

DROSOPOULOS, S., AND M. F. CLARIDGE, EDS. 2006. *Insect Sounds and Communication. Physiology, Behaviour, Ecology and Evolution*. CRC (Taylor & Francis), Boca Raton, FL. xvii + 532 pp. + a DVD. Hardback, ISBN 0-8493-2060-7, \$139.95.

Books that purport to cover a field of study as large and as rapidly growing as acoustic communication in insects face a daunting task. The current book accepts the challenge and is gratifyingly complementary rather than duplicative to the only other post-1991 book on the subject: Gerhardt and Huber's (2002) *Acoustic Communication in Insects and Anurans*. This earlier book succeeds to a remarkable degree in synthesizing what is known, and in identifying what should be studied next, regarding acoustic communication in the principal animal groups that use loud, airborne sounds to attract their mates—namely, crickets, katydids, grasshoppers, cicadas, and frogs. On the other hand, the current book deals mostly, and in depth, with the much more diverse groups of insects that communicate chiefly with substrate-borne sounds or vibrations or with weak or near-field airborne sounds.

The current book had its genesis in a symposium on insect acoustics that its editors, Sakis Drosopoulos (Greece) and Michael Claridge (U.K.), organized for the 2002 Thessaloniki European Entomological Congress. When asked to develop a book around their symposium topic, the two organizers chose to make it an edited volume and successfully solicited 32 contributions from 41 authors, mostly from eight European countries and the U.S. but also from Argentina, Australia, and Japan.

The book's 32 chapters are arranged in two sections entitled "General aspects of insect sounds" and "Sounds in various taxa of insects". However, most of the 20 general-aspects chapters are specific to particular taxa—e.g., "Acoustic communication in Neuropterid insects," by C. Henry, and "Vibratory communication and mate searching behaviour in stoneflies," by K. W. Stewart and J. B. Sandberg. Only four chapters are general in regard to taxonomic coverage: "Insect sounds and communication," by M. Claridge; "Sound and techniques in sound analysis," by E. Eliopoulos; "Insect species and their songs," by J. Sueur; and "Acoustic signals and temperature," by A. Sanborn. Sanborn, who has studied cicada calls extensively, fails to note that temperature effects on the wing-stroke rates of cricket and katydid calls conform well to linear and poorly to exponential ( $Q_{10}$ ) models and that the regression lines for closely related species tend to converge at a common x-intercept (Walker 1975). Macdonald (1981) provides a physiological basis for these surprising results.

Of the book's other 28 chapters, seven concern taxa that mostly use loud, airborne sounds to communicate acoustically. One of these is W. Bailey's chapter, "Insect songs—the evolution of signal complexity," in which he considers songs of

both minimal and maximum complexity and discusses the evolutionary forces that may lead to each. Another, related one, is K.-G. Heller's "Song evolution and speciation in bushcrickets" [bushcricket=katydid=Tettigonioidea], which seeks to explain why, in isolated katydid populations, changes in calling song seem to appear more slowly than changes in male genital morphology. Two long chapters outstanding for their thoroughness are "The auditory-vibratory sensory system in bushcrickets," by W. Rössler et al., and "Acoustic signals, diversity, and behaviour of cicadas," by M. Boulard.

The remaining 21 chapters deal with taxa that utilize softer mechanical disturbances, produced in a variety of ways and transmitted by a variety of substrates and media. These are what make this book stand out from all previous books on insect sound. Compared to loud airborne sounds these phenomena are difficult to record, analyze, and reproduce; and only with the development of special methods have their prevalence, complexity, and functions become apparent. Most of the studies reported here deal with sound that is transmitted both by substrate vibration (where it can be transduced by a phono cartridge) and by air (where it can be picked up by a sensitive, well-positioned microphone). However, the insects receiving the signals do so only via the substrate vibrations, thus requiring that sending and receiving individuals be on the same substrate (usually a plant part) or on substrates that are in contact.

The order where vibratory communication has been most studied is Hemiptera (Homoptera + Heteroptera). Six of the book's chapters deal with small Auchenorrhyncha such as leafhoppers, treehoppers, and plant hoppers, which have small tymbals that make soft sounds that function through substrate vibrations. Five deal with other hemipterans, including jumping plant lice, whiteflies, Triatominae, and Heteroptera. Other chapters deal with Plecoptera, Neuroptera, Coleoptera, Apoidea, Drosophilidae, Chloropidae and Agromyzidae, and *Aphodius* dung beetles.

The editors and publishers of this book maintained high standards: the English of non-native speakers reads well, typos are hard to find, the 32-page index is thorough and useful, and the references in the 64-page union reference list are generally accurate. (In a sample of 20 references, the only noteworthy error detected was a volume number listed as 39 rather than 59.)

Inside the back cover of the book is a DVD with 1.83GB of supplementary material for 19 of the book's chapters. It comes with no instructions and, except for Ch 25, its contents are not referenced in the printed chapters. However, if users

have a computer with a DVD drive, they can easily determine that most of the DVD's contents are organized by chapter and that if they open the folder for a chapter, they will find an *index.htm* file with links to the supplementary content for that chapter. For most of the chapters covered by the DVD, this content consists of color versions of figures and aif or wav files for most or all of the sounds illustrated in the chapter. In some chapter folders the DVD has images and sounds in addition to those noted in the chapter's text. The supplementary material for both Ch 19 and Ch 26 are in the Ch 26 folder.

This book should be bought by those who are deeply interested in acoustical communication in insects and by research libraries, so that their clients can benefit from a book that deals at length and in depth with sound communication in insect groups that most entomologists long thought were mute.

#### REFERENCES CITED

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