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An introduction to the aquatic insects of North America. 4th edition

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An introduction to the aquatic insects of North America. 4th edition. R. W. Merritt, K. W. Cummins, and M. B. Berg (editors). ISBN 978-0-7575-5049-2. Kendall/Hunt Publishing Company, 4050 Westmark Drive, Dubuque, Iowa 52002 USA. 2008. 1158 pp. \$124.95 (paperback).

Like the 3 previous editions (the 1st was published in 1978), the 4th (revised) edition of An introduction to the aquatic insects of North America has no equal. This edition is, without a doubt, the most complete compilation of taxonomic and ecological information on the aquatic and semiaquatic insects of North America. The editors have stated in the Preface "we hope this new edition will be of even greater use to professional and lay groups interested in aquatic insects." Professors Merritt, Cummins, Berg, and 45 other authors surely have accomplished this monumental task superbly. I have all of the previous editions (several copies of each) and have used them continually for my research and the aquatic entomology courses that I have taught over the past 25 y. I am currently using the revised 4th edition. My students and I have found the taxonomic treatments excellent, and we really appreciate the expanded coverage of the biomonitoring, ecology, and life-history chapters.

New features added to the 4th edition include a galley of color photographs of selected taxa, a comprehensive glossary, and an interactive CD that provides a well-illustrated key and habitat images. This CD operates on both Windows (up to XP) and Macintosh (OS X 10.1–10.3). Ecological Tolerance Values for each taxon have been added to "Summary of ecological and distributional data..." tables at the end of each chapter. The coil binding appears to be better constructed than that of the previous edition, and hopefully, this improvement will help to prevent the covers and other pages from tearing out prematurely.

Apparently, a glitch occurred in the 1st printing of the 4th edition. In a letter dated 25 February 2008 from Kendall/Hunt to buyers who purchased this 4th edition directly at first availability from the publisher, the editors indicated "The beta

version you now own contains significant errors in both content and printing and should not be used. These errors have been corrected." My experience returning the beta version for the corrected printing (ISBN 978-0-7575-5049-2) was excellent. Hopefully, all buyers of this original printing have traded in their copy for the revised version.

Well-known authorities have written the 26 chapters. My objective is to provide a few highlights from each. For example, a useful annotated list of general references can be found in Table 1A in Chapter 1 ("Introduction"). I would have added the fantastic book by Wichard et al. (2002) to the Ecological Treatments listed in the table. Wichard et al. (2002) is listed as reference 5597. Chapter 2 ("General Morphology of Aquatic Insects") is similar to the previous edition. I like the inclusion of new references for using the terms nymph and larvae. Chapter 3 ("Sampling Aquatic Insects") has been updated, and many new references have been added. This chapter is crucial for anyone learning how to sample aquatic insect communities and for those who think they already know how to sample adequately. Chapter 4 ("Aquatic Insect Respiration") is a thorough review of the varied respiratory options of aquatic insects. The expanded Respiration and Toxicants section indicates that the effects of environmental stressors on respiration are not definitively understood and that more research is needed. The 48 pages of expanded Chapter 5 ("Habitat, Life History, Secondary Production, and Behavioral Adaptations of Aquatic Insects") could easily have been a separate "Citation Classic!" Alexander Huryn and his colleagues have provided a remarkably succinct summary of the references listed in the 9 pages of Table 5A. Figures 5.5 and 5.6 are a wonderful graphic depiction of the growth of the mayfly, *Isonychia bicolor* (Walker), and a guild of scraping caddisflies from White Clay Creek in Pennsylvania. Chapter 6 ("Ecology and Distribution of Aquatic Insects") has been rewritten and expanded and now covers adaptations to habitat, functional trophic relationships, surrogates for ecosystem attributes, and energetics. This chapter also could be a separate noteworthy publication. Chapter 7 ("Use of Aquatic Insects in Biomonitoring") is completely updated and covers all scales of biomonitoring well. It has excellent information on how to design a biomonitoring program properly. Chapter 8 ("Phylogenetic Relationships and Evolutionary Adaptations of Aquatic Insects") covers a subject that is inherently difficult to review. Nevertheless, my students found this updated chapter perfect in scope and depth.

Chapters 10 to 22 provide an introduction for each order and diagnostic keys to the adults or immatures. Each of these chapters is written by noted experts and presents the most recent updated taxonomic treatment of each group. My students have always found the keys relatively easy to use with some instruction and with a good teaching collection available. Additional new figures are provided in most chapters. These chapters are relatively error-free, and the authors should be congratulated for their painstaking efforts to make each treatment useable for nonexperts. Some groups, such as the Corixidae and Dytiscidae, are challenging for the beginner, and verified voucher material for comparison often is required. Chapters 23 to 26 are generic treatments of 4 common and important families of

nematoceran Diptera, the Tipulidae, Culicidae, Simuliidae, and Chironomidae. The Chironomidae chapter is especially important because it is the only complete treatment available for the North America genera, and many biomonitoring programs now require identification of larval midges to genus. A few typographical errors occur in Chapter 26. On page 896, the couplet that begins 47 (47') should be 48 (47'), and at the bottom of page 937, the couplet that begins 121(121') should be 121 (120').

As in previous editions, the index is outstanding and allows rapid and successful searches for terms and taxonomic names. It is a monumental accomplishment in its own right.

If I were to complain about anything in this book, it would be the “Color Photo Galley of Aquatic Insects.” The quality of many of the photographs is marginal, and some of the insects are misidentified (i.e., **Fig. 5 appears to show a species of Taenionema, and Fig. 24 appears to show an Isoperla**).

The date of publication of the 4th edition is 2008, but major new generic taxonomic changes already have been made. For example, in the mayfly families Ephemerellidae (Jacobus and McCafferty 2008) and Caenidae (Sun and McCafferty 2008), new genera are proposed that are not included in the 4th edition. Of course, this problem cannot be avoided because ongoing research and improved techniques continually produce changes in the field of taxonomy and systematics. Thus, the Preface wisely urges the user to “continually update material in their own areas of interest.”

Literature Cited

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to close By Author

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