SCHAEFER, C. W., AND A. R. PANIZZI (eds.). 2000. Heteroptera of Economic Importance. CRC Press; Boca Raton. (20+) 828 p. ISBN 0-8493-0695-7. Hardback. $94.95.

This book is a comprehensive and up-to-date review of worldwide literature on Heteroptera from the point of view of their economic importance, whether in managed or natural systems. The book's most important contribution is as a resource, not just for those involved in the management of agricultural pests, but for anyone interested in true bugs. Its organization is so practical as to invite the reader to simply read it for edification and enjoyment or to find information with immediate applicability. This book represents a clear guide for future research in heteropteran biology, and its reviewed references and the massive bibliography make it a necessary reference book in entomological libraries.

Currently, Heteroptera, a suborder of the insect order Hemiptera, include about 37,000 described species, many of which feed on plants; thousands more await description or discovery, according to Schaefer and Panizzi (Introduction, Ch.1). Little is known about the basic biology and ecology of most true bugs. This book succeeds in thoroughly summarizing and assessing present knowledge of the true bugs and presents it in the form of current reviews and references. The authors reviewed thousands of articles and books, although not all references are listed; nonetheless, the number of references is impressive. For example, Sweet listed 925 references (Lygaeoidea, Ch.6). The references include information on taxonomy and control of true bugs, as well information on natural history, behavior, morphology, embryology, endocrinology, and ecology, etc. Some of these references guide the interested reader to identification keys, but which are not included in this book.

The scope of this book is beyond that of only North America; for example, research is reviewed from India, China, Brazil, Thailand, Poland, and Ukraine. An insect or a plant that is considered a pest or a beneficial species in the United States may not be seen in the same way in other parts of the world. The editors are to be praised for allowing different points of view.

What makes true bugs economically important? Many feed on plants, some of which transmit plant-pathogenic viruses. An important example is *Eurygaster integriceps* Puton, a serious pest of wheat (Scutelleridae, Ch.14). Because heteropterans feed in a unique way, with piercing-sucking mouthparts, Hori (Ch. 2) explained, their stylets bypass many of the plants' defenses against biters and chewers, which also protects them from many pesticides. Some plant-feeding bugs are helpful for the control of pest plants; for example, *Zulubius acaciaphagus* Schaffner (Alydidae, Ch.10) has helped to reduce the seed bank of *Acacia cyclops*, a weed introduced from Australia to South Africa.

Many true bugs are important predators of insect pests and mites. De Clercq (Pentatomidae: Asopinae, Ch. 32) stated that the present literature review has demonstrated the potential value of several pentatomid predators for the management of a wide array of agricultural insect pests. This information could be extended to other Heteroptera families as well, such as Nabidae (Ch. 27), on which there is little information in general, especially for the tropics. Berytid predators (Ch. 31) have also received little attention, but are potentially important. Mirids (Ch. 28) that feed on delphacid planthopper eggs have been used successfully in classical biological control programs. Other zoophagous heteropterans, mostly aquatic and semiaquatic, are economically important natural enemies because they feed, in part, on blood-sucking Diptera, especially mosquito larvae and pupae (Ch. 21 to 25). Biological control programs have to take into account that some of these predacious species are cannibalistic, some may damage crops, or may feed on beneficial arthropods such as pollinators and spiders.

The authors in this book do not restrict their reviews to Heteroptera associated with agricultural crops, but also those associated with ornamentals, plants not cultivated for major commercial benefit such as sycamore trees (Tingidae, Ch. 4) and royal palms (Thaumastocoridae. Ch. 5), and natural systems, where the intrinsic value of Heteroptera has not been quantified.

This book is also an excellent resource for beginning entomologists. There is a general description for each of the families included and a review of their classification and their feeding behavior. Homeowners will also find it useful because it contains details about true bugs that occasionally become nuisances in or around homes, such as boxelder bugs (Rhopalidae, Ch. 9) which move towards or into houses in large numbers in the autumn. Even the general public will find it easy to read and use because it is devoid of much jargon. Apparently, it has very few errors in spelling; the only one noticed was in the title of Ch. 8. It is well organized and indexed. The book would have benefitted, though, by including some photographs of the most important pest or beneficial species.

This book is an important resource for health professionals since it contains information on occasional bites (Ch. 19) by non-blood-feeders, which do not transmit pathogens, and on Chagas' disease, of great medical and social importance in the Western Hemisphere, that is transmitted to people by infected triatomine bugs (Reduviidae, Ch. 18). Cimicids (Ch. 17), or bed bugs, also feed on human blood; studies on whether they can be vectors for diseases such as hepatitis B, HIV, and yellow fever are reviewed.

Entomologists and biological control specialists will find this book useful, but for heteropterists, it is an essential book. The writers state the strengths of previous and current research and recommend research goals for the future. They emphasize the value that basic biological information has with respect to applicable work for the control of heteropteran pests and the use of beneficial species. Also, the value that good systematic research has with respect to identification is discussed by the authors. Not all heteropteran families are covered, for which I hope that a second book of the same style will be written. As a worker on Lygaeoidea, this book helps me to focus my interests, guides my research and inspires me to write. I highly recommend this book.

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