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## BOOK REVIEW

HODEK I., VAN EMDEN H.F. & HONĚK A. (eds): ECOLOGY AND BEHAVIOUR OF THE LADYBIRD BEETLES (COCCINELLIDAE). Wiley-Blackwell, Oxford, 2012, 561 pp. ISBN 978-1-4051-8422-9. Price GBP 120.00, EUR 143.50.

This book of 561 pages explores the amazing world of coccinellids, also known as ladybirds, ladybugs or lady beetles, and will appeal to both professional entomologists and amateurs. The important role played by coccinellids in biological control is chronologized since the successful introduction of the vedalia beetle, *Rodolia cardinalis*, into Californian citrus orchards in 1888–89, to control cottony cushion scale. The vedalia beetle saved the California citrus industry and has since been exported to many other parts of the world with equally successful results. For this reason, the ladybird has become an iconic symbol of classic biological control.

Aside from their practical uses in biological control, including augmentation and conservation, the Coccinellidae are a very important group in ecology and are often used as a model systems in biology classsrooms and in many entomological studies. All scientists involved in applied ecology and pest control sooner or later need to deal with ladybugs and these insects are studied worldwide by many research groups. Also, because of their attractive appearance and public appeal, many amateurs collect and study them.

Although there are a number of books on coccinellids, this compilation is a state of the art treatment of their biology, ecology and behavior. The editors are among the most important coccinellid specialists in the world, and this book comprises a major revision of previous editions with 12 chapters written by 14 different contributors. It covers all biological aspects of the Coccinellidae, including phylogeny, genetics, life history, distribution in habitats, food relationships, diapause, intraguild interactions, natural enemies of lady beetles, semiochemicals, quantification of their impact on prey, biological control, and recent developments and future trends in the study of these insects.

The book begins by detailing recent developments in two basic disciplines, "Phylogeny" and "Genetics", which are often neglected by ecologists and pest control specialists. Subsequent chapters address topics important to understand and interpret the role of Coccinellids in their habitats and present detailed updates on the subject matter, including summary tables that facilitate the synthesis of large amounts of data. All these topics are presented in a perspective of Coccinellid conservation and approaches to habitat and landscape management are provided. In the subchapter on "Food Specificity" (pp. 157–165), the relationships of coccinellid species to their prey is analysed by comparing examples of toxic and rejected prey (mostly aphids) to those that represent suitable food. Prey suitability cannot be estimated simply by acceptance, because toxic prey are also consumed (pp. 145–147). It is stressed that the quality of food should be considered in terms of its physiological/nutritional suitability and whether it supports complete development and successful reproduction. The chapter on "Intraguild interactions" deals with a very debated and controversial topic with implications for ecosystem functions, pest control and the potential impacts of exotic species. The chapter on "Biological Control" is an exhaustive review on the role of coccinellids in controlling pests and covers numerous examples of importation, augmentation and conservation. In this chapter, the reader can also find interesting ecological contrasts between coccidophagous and aphidophagous coccinellids that are construed to account for their differential impacts on coccids versus aphids. This section contains also a table summarizing insecticides that have some degree of selectivity for coccinellids, which is of importance in the context of IPM. "Quantifying the Impact of Coccinellids on their Prey" is another important topic, and this chapter outlines recent molecular tools which can assist such studies, in addition to reviewing conventional approaches. "Natural Enemies of Coccinellids" and "Semiochemicals" are approached from an ecological perspective and provide a comprehensive summary of these topics. In particular, the chapter on "Natural Enemies of Coccinellids" contains clear tables and charts which help the reader synthetize all the information. The chapter "Semiochemicals" and the subchapter "Food Related Behaviour" explore the potential of specific molecules to manipulate coccinellid behaviour. In contrast to earlier views that foraging is a random process, evidence is now presented that coccinellids are guided by olfactory and visual cues (pp. 223–226). Another breakthrough is the discovery of oviposition deterrence; ladybird females avoid the trails of conspecific larvae because they pose a risk for egg cannibalism (pp. 228–232).

The last chapter is dedicated to future trends in research, which makes it interesting for specialists and ecologists, and also to those just beggining study of these insects, including students and young researchers. The lacunae in knowledge and needs for future research are treated with clarity and accuracy, which encourages and motivates the reader towards studying this important group.

At the end of the book, an appendix contains the "List of Genera in Tribes and Subfamilies". The contents are really detailed (as indicated in the book of Coccinellidae), and this is very useful and practical aid for reader orientation among the many topics covered, facilitating a comfortable read. This is also aided by the use of bold print to highlight key terms throughout the text.

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