

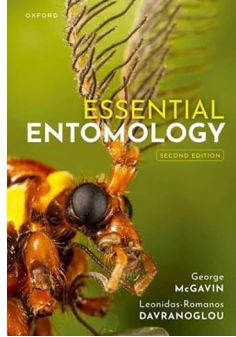
Essential Entomology. Second Edition

By George McGavin and Leonidas-Romanos Davranoglou. Illustrations by Richard Lewington. 2022. Oxford University Press. 314 pages, colour photos, and black and white illustrations, 97.00 USD, Hardcover, 48.99 USD, Paper. Also available as an E-book.

The world of insects is huge, and hugely diverse, with well over one million described species and estimates of unknown insects running from five million to as high as 30 million species. The literature attempting to make these numbers palatable and comprehensible at human scale is also rich, beyond anything that one humble reader can hope to digest. So what is the person interested in insects to do? If you have some smattering of biology somewhere in your background, and some tolerance for technical terms, you could do much worse than picking up a copy of McGavin and Davranoglou's *Essential Entomology*. The second term in the title is self-explanatory, but the first term is rather ambiguous, meaning 'must have' or the 'basic / important' elements of the topic. I'm fine with both definitions—glad to have it and satisfied that it conveys the essence of this deep, rich field.

Midway through the Preface—which begins by noting the 400-million-year history of insects and their relationships with plants, the other megadiverse group of Earth's living things—the authors raise my question, or something like it: "the study of insects is exciting and intellectually satisfying, but where do you start?" (p. viii). Their answer? "With classification, of course. In any study ... the first thing you need to know is what sort of insect you're dealing with" (p. viii). Mercifully, they remind us that, given the sheer number of species, "you do not need to know them all individually" (p. viii). The two main sections of the book provide this information, while the third and final section is an extensive discussion of finding, collecting, and preserving insects.

Section 1, Introduction to Insect Evolution and Biology, begins with a brief overview of the evolution of the arthropods divided into two basic groups: the small, arthropod-like group Panarthropoda and the true arthropods, Euarthropoda, a group which contains everything else, including Insecta. The largest part of this Introduction is The Origins of Insects and Other Hexapods, a key focus of which is the Five Factors in a Winning Formula that outlines the reasons for the great success of insects. These factors are size, cuticle, central nervous system, flight, and



rate of reproduction, and each is presented in crisp, interesting detail. Insects have a fascinating range of Interactions with Other Organisms (another section in the Introduction), which include bacteria, fungi, other arthropods and, most extensively, plants. Symbiosis, herbivory, and plant defenses are each considered. The section moves on to a discussion of the basic, shared body plan of insect structure, and then concludes on a note about the rarity of marine insect life.

The third and final section, Fieldwork, focusses on collecting, killing, recording data, and preserving specimens. These are timeless topics in the sense that it seems every serious book on insects includes them, but also that it took a lot of time for such procedures to develop. The authors are attached to the Oxford University Museum of Natural History, and their emphasis on the importance of proper collection techniques for the accurate determination of identities reflects that august institution's historical purposes and practices. The book does not address the tension between these approaches and the more casual approach of citizen scientists, who rely primarily on photography.

The first and third sections bracket the main section, The Insect Orders, 240 pages of introductions to each of the recognized 28 orders within Insecta. The first page provides a quick overview of Hexapoda, the subphylum comprised primarily of insects but also including three related 'near-insect' groups. A cladogram of the "latest [i.e., 2014] insect tree of life ... at the time of writing this book" (p. 36) is squeezed in—a larger version would have been welcome. One page to present this information seems short shrift, but taxonomy / systematics / classification is a moveable feast; given the proposed audience for the book, simply noting 'here is what we're doing' without elaboration seems wise. Section 2 is well outlined in the detailed Table of Contents, to which I found myself referring frequently as several terms were unfamiliar. The important thing here is the descriptions themselves.

A one-page introduction is provided for each order, no matter how large or small. Seven data points are noted in a banner below the order title: Common Name, Derivation [of the scientific name], Size [i.e., body length], Metamorphosis, Distribution, Number of Families, and Known World Species. A fine, clear line drawing of a representative for each order includes labels of key body parts. Order descriptions

begin with notes on Key Features, followed by colour photographs, a textual outline with keywords in bold frequently illustrated in the margins with line drawings, and tables of main families. A Key Reading list concludes the discussion of each order. Technical terms tend to be kept to a minimum; a six-page Glossary is there if needed, although several terms that I looked up were not included! For pretty much every order, the text includes an unusual, often surprising fact or two. Take, as one random example, the humble and oft-hated earwig: its ability to fold its hind wings under its fore wings “in an origami-like manner is so effective that it serves as an invaluable model in the design of biologically inspired technology” (p. 63).

The mechanics for achieving this evolved some 280 million years ago.

In short, the text is, as the authors intended, “a readable introduction to the most abundant multicellular life forms on Earth” (p. ix). It is neither a field guide nor a textbook for entomology students, nor is it meant to be; it’s intended for those of us without a formal background who take a serious interest in the subject—in a word, dedicated amateurs. As a member of that group, I can highly recommend this book to others, for this work sits satisfyingly between the college textbooks and the many popular accounts.

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