

GARRISON, R. W., N. VON ELLENRIEDER, AND J. A. LOUTON. 2006. Dragonfly Genera of the New World. An Illustrated and Annotated Key to the Anisoptera. Johns Hopkins Univ. Press, Baltimore, MD. xi+368 pp. Hardback, ISBN 0-8018-8446-2, \$99.00.

Dragonflies and damselflies are intriguing animals, important predators in and around aquatic environments, and often good indicators of ecosystem health. In the past decade or so the study of Odonata has become increasingly popular with naturalists, students, and scientists alike. Books on regional faunas have blossomed everywhere. Much of this heightened interest is the result of the Internet—the availability of dozens of excellent websites, instant international communication, and digital photography. New and important taxonomic and identification resources, so basic and critical to biology, also have appeared. The latest offering in this line, *Dragonfly Genera of the New World*, written by three experienced and well-known odonatologists, is an illustrated identification key packed with additional descriptive and taxonomic information.

Many experts use the term “dragonfly” to represent the whole insect order Odonata but, as is more and more the case, here it refers only to the suborder Anisoptera (true dragonflies) and does not include the Zygoptera (damselflies). The genera of the Zygoptera will be treated in a forthcoming volume by the same authors.

This superb book is the most important reference on the Order Odonata to appear since the 1999 publication of Philip Corbet's monumental work on the behavior and ecology of Odonata. In the context of specimen identification and faunistics, it is the most significant contribution in decades, for it opens a new door to the most diverse and least known dragonfly fauna on Earth, that of the Neotropical Region. The book treats the genera of all the New World dragonflies, but while the Nearctic Anisoptera (at least north of the Mexican border) is extensively summarized in many taxonomic and identification manuals (e.g., Needham et al. 2000), the Neotropical fauna remains rather poorly known. Much of it still is undescribed and taxonomic syntheses are few and far between. This is partly because of its huge diversity, the remoteness of much of the region, and the relative scarcity of specimens in collections. As T. W. Donnelly (2006) noted in a recent review of this book, the New World tropics have always been a challenge to biologists in many disciplines because the region was first colonized by the Spanish and Portuguese who largely lacked the tradition of natural history studies characteristic of the British, French, Dutch and Germans in Africa, India or Southeast Asia. In South America there simply was no F. C. Fraser to write an equivalent to his three volumes on the Odonata in *The Fauna of British India*. Borror (1945) was an early and wonderful resource for deciphering the genera of the large family Libellulidae in the

Americas. Calvert's hard-to-find contributions on the Odonata (1902-1908) in the *Biologia Centrali-Americana* helped students of the Central American fauna; the updated equivalent by Förster (2001) for Mesoamerican genera is also important. But as far as syntheses and overviews, that's about all there was—until now.

As Donnelly also notes, identifying the Neotropical Odonata has been full of pitfalls, even for veteran experts like him. So it is not surprising that dabblers (like me) in the identification of that huge fauna encounter frustrating problems. Fortunately, I have had friends like Donnelly, Dennis Paulson, or Rosser Garrison (with experience, fine libraries and big collections at hand) to help me with perplexing specimens. Many of us receive more and more requests from eager students in South America asking for help with the literature. Now, as Donnelly says with relief, we all have a helpful answer—“Get Garrison et al.!” How wonderful that all that scattered literature, written in many languages, is condensed in one compact, readable and authoritative book!

The book deals with 124 genera in seven families, including the large family Libellulidae, which here also includes the subfamilies Macroiniinae and Corduliinae, taxa that are given full family status by many authors. Indeed, the three libellulid subfamilies are treated separately, in the same way as the other six families are handled. For each family the following information is given: world geographical distribution, number of genera and species in the world and New World, diagnostic characters (with extensive reference to figures), status of the classification and taxonomic comments, and identification keys to the genera (separate keys to males and females). By the way, the authors list 1019 described species of New World Anisoptera.

The primary goal of the work is the accurate identification of genera and, as the authors note, the higher classification of the Anisoptera used is conservative. Recent phylogenetic analyses, some by the authors themselves, show that parts of the presently accepted classification are artificial and various changes have been proposed. Although the authors comment on many of the phylogenetic problems, they refrain from making innovative changes, no matter how justified, preferring to wait until more research builds better hypotheses concerning evolutionary relationships.

Each genus account includes the generotype designation, the species total for the world and New World, a synoptic list of valid New World species with references to larval descriptions, references to taxonomic revisions, a summary of geographical range and a distribution map, a brief

description including unique characters, the status of the classification with taxonomic notes, a statement about the potential for the discovery of new species, notes and references on habitat and biology, and illustrations of wings, genitalia, and other important taxonomic characters.

The book contains 124 distribution maps; eight color plates, each with three photographs portraying a diversity of genera; and 1626 figures, many with more than one drawing each. This staggering array of figures is a major feature of the work. Who has not been exasperated by ambiguous statements in keys? But here every statement in every couplet is illustrated. The figures are beautifully executed, and almost all are drawn by Garrison or von Ellenrieder themselves. The specimens illustrated are biased towards Neotropical species; this was a conscious decision by the authors, allowing a wider range species of this poorly known fauna to be exposed in print. An unusually complete list of figures further emphasizes the authors' attention to detail—the list includes complete captions, the collection locality of specimens illustrated, the collection where these are deposited, and the name of the illustrator.

The keys are generated by DELTA (DEscription Language for TAXonomy) software, which produces most parsimonious keys using recognized character states and allows easy modification when new characters or taxa are added later. DELTA keys, compared to traditional ones, are often significantly reduced in length; resolution is not lost and ease of use is normally increased. Variation, the downfall of many identification keys, has been well examined—the authors stress that they checked as many species as possible in the keys.

A list of the main collections holding New World Odonata is given as is a brief statement about the strengths of each collection and its contact information. The literature cited is well-chosen and useful. Distributional tables give an extremely valuable summary of genera occurring in each country of the region.

For the pedants among us, I did come across a few minor errors, although I found precious few for a book so dense with detail. *Williamsonia lintneri* is spelled “*litneri*” in all figure captions, including those in the list of figures. Borror's key to the Libellulidae (1945), though cited, is not listed

in the references; J. G. Needham is termed “J. C. Needham” in his last entry in the references; and on the back cover, it's noted that the book contains 1595 illustrations when there are actually 1626. This is a book full to the brim with information and, of course, this is its great value. But on many pages, particularly in the keys, the text and figures are so closely packed that it is often difficult to find the correct route down the page. This is a minor confusion, however, and I'm sure the dense layout was a conscious decision designed to keep the size of the book within bounds and, especially, to ensure that in the keys the illustrations fall on the pages where they are cited.

Dragonfly Genera of the New World is a significant contribution to the entomological literature. It is an original and important base for future work on the Odonata of the Western Hemisphere, a region that contains 30 per cent of the Earth's dragonfly and damselfly species. The book will be a huge stimulus for research in the Neotropics, where so much needs to be done, and will be an especially welcome resource for Latin American workers in the study their own faunas.

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