



Diving Beetles of the World. Systematics and Biology of the Dytiscidae. Kelly B. Miller and Johannes Bergsten, 2016. 320 pp. Hardcover. Johns Hopkins University Press, Baltimore. ISBN 13: 978-1-4214-2054-7 and 10:1-4214-2054-6. £1111.00

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BOOK REVIEW

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This is a beautifully produced book, well-illustrated with colour photographs of the beetles and their habitats, excellent line drawings of morphological features and maps showing the distribution of all the genera.

The book begins with a short Introduction to the family Dytiscidae, mentioning the work now available on such topics as molecular phylogeny, and pointing out that this is the first attempt at a systematic review of the family since Sharp's classic "On Aquatic Carnivorous Coleoptera or Dytiscidae", published in 1882. Next comes a seven-page overview of life history and behaviour, adaptations to aquatic life, dispersal, feeding, defence, associations with other organisms, "other aspects of diving beetle ecology", mating and mating systems and development. This is a very wide-ranging suite of topics and the coverage is of necessity a summary.

The section on habitats, which comes next, occupies six pages and is illustrated with excellent well-chosen photographs. It is very useful to have an account of dytiscid habitats world-wide. Fossil history is covered in just under two pages and this seems adequate for the state of knowledge to date. Collecting and curating are covered in five pages, again well-illustrated. This introductory section concludes with a page on diving beetles and human society, divided equally between conservation, applied entomology and human culture.

At this stage the main part of the book begins – 238 pages devoted to a systematic review of the family. It begins with 17 pages on methods, diagnosis and relationships of the Dytiscidae, history of systematic study, and morphology. The account of the history of systematic study includes a clear phylogeny of the tribes and subfamilies (as Fig. 2.2) based on the most up-to-date analysis of morphological and molecular data. Here there are surprises, such as Laccophilinae coming out close to Cybistrinae and not far from Dytiscinae. The section on the morphology – of larvae, pupae and adults – is detailed, thorough and very well-illustrated. Next come keys to the subfamilies, first for adults, then larvae. These are followed by a key to the genera of terrestrial and subterranean adults – again very fully illustrated with both line drawings and photographs. In the following sections, on the various subfamilies, keys are either directly to genera, in the smaller subfamilies such as Matinae, or first to tribes, then to the genera of each tribe. As is the case throughout this book, the keys are very well-illustrated with line drawings, and there is at least one colour photograph of an adult of each genus. Maps showing the world distribution of each genus are provided.

This section of the book presents a mass of information, much of it new and, to me at least, surprising. I guess I am not the only person with a partial, largely regional, knowledge of the Dytiscidae, and it is this which leads to surprises when presented with a comprehensive world view. Thus I had always thought that *Platynectes* and *Platambus* were closely related genera, but in fact they are in different tribes. Another surprise is the way in which highly distinctive and unusual body forms, such as that of the elongate *Hydronebrius cordaticollis* with the lateral margins of its cordiform pronotum not at all flush with those of the elytra, are mirrored by species in other, not particularly closely related, genera – in this

case *Ilybiosoma cordatum*. The book concludes with 47 pages of references, followed by an index.

It is inevitable that, in a book of such detail and complexity, some errors and omissions will occur. Thus the reference to Holmgren et al. on *Graphoderus* is mentioned in the text but omitted from the list. Not serious as a few moments on the Internet would surely come up with it!

In conclusion, this is an excellent book, a worthy successor to Sharp's great 1882 work, and, although expensive, very good value.

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