with line drawings and other illustrations. Most chapters include keys to families (and in the case of the ticks, keys to genus). This volume includes a new ranking of mite groups compared to the 1978 edition. For example, the order Astigmata (or Acaridida, according to some) is placed in a cohort within the suborder Oribatida, a downgrading of its previous status. Significant other changes also were made in ranking, with the basis for these changes apparently based on morphological analyses rather than the use of molecular phylogenies. This edition indicates there are 6 orders (including the Opilioacaridida, Holothyrida, Ixodida, Mesostigmata, Trombidiformes, Sarcoptiformes) within the subclass Acari.

The identification of mites to family with the keys requires that adult mites (often both males and females) be killed, fixed, and preserved before being slide-mounted for observation under a light microscope. To see the diagnostic characters used in the keys to family or genus, magnifications of 100-1000X are required, and a phase-contrast microscope is highly desirable. As noted by the authors, "Making a good slide mount requires practice and more than a modicum of patience. Pitfalls to be avoided include improper centering of the

medium droplet on the slide, using too little medium to accommodate the coverslip, and failure to rinse reactive macerants from the specimen prior to transfer to the mounting medium." Thus, for the novice, getting specimens properly prepared for identification with the keys in this volume is a substantial task.

This volume will be useful to those who are teaching courses in acarology that include laboratories involving mite identification. It will be valuable to serious acarologists everywhere, as well as ecologists and others interested in this highly diverse group of arthropods. The update in references is a valuable resource for anyone interested in the orders. Information on the biology of mites is updated, although in abbreviated form, but those interested in learning more about a specific group may find references leading to more detailed information. Unfortunately, as Lindquist, Krantz, and Walter point out in Chapter 8, "Discoveries of new mite species, genera, and even families have continued apace, and many of these findings have challenged existing familiar- and generic-level concepts." As a result, this volume may have a limited lifespan because new discoveries will lead to different perspectives in the placement of the acarine taxa. However, this valuable volume represents an enormous contribution of time and accumulated wisdom on the part of its expert authors.

It would have been interesting if the authors had compared their ordinal, subordinal, and generic categories, based primarily on morphological traits, with molecular phylogenies. Mites are highly evolved and have lost many taxonomically useful characters; unlike insects, they lack antennae, wings (and thus, venation), and have lost their primitive segmentation patterns. Molecular data indicate that some 'species' include cryptic species, indicating that it is likely that the categories and keys presented will need modification as we identify new taxonomic groups.

Despite this quibble, the volume clearly is a labor of love by dedicated acarologists, and is a very significant addition to the acarological literature. Enjoy this volume, because the field of acarology (and entomology) is losing skilled taxonomic specialists at a rapid rate, and any future editions of this book may be at least as long in coming as this one.

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