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Tiger Beetles: The Evolution, Ecology, and Diversity of the Cicindelids

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BOOK REVIEWS

PEARSON, D. L., AND A. P. VOGLER. 2001. Tiger Beetles: The evolution, ecology, and diversity of the cicindelids. Comstock Publishing Associates (Cornell University Press); Ithaca, NY, xiii + 333 pp. ISBN 0-8014-3882-9. Hardback. $39.95

Tiger Beetles is a synthesis of the current knowledge about a popular family of beetles, the Cicindelidae, known as tiger beetles. The authors have compiled taxonomic and ecological information, providing detailed discussions of most aspects of these topics. The book is divided into three major sections, part 1 is titled Taxonomic Diversity: Tiger Beetles in Space and Time. Part 2 is titled Ecological Diversity: Tiger Beetles in Their Environment, and Part 3 is titled Interaction of Ecological and Taxonomic Diversity. Numerous photographs (color and black and white) and drawings illustrate exotic and native North American species, adults and larvae. After their comprehensive discussion the authors present 2 appendices, one detailing how to observe and collect tiger beetles, the second presenting brief summaries of the natural history of the major tiger beetle genera of the world. Each genus discussed here is also illustrated. A lengthy list of cited references should bring the reader up to date on the most recent publications dealing with all aspects of tiger beetles.

In the introduction the authors caution that some readers may find sections too technical and recommend skipping these, to come back later for additional study. In several instances a distinction is made between professional researchers and amateur researchers and the material that may suit each of these groups. The content of many of the chapters is admittedly very technical in nature, and if one is not schooled in cladistics and molecular biology, may prove too technical to follow. I personally found several sections difficult to comprehend, and wonder if other readers will encounter the same difficulty. However, having said this, current research is indeed moving in the direction of using molecular studies to reinforce or contradict traditional classification of tiger beetles.

Chapter 1 discussed the merits of tiger beetles as research organisms. A brief history of tiger beetles studies is presented. After defining the characteristics of an ideal model test organism, the authors discuss why tiger beetles meet the requirements remarkably well. The authors conclude their discussion, stating "Molecular phylogeny, function of acute hearing, spatial modeling, and physiology of vision fields are but a few examples of areas of research made possible or greatly enhanced by researchers who recognized the value of tiger beetles as model organisms."

Chapter 2 is a detailed discussion of what constitutes a tiger beetle. Adults and larvae are described, and detailed illustrations of external and internal anatomy illustrate the unique characters that separate tiger beetles from other beetles. In a section titled Body Parts the authors illustrate key characters used in the identification of tiger beetles. A detailed discussion of the digestive tract follows, as well as a discussion of vision in these beetles. The reproductive tract of male and female tiger beetles is presented, and the chapter concludes with a discussion of larval traits and behavior.

Chapter 3 details an in-depth overview of the classification and evolutionary schemes that have been applied to tiger beetles. Then the authors delve into the application of cladistic analysis to the classification of tiger beetles, and here is where some readers may be left behind due to the technical nature of the discussion. A list of terms used in phylogenetic construction with their definitions may help some readers, but I found the list to be difficult to apply to their discussion, and I feel too much prior knowledge of cladistics by the reader is assumed by the authors. Terms like "bootstrapping" and "jackknifing" are used without explanations. Numerous other cladistic techniques are mentioned without explanations. This section will prove too technical for many readers.

Cladistic procedures are followed by a discussion of the evolution of diversity among tiger beetles, specifically morphological diversity, color patterns, and finally phyletic diversity.

Chapter 4 deals with the species concept as applied to tiger beetles, and uses DNA sequencing examples to illustrate how morphological differences may not reflect the same relationships as molecular studies. This chapter also contains 29 color plates of various tiger beetle adults and larvae, and figures of subspecies and their ranges. The photography is striking in quality, and many species figured have not been illustrated before in such detail.

Chapter 5 discusses the genetic system of tiger beetles. Tiger beetles differ from almost all other beetles in possessing multiple sex chromosomes. I found this chapter to be of such technical nature that I would personally skip over this and come back later if the need should arise to learn about the genetics of tiger beetles.

Chapter 6 concludes part 1 with a detailed discussion of biogeography as applied to tiger beetles. This chapter makes for fascinating reading and is one that every person interested in studying tiger beetles should read.

Section 2, Chapters 7-11, deals with ecological diversity and tiger beetles in their environment.

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Chapter 7 deals with tiger beetles in their natural habitats and influence of environmental changes. Chapter 8 deals with mate selection and reproduction. Chapter 9 discusses enemy avoidance and antipredator strategies. Chapter 10 analyses competition for resources, foraging behavior and species radiation. Finally, Chapter 11 discusses conservation and economics as applied to tiger beetles. The authors state that the use of tiger beetles in conservation has begun to make them important in the fight for future environmental preservation.

Section 3, Chapter 12, is a discussion of the need for future studies and the use of tiger beetles to document the general decline of biological diversity. Tiger beetles and their distribution patterns are useful for studying biological diversity. This is further reinforced by the need for studying the many named subspecies and how they reflect patterns of diversity.

The authors are to be commended for bringing together such varied topics and presenting them in a logical manner. I will certainly buy this book, for I find it a useful reference to several topics of which I did not have prior knowledge, and for the color photographs of exotic species of tiger beetles that I have not seen before. In spite of the highly technical sections throughout the book I feel that most tiger beetle enthusiasts will find this a useful reference book to add to their collection of tiger beetle books.

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