

BOOK REVIEW

TURIN, H., L. PENEV AND A. CASALE (EDS.). 2003. *The Genus Carabus in Europe. A Synthesis*. Co-published by Pensoft Publishers, Sofia-Moscow, and European Invertebrate Survey, Leiden; xx + 512 pp., 24 color plates, 217 maps. Price: 95 Euros, available from the Pensoft website: www.pensoft.net/news/first.htm.

As the title suggests, this book is intended to pull together knowledge of European members of the genus *Carabus* and as a synthesis, implies that new information and ideas will emerge. The authors confirm the intent of the book in their introductory chapter by calling it a “comprehensive synthesis,” suggesting it as a model for other beetle groups. The project is necessarily collaborative and the book has 19 prominent carabidologists listed. The list includes exceptional experience in all aspects of research on Carabidae.

The book is prefaced by G. E. Ball who explains why scientifically we should be interested in the group and provides us a sense as to why we might ‘like’ the organisms. The rest of the book is organized into 10 variously authored chapters, grouped as Introduction, Special Part, and General Part, a glossary, addendum, and indices by taxon and author.

In the introduction the editors set out their rationale for a work of this magnitude on a single genus. Reasons include the prevalence of ground beetle studies, the fact that *Carabus* is common in collections, the large body of literature, the popularity of these beetles among many kinds of entomologists, the beetles’ large size, the relatively large amount of rearing experience, and more generally, because they are excellent model organisms for many kinds of biological phenomena. It is historical contingency and certain human predilections that have conspired to make *Carabus* such an exemplar, but it is the keen interest and abilities of this set of authors that allows for a synthetic investigation of the group that can address broader biological questions.

The Special Part includes a checklist based on a “pragmatic solution to classification.” The classification underlies and provides the framework for everything else in the book, and its tentative nature creates a tension and need to consider the implications of the sure-to-change classification as one reads the remaining chapters. The Keys to Adults begins with a useful discussion of the classification history. The key, composed of concise couplets that are generally clear, if less illustrated than one would hope, follows. In some cases couplets are unfortunately reliant on comparative statements like “Pronotum transverse” as compared to “Pronotum less transverse.” Reference to larval characters in couplet 29 and unexplained cross references to brevimandibulares and longimandibulares (couplets 55, 56) are likely to cause less frequent users of keys and individuals without comparative material trouble. With use and accumulation of some specimens, all users will be able to arrive at correct identifications of subgeneric groups.

Likewise the keys to species and subspecies are similarly formatted but necessarily consist of detailed, verging description-length, couplets. Because of morphological complexity and subtlety, the descriptive language will require significant effort to master. Geographical information is woven throughout and will prove invaluable in helping the student of *Carabus* find and identify the numerous forms. In some cases identification relies on characters of the aedeagus, which renders female conspecifics difficult to identify.

The Key to Larvae has an impressive coverage, even if less complete than for adults. About 75% of the European species can be identified by a combination of the key and distributional information. Having only modest experience with carabid larvae and not having any examples of European taxa at hand, I didn’t put the key to use. However, it appears clearly written and sufficiently illustrated, and so will certainly be a useful tool to researchers in need of larval *Carabus* identifications for European species.

Species accounts are assembled from a broad selection of literature and tie together various aspects of this book, as a result it is one of the most valuable and potent sections. Each account includes information on literature, distribution, taxonomy, and biological data in as much detail as is known. This section is an excellent synthesis of published knowledge and shows the depth of understanding for the group the authors have.

The General Part includes chapters on Biology and Ecology beginning with a succinct, although a bit sketchy, account of the reproductive biology and life history of *Carabus* with particularly good summaries of all subimaginal stages. The summaries of various biotic and abiotic aspects of *Carabus* are thorough and well organized.

