BOOK REVIEW

CIEGLER, J. C. 2003. Water Beetles of South Carolina (Coleoptera: Gyrinidae, Haliplidae, Noteridae, Dytiscidae, Hydrophilidae, Hydraenidae, Scirtidae, Elmidae, Dryopidae, Limnichidae, Heteroceridae, Psephenidae, Ptilodactylidae, and Chelonariidae). Biota of South Carolina. Vol. 3. Clemson University, Clemson, SC. 207 pp. ISBN 0-9712527-7-7. Paperback. $40.00.

The southeastern United States has a rich water beetle fauna that has attracted the attention of many Coleopterists, most notably the classic study of the water beetles of Florida by F. N. Young (1954) and updated by Epler (1996). Water beetles of neighboring states, namely Georgia and Alabama, also have been studied by various authors, and Brigham (1982) reviewed the water beetles of North and South Carolina. However, as pointed out by Ciegler, many of these studies are lists of species without means of identifying specimens or contain omissions of species or lack detailed range and habitat information. Thus Ciegler's study was done to "aid in identification of water beetles of South Carolina and southeastern states, and to document information on distribution as it is known today."

A study of water beetles needs to define its subject, for what is meant by water beetle varies from author to author. Ciegler provides as a subtitle a list of the families she includes so her concept of a water beetle is clearly understood. However, some readers may be surprised to see Heteroceridae and Hydrophilidae, subfamily Sphaeridiinae, included whereas many species with equal affinity to water among families such as Carabidae and Staphylinidae are omitted. Perfectly good water beetles by any definition among the Chrysomelidae and Curculionidae also are omitted although references are given to works that treat them.

The major components of the book include an introduction which briefly reviews the literature on United States water beetles and in more detail works that treat the fauna of eastern and southeastern United States; Physiographic Regions of South Carolina describing principal topographic features and types of aquatic habitats within each region; Material and Methods which outline collection and preservation techniques for water beetles, and sources of material examined; and the systematics section which forms the bulk of the book and provides keys to families of beetles living in or near water, and detailed treatments of aquatic taxa. A comprehensive table of contents and an index make finding information on the included taxa easy. In addition, a glossary of terms used in keys and descriptions, and an appendix relating cities, counties and physiographic regions are presented. A second appendix summarizes taxa reported from South Carolina for the first time (39 of the 374 treated species, which are those actually or likely occurring in the state).

The format of the systematic section consists of keys to taxa and brief diagnostic descriptions. The family level classification follows that of Lawrence and Newton (1995). Most of the keys have been drawn from or modified from other works. For example, the key to families is adapted from Arnett (1960). This has generally resulted in reliable, usable keys. However in some cases older, less easily used keys are drawn on. For example, the key to the diverse members of the genus *Neoporus* (Dytiscidae) is based on Fall (1923), an excellent study but with a difficult key because of reliance on many qualitative and gradational characters, rather than on the keys by Wolf (1984) and Epler (1996) that attempt to define natural groups on the basis of more objectively assessed characters. A brief diagnostic description is given for each taxon at each level. These diagnoses are clear and to the point and greatly aid in confirming identifications made through the keys. Synonymy is treated in an uneven way. For each species a citation of the original combination is given. Synonyms are given for some species but not others. Similarly rather extensive literature citations are given for some species but missing for others. Generally speaking the presence or absence of this information is not important as the citations are available in other works, and the names used are those currently accepted—no nomenclatural innovation is introduced.

The work is abundantly illustrated with photographs, original drawings and illustrations adapted from other publications. Generally photographs of small, shiny, dark beetles do not work very well. However, photographs are used here to give a representation of habitus of the genera and for this purpose they are very effective, for important features for generic recognition are often general body outline and shape. Either a scale bar or a life size reproduction of the photograph is given to indicate scale. The original line drawings are generally well executed and useful in showing characters or character states, but some of computer produced graphics have not been finished so that severe angulations and variation in relative sizes of structures render them rather grotesque.

One of the ways a regional study can make an important contribution is through detailed accounts of the habitats and ecology of the species. For each species a very general account of habitat and collection records, presumably deduced from label data, is included, but these accounts generally give little insight into the specific habitats of each

species. Similarly the described collection techniques are quite general and are an adequate guide to collecting the more common and widespread species but are not helpful for some of the specialist species. For a regional fauna it would be valuable to alert the neophyte collector to some of the methods used to find specialist species, such as *Spanglerogyrus*, which are proving to be more widespread once looked for in their specialized habitats.

In general this is an excellent introduction and guide to the water beetle fauna of this interesting area. Both the newly initiated as well as the experienced collector will find the clearly and pleasingly presented material a good, efficient guide and aid to beetle identification and biology. As a water beetle enthusiast who does not live in the area, and has not and is perhaps unlikely to encounter some of the species in the field first hand, I wished for more details on collecting notes and habitat observations. However, the availability of such a fine guide will no doubt encourage and enable more exploration of this fauna and lead to more publications to satisfy my interests as an armchair naturalist of the area.

David J. Larson
Department of Biology
Memorial University of Newfoundland
St. John's, Newfoundland A1B 3X9 Canada
dlarson@mun.ca

References Cited

ARNETT, R. H. 1960. The beetles of the United States. Catholic University Press, Washington, DC. 1112 pp.

BRIGHAM, W. U. 1982. Chapter 10, Aquatic Coleoptera, pp. 10.1-10.136. *In* A. R. Brigham, W. U. Brigham and A. Gnilka (eds.), Aquatic insects and oligochaetes of North and South Carolina. Midwest Aquatic Enterprises. Mahomet, IL.

EPLER, J. H. 1996. Identification manual for the water beetles of Florida (Coleoptera: Dryopidae, Dytiscidae, Elmidae, Gyrinidae, Haliplidae, Hydraenidae, Hydrophilidae, Noteridae, Psephenidae, Ptilodactylidae, Scirtidae). Bureau of Water Resource Protection, Florida Department of Environmental Protection, Tallahassee. 259 pp.

FALL, H. C. 1923. A revision of the North American species of *Hydroporus* and *Agaporus*. John D. Sherman, Jr., Mt. Vernon, NY. 129 pp.

LAWRENCE, J. F., AND A. F. NEWTON, JR. 1995. Families and subfamilies of Coleoptera, pp. 779-1006. *In* J. Pakaluk and S. A. Slipinski (eds.), Biology, phylogeny, and classification of Coleoptera: papers celebrating the 80th birthday of Roy A. Crowson. Museum i Instytut Zoologii PAN, Warsaw.

WOLFE, G. W. 1984. A revision of the *vittatipennis* species group of *Hydroporus* Clairville, subgenus *Neoporus* Guignot (Coleoptera: Dytiscidae). Trans. American Entomol. Soc. 110: 389-434.

YOUNG, F. N. 1954. The Water Beetles of Florida. University of Florida Press, Gainesville. 238 pp.