

Encyclopedia of Insects. Resh VH, Cardé RT. (eds.) 2003. Academic Press, Boston, MA, USA. xxvii + 1266 pp. ISBN 0-12-586990-8, US\$ 99.95 (hardcover).

In this day and age of ever increasing internet resources, one has to question why anybody would want to tackle such a seemingly impossible task as to provide an encyclopedia on insects. In her foreword, May Berenbaum provides many of the justifications, so there is little need to do so here. By soliciting contributions from an impressive team of international experts, including many Canadians, Vincent Resh and Ring Cardé have managed to pull this off in an attractive and well laid out package. Even the reviews on the jacket back cover, written by the likes of Edward O. Wilson, Sir Richard Southwood, and Charles Michener, provides evidence for the significance of this volume.

Entries in the encyclopedia are easy to find through the various indices. At the front are the alphabetically arranged "Contents", followed by "Contents by Subject Area". There are twelve general subject areas, ranging from 'Anatomy' to 'History and Methodology'. The contents sections are followed by the impressive list of contributors, each listed along with their respective article topic(s). At the end of the book is a "Subject Index", with more than 7,000 entries. In addition, there is a "Guide to the Encyclopedia" to explain how the work is organized, and a fairly extensive "Glossary".

Articles range in size from a few paragraphs to 10 or more pages. For example, the fairly narrow topic "June Beetles" written by D.A. Potter and D.W. Held occupies about a page, while a broad topic like "Eyes and Vision" by M.F. Land, provides a thorough review over 12 pages. Articles are illustrated with colour photos, line drawings or graphs. The range of topics covered by the articles is impressive, but obviously not exhaustive given the huge scope of the topic. I found that topics of particular interest to me were often not covered at all, or they were covered as part of a broader topic. For example, 'forest entomology' was mainly covered in the article "Forest habi-

tats" by D.L. Wood and A.J. Storer. 'Ambrosia beetles' were not covered at all. On the other hand, I found a wealth of information on various topics by looking through the contents or simply leafing through the volume. For example, there is an article on the newly described Order Mantophasmatodea by K.-D. Klass, and you can learn about "Photography of Insects" in an article by M.W. Moffett.

In a book of this magnitude, it would be truly remarkable if errors were totally absent. However, in reading various articles, I detected no typographical errors. I found a small error of fact in one article in my own discipline, but even then, this was more due to the organization than an actual error.

I believe this encyclopedia would be a valuable reference resource for both laypersons and professionals. Anyone teaching introductory entomology should value this volume - I know I will.

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Pheromones and Animal Behaviour: Communication by Smell and Taste. Wyatt TD. 2003. Cambridge University Press, Cambridge UK. 408 pp. ISBN 0-521-48526-6, US\$ 45.00 (paper).

This book is a very easy read without too much of the details of semiochemicals or evolutionary theory. Its principal accomplishment is to combine descriptive information on pheromones with the jargon and principles of evolutionary ecology over many, many taxa, not just the social insects or primates. This book will serve as a valuable introduction to the world of pheromones, to students and professors alike. It can provide established researchers with the opportunity to gain significant insights into their respective systems by re-evaluating their knowledge in the light of behavioral ecology theory, moving from detailed and valuable descriptions of semiochemicals to an understanding of the underlying evolutionary processes.

The book contains 13 chapters with three ap-

pendices. Two of the appendices are valuable whereas the third is misleading, containing only a citation to a review work. Each chapter ends with a conclusion section that I found weak in most chapters. The section on further readings with each chapter might have been better included in the third appendix. Surprisingly, the author fails to recommend a number of periodicals such as *Chemoecology* and the *Journal of Chemical Ecology* with respect to further readings, even though the primary literature may be the next logical step.

In Chapters 1 and 2, Wyatt reviews some basic issues in the identification and role of pheromones, noting the importance of defining "communication", and highlighting variation in definitions and context of research in Chapter 1. In Chapter 2, the author reviews the methodologies used in the identification of pheromones. Issues of confusion related to such things as definitions of semiochemicals, interpretations of bioassays and the role of chemicals in different environments are brought to the forefront in both chapters. Like many other texts, Chapters 3-8 cover the major groups of pheromones: sex pheromones, aggregation and host-marking pheromones, scent marking and territorial behaviour, social organization, recruitment communication and alarm pheromones. Unlike other texts, the author motivates the reader to consider the ultimate "Why" by incorporating the concepts of evolutionary behavioral ecology into all the discussions. The author does a great job in comparing and contrasting pheromone systems across numerous and diverse taxa, without causing the brain to react in frustration. The contrasts highlight variations in groups with respect to key pheromone groups or research directions whereas the comparisons detail the important similarities.

I found Chapters 9-10 on the mechanisms involved in perception and reaction to pheromones to be quite clear and effective. The author took a fairly dry subject and made it interesting and informative with a minimum of details. I found Chapter 11 to be pretty cool, dealing with cheaters ... "illicit signalers and receivers of semiochemical signals". The author discusses pheromones in their potential roles as kairomones,

allomones and synomones, with a good little treatment on the tritrophic relationship between pine trees, bark beetles and beetle predators! A complete and accurate understanding of pheromone communication must consider the roles of predation/parasitism and interspecific competition. Chapter 12 provides a modest, but fairly complete treatment of the application of pheromones, particularly with respect to pest management. The author notes, as others have before him, that the major barriers to the commercialization and use of pheromones are economic and political. And lastly, in Chapter 13 we are treated to a review of the pheromones in the human context. It's an interesting and thorough review of our fascination with body odors.

The book does have a few errors such as referring to *Dendroctonus ponderosae* as *Dendroctonus montanus* in work by Raffa and Berryman (1983) on page 81. However, these errors are trivial and do not detract from the books. Some entomologists may complain that the author fails to elaborate on all the pheromones used by a single species. Evolutionary biologists may complain that the theories are too generalized and not presented in their complexity. However, the author has attempted to focus on specific evolutionary processes without too much noise. I think he's done a good job in achieving his goal and I would recommend the text to students and established researchers alike.

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