Wildlife Toxicology: Emerging Contaminant and Biodiversity Issues

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Overall, *The Biology of Small Mammals* is a complex mix of favorable and unfavorable features. The subject matter is inherently interesting and important, and for the most part has been well chosen. Merritt writes with evident enthusiasm for his subject, he is impressively up to date on most topics, and the book is copiously illustrated. Care is exercised in providing supporting documentation and in the use of scientific names. All of these favorable attributes would seem to guarantee a superb product; unfortunately, hurried writing and lack of comprehensive editing can compromise even a good plan. A more subtle critique of this book is that it misses opportunities to encourage a scientific perspective for the nonscientist readership that it covets. The author hardly mentions that the majority of small mammal species are little known. He misses multiple opportunities to educate by making statements that falsely imply complete knowledge about something. For example, the statement, "Of the 376 species of shrews, only 7 cache food" could easily have been transformed into a factual one—with a science lesson as a bonus—by adding the words "are known to."

All things considered, I can recommend this well-conceived book to the broad audience intended, but with the caveat that one must be wary of the widespread lapses in scientific and editorial rigor that weaken its impact.

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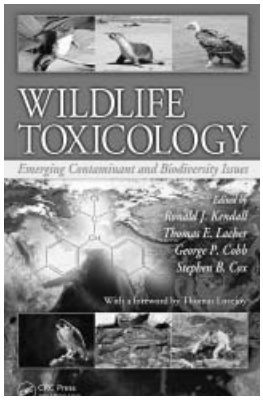
WILDLIFE TOXICOLOGY WITH A GLOBAL PERSPECTIVE

Wildlife Toxicology: Emerging Contaminant and Biodiversity Issues. Ronald J. Kendall, Thomas E. Lacher, George C Cobb, and Stephen Boyd Cox, eds. Taylor and Francis, 2010. 340 pp., illus. $119.95 (ISBN 9781439817940 cloth).

Wildlife Toxicology: Emerging Contaminant and Biodiversity Issues follows another edited book on wildlife toxicology published in 1994. That book, *Wildlife Toxicology and Population Modelling: Integrated*



Studies of Agroecosystems, was also edited by Ronald J. Kendall and Thomas E. Lacher. The present volume is designed to update, expand the scope of, and add new perspectives to biodiversity and emerging contaminants. The goal, as stated in the preface, was to integrate the broader issues of loss of biodiversity and global climate change to allow for better assessment of wildlife exposures to environmental contaminants. The result is a multiauthored volume of review articles on various topics. Lead editor Ronald J. Kendall is director of the Institute of Environmental and Human Health at Texas Tech University; two of the other three editors are also from Texas Tech, as are six of the nine lead authors, so it is almost an in-house effort. After an introduction and overview chapter by Kendall, the topics covered are toxicology of munitions-related compounds; pesticides and biofuels; pesticides, contaminants, and disease; contaminant effects on biodiversity and ecosystems; carbon dioxide and climate change; statistical models; global perspectives and emerging issues; ecological risk assessment; and looking forward—the future of wildlife toxicology, again by Kendall.

Each of the chapters is a reasonable review of the topic at hand. I very much enjoyed the chapter on biodiversity and ecosystem function by Lacher and coauthors, which presents four interesting case studies of how contaminants have had effects at the population and ecosystem levels. From veterinary pharmaceuticals reducing ungulate-carrion-eating vultures in India to diclophenac and amphibian declines, from genetic and evolutionary changes in wildlife in Azerbaijan to agriculture and birds, these four case studies provide insight into events in parts of the world unfamiliar to many of us, places with less regulation of pesticides and toxic substances than we have here. Similarly, interesting insight is provided by the chapter on global perspectives, which presents information about contaminant threats to wildlife in different geographical regions, each region being covered by a different set of authors for a total of seventeen. It is frightening to learn about the excessive use of pesticides in developing countries that lack environmental regulation.

Describing the situation from the perspective of different continents seemed appropriate, but the inclusion of the ocean as a separate region to be covered in a few pages struck me as odd, since the organisms, exposures, and environment of the marine world are so totally different. I was also surprised by the emphasis on flame-retardant compounds (polybrominated diphenyl ethers) and the lack of discussion of metals such as mercury, which is a major pollutant to wildlife and threat to human health in a number of regions of the world as a result of mining and industrial activity. None of the chapters really deals with metal contamination. There are also some chapters that don't seem to fit together and that are not well integrated into a volume with such an

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encompassing title and lofty goal of integrating the broader issues of biodiversity loss and climate change.

