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BOOK REVIEW

HECKMAN CH.W.: ENCYCLOPEDIA OF SOUTH AMERICAN AQUATIC INSECTS: EPHEMEROPTERA. Kluwer Academic Publishers, Dordrecht/Boston/London, 2002, viii + 419 pp. ISBN 1-4020-0775-2. Price USD 197.00.

This volume is the second part of this Encyclopedia dealing with the order mayflies, Ephemeroptera and is characterized by the subtitle "Illustrated Keys to Known Families, Genera and Species in South America". The book consists of two main chapters. The introductory one deals with the history and main objectives of the project, and includes a five page general section called "An appeal for quality in taxonomic works". The principal part of this book deals with the determination of both larvae and adults of genera and species of 11 South American mayfly families, of which there are 32 extant families currently recognised, but not all the genera of South America are keyed to species level and some extralimital taxa are included in the keys. The basic general characteristics of the order are defined on p. 13–26 and in chapters on Morphology, Ecology, Preservation and Examination, Taxonomic problems and Suggestions for Improvement. The keys are followed by a list of about 250 references and an index of scientific names.

Anyone who purchases this book should ignore the keys. They are riddled with errors and contradictions, such as adult Siphlonuridae (as *Metamonius*) and Ameletopsidae are grouped with families that do not have veinlets from CuA to the hind margin, an error that any reviewer would instantly find. The characters cited for adult Oligoneuriidae do not apply to South American or any Oligoneuriidae, and this part of the key must have been taken from a North American source when for a brief period the Oligoneuriidae included the Isonychiidae. Heckman keys (falsely) indicate that the following families have a series of veinlets attaching the CuA to the hind margin of the wing: Baetidae, Leptophlebiidae, Ephemerellidae, Caenidae and of

course Heptageniidae, which, like the Palingeniidae and Potamanthidae, are keyed although they do not occur in South America.

If we ignore such couplets, there are still problems: the author fails to accept the absence of hindwings in some Leptophlebiidae and uses Ulmer's 1920 wing terminology for Ephemerellidae, which is not the same as Ulmer used in 1943 and in the introduction where the veins "correspond roughly" with current venational terminology. Then, for Leptophlebiidae he uses a figure of *Penaphlebia fulvipes* from Needham & Murphy (1924), but because the wing venation is not the same he makes up a bizarre and original venational terminology for Fig. 2.17. Oniscigastridae are keyed out with Caenidae because they lack hind wings, although hind wings are clearly illustrated in the figure of *Siphlonella* (accompanied by redrawings of the Australian *Tasmanophlebia*). The key to nymphs is a little better, but the author has obviously confused *Metamonius* (Siphlonuridae here) and *Siphlonella* (Oniscigastridae), and continues to key out families unknown in South America.

Listing all the errors would take more time than it is worth, but here are a few notes for families for which we have more than a passing acquaintance. The nymph attributed to *Hermanellopsis* is actually a species of *Hermanella* according to Savage & Peters (1982), and the nymph of *Hermanellopsis* is unknown. There are presently thirty-two recognized genera of Leptophlebiidae in South America, described from adults (and two with left-over names because the species have not been reassigned).

Of the 32 families, 16 are correctly identified and the others are not. This is a 50% success rate. Is this good enough for ecologists?

Interestingly, the family Polymitarcyidae is one of the few families that can actually be keyed out in the introduction and is illustrated there using the Edmunds & Traver (1954) terminology (never acknowledged), but the key to species of *Campsurus* uses other older terminologies (probably Needham & Murphy, 1924 and Traver, 1947), not the present Edmunds & Traver (1954, as used by Savage, 1983) or Ulmer, 1943, which results in the same vein having different names within the key. When comprehensible, this key uses wing characters refuted by Traver (1947). She stated that the only reliable characters are those of male genitalia but this structure is quite complicated. The figure of *Campsurus pedicellarius* is actually of *Ulmeritoides flavopedes* (Leptophlebiidae) redrawn in the inimitable style of Spieth (1943), while the figure for *Campsurus segnis* is taken from Needham & Murphy (1924) and not from the more detailed and accurate work of Morgan (1929), but no matter whether accurate or erroneous figures are used, the male genitalia of *C. segnis* and *C. pedicellarius* are not similar and the statement that their status is questionable is but a random page filler. Anyone that thinks they can now identify species of *Campsurus* is mistaken.

Another family with which we are familiar is Oligoneuriidae, for which Heckman uses the venational terminology of Demoulin (1952). However, vein CuA of *Oligoneuriodes* is bifurcated and is illustrated as such in the figure from Demoulin (1955). Part of the problem with this key is that the carefully "redrawn" figures of *Oligoneuria anomala* from Eaton are of *Oligoneuriella rhenana*, the common European species. There is no point in continuing.

According to the author, all figures in the Encyclopedia were redrawn from originals. Having done the originals of many of these figures and knowing how much time is involved, we have difficulty believing that all the figures were redrawn (even in some cases with the original labels). Superficially at least, some appear to have been copied using scanning machines, but if wrong, we commend the author for the amazing amount of time spent reproducing such tedious detail. It is a pity he didn't put the same effort into the text.

Most of the figures are at least as accurate as their original sources, which is more than can be said for the text or keys. However, this cannot be said, e.g. for the figure on p. 72, in which an adult of *Campsurus* possesses only six (!) abdominal segments. The author has patched together keys from a variety of sources, with a variety of wing venational terminologies (at least 7), and without apparently reading the text that accompanied the newer keys, which explained the problems of the older keys. The text appears to be an example of the truism "the more time devoted to pretentious writing, the less time devoted to accuracy". The families recognized are those of O'Brien & Wibmer (1978) and new families described after that date are omitted "as they have not been generally accepted". For those unfamiliar with this reference, publications of O'Brien and/or Wibmer (1978), are all on Curculionidae.

After many hours cross-checking, it was decided not to present any more errors or address questionable issues (for example when Heckman thinks two species might be synonymous, he speculates it may be a consequence of interbreeding; when there is bad original figure and a good redescription, he uses the bad original; when a species is *nomen dubium* it is nevertheless included in the keys). Keys and figure legends are always a problem in publications, as authors are so familiar with them they are rarely checked, and errors occur. In this book, however, errors are standard. This Encyclopedia provides some keys to genera. If these are taken directly from a single source, they are as good as the source; modified keys should be avoided.

This Encyclopedia of South America Aquatic Insects: Ephemeroptera is a compendium of errors, most of which were created during the production of this publication. Other works such as the recently published Guía para la Determinación de los Artrópodos Bentónicos Sudamericanos (Domínquez et al., 2001) are much more accurate and cheaper.

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