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# Book Review

TOXICOLOGY OF MARINE MAMMALS Editors: Joseph G. Vos, Gregory D. Bossart, Michel Fournier, Thomas J. O'Shea. Taylor & Francis, 2003. ISBN 0-415-23914-1, 643 pp., 150 USD.

Looking back on the environmental follies of the previous century, one cannot resist the temptation to lay blame. Blame on the industries and corporations responsible for releasing hazardous chemicals on the environment (intentionally or not). Blame on the military use of such chemicals in the interests of warfare. Blame on the politicians who supported them. It has become apparent, however, that convincingly linking pollutants or exposure events to observed environmental problems is not so easy. Linking even the strongest toxicological evidence to pathologies observed in marine mammals is even more challenging. Yet, these challenges have not prevented many talented and persistent researchers from trying to uncover the realities of the effects of toxic substances on marine life.

*Toxicology of Marine Mammals* features the collective work of 55 notable researchers studying the effects of natural and introduced toxicants on marine mammal health and mortality. It is the latest volume in the series, *New Perspectives: Toxicology and the Environment*, edited by Donald E. Gardner, A. Wallace Hayes, and John A. Thomas (other volumes address toxicology of marine and freshwater teleosts [two volumes] and birds [forthcoming]), and it highlights efforts to merge highly specialized subdisciplines that present plausible explanations to complex environmental problems related to marine mammals. This book's editors, Vos, Bossart, Fournier, and O'Shea, each contributed original writing (7 of the 23 chapters), as well as obviously investing editorial effort in providing continuity among chapters, connecting complementary ideas with relevant internal citations, and avoiding redundancy. Could this be the long-awaited text to support students of marine mammal toxicology?

The title is ambitious, suggesting the merging of "marine mammalogy" and "toxicology." The former is a monster of a field, fractured by a lack of monophyly; plagued by anecdotal accounts as the primary source of information for many elusive species; and itself the amalgamation of physiology, ecology, and ethology, among others. The latter is more empirical, however, a complex field to reduce to yet another subdiscipline of marine mammal science. Marine mammal toxicology is by definition an interdisciplinary field, at once its strength and weakness, and synthesizing the progress of science and literature among these highly technical disciplines is vital to approaching complex environmental problems related to marine mammals. However, synthetic studies can be hampered by the difficulties in broaching a line of research parallel to one's own. Immunotoxicologists, environmental chemists, veterinary pathologists, genotoxicologists, and graduate students wishing to begin studies or collaborations with pinniped or cetacean specialists will all benefit from the content of this volume. *Toxicology of Marine Mammals* serves to at least provide an initial introduction to both historical and recent progress and publications for researchers investigating topics outside their field of study.

Chapters include both overviews and species-specific examinations, and are organized in five parts: I. Implications of Contaminants for Marine Mammal Health; II. An Overview of Contamination of Marine Mammals and Their Environment; III. Cetaceans; IV. Pinnipeds; and V. Perspectives for the Future (a single, summary chapter). Several criticisms of this format are worth noting. Part I employs the "weight of evidence" approach to justifying toxicological studies of marine mammals, and in some sense, to justifying the text. If read front-to-back, a reader may not continue past these first several chapters, for this approach, while compelling, is not sufficient for proving whether or not contaminants affect marine mammal health. Part II, especially Chapter 6 (a retrospective review), might have been a better introduction to the book. The plethora of case-study style chapters detracts from the book's appeal for the usual reason; they often read more like chronicles of the authors' careers than as literature reviews; however, the contributions are mostly well-written and informative, many providing concise if not complete summaries of the relevant literature. A student embarking on his or her first inquiry into marine mammal toxicology will find a wealth of information using this text as an introduction.

Assuming that more marine mammalogists than toxicologists will read this book, it is vital to

educate the reader about the basics of toxicology. Concepts such as PAH mutagenicity, cytochrome P450 function, or the pathology of heavy metal exposure must be understood prior to discussing the marine mammal data relevant to each subject. Some chapters (4 &16, for example) provide such background as introductions to the more detailed concepts the authors discuss. They include the seminal toxicological works on rodents or other model organisms that contribute to our general understanding of function, and then introduce marine mammal examples to cater to the interest of the specific audience. Other chapters lack the organization to both educate and exemplify. The chapter on toxic algal blooms (Chapter 10) narrowly succeeds in both these tasks. Genotoxicity, as well as methodologies employed in its study, is well-summarized using the beluga whale as a case study (Chapter 15), but necessarily sacrifices the breadth that one might expect in a thorough discussion of the topic. It is unreasonable to expect a thorough treatment of each toxicological concept in a book dedicated to marine mammal examples; therefore, the reader must be satisfied with a cursory review.

As a reference book, this volume is of variable utility. In exercising the index, one will find inconsistent uses of common names. While there is no citation for "beluga whale" in the alphabetical listing, it appears frequently under other listings (such as under "cadmium"). Those familiar with the scientific name will find a very complete and useful list under "*Delphinapterus leucas.*" Both "bear" and "polar bear" are included as separate listings, however, and the reader is directed to "*Ursus maritimus*" (again a very useful listing of page references). Few figures are original, and most are either superfluous (uninformative photos), elementary (DNA structure), or reproductions from other literature, seemingly out of context. The references summarized and cited within each chapter are the most valuable aspects of the text.

Where does *Toxicology of Marine Mammals* take us, the readers? We are left with few conclusions, reflecting the shortcomings of the many disjointed field studies, experiments, and models employed to indirectly examine the effects of contaminants on marine mammals. The lack of convincing and consistent evidence to support hypotheses on mechanisms toxicity in marine mammals is obvious and frustrating; however, the optimistic reader will gain inspiration for future studies and, hopefully, will find direction for continuing research and forming collaborations. While inappropriate for an undergraduate course, this text might find itself well-suited for graduate-level courses in the company of other volumes such as the *Encyclopedia of Marine Mammals* (© 2001 Academic Press) and *Marine Mammals: Evolutionary Biology* (© 1999 Academic Press).

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