After the book defines wildlife as "vertebrate animals," and toxicology as "effects of toxic chemicals," some chapters stray far from this focus. The article on munition-related compounds focuses on daphnia and soil invertebrates, and states that there has been little work done on birds and mammals—both major examples of "wildlife." The chapter on pesticides and biofuels is about neither their toxic effects nor about wildlife. The chapter on contaminants and disease, one I looked forward to reading, is primarily an overview of infectious diseases of wild and domesticated animals, with a bit about activity and behavior of animals. Only a few pages are devoted to how contaminants can alter susceptibility to disease, which presumably should have been the major focus of a chapter in this particular book. I also looked forward to reading a chapter on climate change effects on wildlife toxicology (temperature increase and ocean acidification are likely to increase the toxicity of most chemicals); I was surprised, however, to find a chapter that might have been titled instead "Climate Change 101"—a general introduction to the issue that did not address wildlife toxicology at all. Although the chapter is a good overview of the topic, I find it hard to imagine that environmental professionals, the book's intended audience, would gain much from it. To try to cover causes of climate change and its effects in the marine and terrestrial environment is a task for multiple volumes of review articles. Lastly, the topic of most relevance in this book—the effects of climate change on wildlife toxicology—isn't covered at all.

Perhaps this book should have been given a different title. But even if it were, it would be hard to see the "glue" that holds this collection of papers together. In the final chapter, Kendall looks forward to a future with greater integration. And with that I can only agree.

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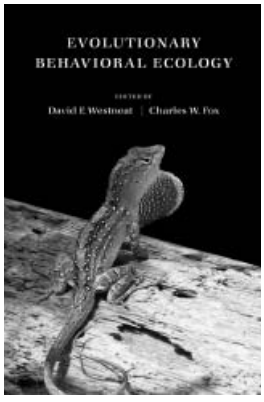
BEHAVIORAL ECOLOGY—ONLY IN THE LIGHT OF EVOLUTION DOES IT MAKE SENSE

Evolutionary Behavioral Ecology. David F. Westneat and Charles W. Fox, eds. Oxford University Press, 2010. 664 pp., illus. $49.95 (ISBN 9780195331929 paper).

Several recent volumes address specific topics in behavioral ecology, such as foraging theory and sexual selection, but a recent synthesis comprehensively assessing the current state of research in all areas of behavioral ecology has not been presented since the 1997 updated edition of Krebs and Davies's *Behavioural Ecology: An Evolutionary Approach.* As the titles of that volume and this one suggest, behavioral ecology is best understood in context of the fundamental concept uniting all of biology: Darwin's theory of evolution. In *Evolutionary Behavioral Ecology,* editors David F. Westneat and Charles W. Fox have compiled an immense collection, drawing upon the expertise of more than five-dozen researchers in the field. The editors charged these authors with the task of making the volume "accessible to students," particularly first- or second-year graduate students, and most chapters are understandable to readers at this level, depending on their prior experience. I found the approach straightforward and easy to follow in subdisciplines with which I was strongly (foraging theory) or moderately (sexual selection) familiar, but I had more difficulty with chapters on quantitative genetics and genomics.

A few chapters cover familiar ground in behavioral ecology (e.g., foraging theory, predation risk, group behaviors, and sexual selection); however, each chapter's authors give comprehensive summaries of keystone literature (e.g., R. L. Trivers's seminal work on parent-offspring conflict) and bring the reader up to date, with an emphasis on findings published in the past decade. The examples are generally well chosen to unite predictions made by older literature and include tests of those predictions using both theoretical and well-constructed empirical approaches. Although such examples are illustrative and speak to the mountain of evidence for how natural selection can act on behavior, they are numerous to the point of being overly exhaustive at times. This reflects the thorough surveys done by



the authors, but it can cause the reader to become bogged down in case studies at the expense of an understanding of general concepts.

One cannot fault the conceptual discussion of the evolution of eusociality for being too thorough, however. Despite E. O. Wilson and colleagues' recent criticism of kin selection theory and the concept of inclusive fitness, chapters 18 (Gardner and colleagues) and 19 (Queller and Strassman) carefully describe the conditions that favor altruism, cooperation, and the evolution of animal societies. Critics of kin selection theory and its ability to predict social behavior in animals would do well to examine empirical examples of long-tailed tits and slime molds

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