The chapter on phylogeny is one of the shortest chapters in the book and provides rather limited resolution, select character sampling, and little certain conclusions. This of course is not really the

fault of the editors and authors, as is repeatedly noted in this book. The whole system has been developing over many years, and with recent additions of new data types and methods the phylogenetic hypothesis for the group is in flux. With all the historical baggage loaded on *Carabus* the authors wisely approach the problem with a fresh cladistic analysis for the subgenera. The analysis combines character systems from larvae, the endophallus of the aedeagus, and mtDNA sequence data. The analysis correctly branches out from strictly European taxa to include all available taxa. One conclusion that is quite clear is that much work is still needed on the phylogeny of the genus. I am certain this book will simulate such research.

The editors themselves authored the chapter on biogeography and take a firm stand that their flavor of this field of research, best describe as a narrative reconstruction method, is viable and potent. They regard their methods as "old, but well-proved." By well-proved one must supposed they mean broadly used—by them—as little of the method can be subject to tests and refutation and much of it relies on authoritative description. The chapter provides extensive information on the geologic and climatic history of Europe, exceptionally useful to anyone interested in the region's biotic history. Information on European zoogeographical provinces provides a very interesting means to discuss ecology and conservation of these beetles.

Description of present-day species distributions in regard to ecological and climatic factors is highly informative, as is summary information on *Carabus* fossils. However, the questionable elements of the authors' stated biogeographic methods show through in the discussion of historical aspects. Claims that certain extra-European regions have a stronger 'influence' or that species originated in one area "penetrated" into another implies knowledge of historical directionality that is unsubstantiated. Many such statements are simply ad hoc. The use of "Taxonomic structure" as a biogeographical analysis is particularly unfortunate as the underlying classification and phylogeny, as the authors stated, is simply a pragmatic solution. The use of taxonomic groups that are not demonstrably sister-taxa means, simply, non-equivalent items are being compared. The authors make a rather un-compelling argument that having a proportion of higher ranked taxa in a given region will require an "explanation based on events that happened in the more or less remote past." Clearly this fails to recognize the problematic nature of taxa, ranks, regions, and faunal types, all constructs or decision of the authors. This section shows what can be done with a checklist, a map, and UPGMA and leaves the nature of *Carabus* historical biogeography wanting for critical tests.

The extremely important chapter on Conservation Biology lays out a number of cases of demonstrable declining and threatened species. A variety of causes for declines of *Carabus* are presented and a discussion of action that can be taken to enhance *Carabus* populations are proposed. These go well beyond simply listing taxa as threatened.

In a final chapter, "*Carabus* Evaluations," offers a summary of the work as a whole. It actually would be a good place for readers to start if they are interested in a particular topic and want a better idea where to find it. This, however, does not make up for the lack of a subject index, which would have been a useful addition.

Overall, and aside from specific criticisms I note above, this work suffers from hardly any deficiencies. There are tolerably few errors of grammar and aside from incorrectly describing *Carabus* males as "containing a series of testicular tubes"—all Adephaga have only a single testicular follicle—I detected no inaccuracies as I read the book. Whereas the illustrations in general, e.g., maps and line drawings, are excellent, the photographic images are of marginal quality. Many are poorly focused and obviously images of moribund individuals.

As the title indicates clearly, this work is circumscribed and species treatments are limited to by a geopolitical boundary such that only synonyms described from European locations are included. Therefore, sections like the checklists will be of great use for European collections and collectors. Even with the circumscription to a faunal treatment, this work is certain to be a classic reference and standard set of analyses to test and judge future studies of *Carabus*, Carabidae, and other insect taxa. Indeed the authors are correct that this is a "comprehensive synthesis" that may serve as a model for such works in other groups of beetles. The book's physical attributes, binding and paper are high quality and made to last, yet it is reasonably priced. I recommend it for the personal shelf of the *Carabus* enthusiast and all carabidologists. It should definitely be a resource in any library with an entomological book section as well.

Kipling W. Will, *ESPM Dept.—Insect Biology Division, University of California, Berkeley, CA 94720, U.S.A.*

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