

BOOK REVIEW . . .

Zoo and Wild Animal Medicine: Current Therapy 3, Murray W. Fowler (ed.). W. B. Saunders Co., Philadelphia, PA, USA. 1993. 617 pp.

Earlier editions of *Zoo and Wild Animal Medicine* contained detailed information on taxonomy, anatomy, husbandry, anesthesia and medical care for all groups of species commonly kept in captivity, and have become the standard English text for veterinary care of non-domestic species. The format of the new 3rd edition has changed dramatically, adopting a "current concepts" format in order to foster the presentation of new information, techniques and procedures. *Current Therapy 3* is not meant to replace the second edition, but rather to augment it. Each new edition will attempt to present new and emerging information in the field of zoo and wildlife medicine. This format change should facilitate general access to information which was previously available only in conference proceedings, often only in abstract form.

Areas of emphasis for this third edition are the inclusion of information on free ranging animals, the humane and legal aspects of captive animal care, and issues surrounding translocation and reintroduction efforts. Over 100 authors have contributed to this edition, which is once again divided into four major sections: I. General topics covering multiple orders and classes, II. Amphibians and reptiles, III. Birds, and IV. Mammals. The appendices are a helpful compilation of wildlife-related legislation, along with addresses and phone numbers of numerous US agencies and governmental departments involved in the care and regulation of free ranging wildlife and captive animals.

The first section on General Topics covering Multiple Orders and Classes contains an excellent summary of laws and regulations addressing the importation, exportation, and transportation of wildlife written by Susan K. Wells-Mikota. The chapter outlines the different US governmental departments and agencies involved in implementation of wildlife regulations, and explains many of the different laws, regulations, and policies covering wildlife and exotic species. The chapter is also supported by a helpful and thorough list of references. This first section also includes good reviews of mycobacterial infections in mammals and birds by Charles O. Thoen and yersiniosis by P. Zwart. Other chapters of interest include discussions of humane aspects of immobilization and study of free ranging wildlife by Elizabeth S. Wil-

liams and effects of inbreeding in captive wild animals by Linda Munson. The topic of wildlife management and utilization is covered by Paul Sayer and Dieter Rottcher, using eastern Africa as an example and discussing the interconnected problems of human growth and agriculture, restriction of wildlife dispersal due to the separation of preserves, as well as game farming, utilization of wild fauna, and poaching. Diseases of concern and suggested immobilization techniques for east African species also are outlined.

The second section, Amphibians and Reptiles, has little information regarding free ranging populations, but contains an excellent overview of common medical conditions in captive amphibians by Graham J. Crawshaw. The chapter on current reptilian anesthesia procedures by C. Douglas Page contains reviews of numerous chemical agents utilized in reptiles, but makes little distinction between restraint, sedation, immobilization and anesthesia. Recommended protocols, especially for field use, would have been helpful. A previous publication error in the dose of atracurium in alligators is repeated; the dose studied was 4 mg/kg of atracurium. Elliott R. Jacobson contributes a brief overview of recognized viral diseases of reptiles, and a helpful chapter on clinical sample collection in reptiles. The clear descriptions of blood sample collection sites in various orders of reptiles could have been assisted by drawings or photographs.

Part III: Birds starts off with a chapter on diseases of free-ranging birds with sections by Alan N. S. Abrey (southern Africa), Zalmir Salvinio Cubras (South America) and David A. Pass (Australia). The impact of human growth on wild bird populations is underscored by discussions of regional problems such as osteodystrophy in South African vultures due to losses of large predators resulting in decreased availability of bone fragments, and thiamine deficiency of Australian honey eaters and lorikeets secondary to artificial cultivation of nectar producing plants. P. T. Redig contributes nice reviews of aspergillosis and "bumblefoot" in captive raptors. A chapter on diseases of specific bird groups includes sections on penguin and alcid medicine by Michael K. Stoskopf; infectious and parasitic diseases of cranes by James W. Carpenter, diseases of go-away birds, turacos and plantain eaters by Roger E. Brannian, a succinct review of common diseases of columbiforms by P. Zwart; and a nice discussion of psittacine incubation, egg necropsy and pediatric techniques by Kim L. Joyner. Multiple

authors contribute sections on aspects of the medicine of captive ratites.

The last half of the text is devoted to diseases and conditions of mammals, grouped by order. While much of the discussion of diseases in each animal group relates to captive animals, significant problems of free-ranging animals are included. The chapter on non-eutherian mammals includes sections by Richard Whittington and Richard Jacob-Hoff reviewing diseases of free-living monotremes and marsupials, respectively. Denny Constantine also gives a free ranging emphasis in a chapter on bat medicine with an excellent review of rabies and lyssavirus, as well as comments concerning conservation and methods of rehabilitation. Dolores Gavier-Widen provides a good epidemiological overview of rabbit viral hemorrhagic disease and European brown hare syndrome in Europe.

The section on primates includes new information not available in the second edition with updates on new viral agents. Highlights include a brief but excellent review of endometriosis by R. Brent Swenson with discussion of new treatments, a section on zoonotic diseases of non-human primates by Janis Ott-Joslin with several helpful tables, and a strong review of retroviruses and simian acquired immunodeficiency syndrome by Linda J. Lowenstine and Nicholas W. Lerche. Intestinal disorders frequently plague captive nonhuman primates, and good sections on bacterial enterocolitis by Joanne Paul-Murphy, protozoal parasites of great apes by R. Brent Swenson, and parasites of new world primates listing diagnostic methods and recommended treatments by Peregrine L. Wolff should prove helpful to clinicians. Information regarding free ranging primates is scanty, other than an outline of the health plan for mountain gorillas of Rwanda by James W. Foster, and an interesting discussion of emerging viral diseases of wild primates by Nicholas W. Lerche, including hepatitis A virus, simian retrovirus D and Reston virus.

The chapter on carnivores is limited, but provides a thorough review of semen collection and analysis by JoGayle Howard. Parasitic diseases of both free-ranging and captive carnivores are reviewed by Bengt O. Roken. Knowledge regarding the medical care of captive giant pandas in Europe and North America is compiled in sections by James K. Kirkwood, Mitchell Bush and Richard J. Montali. The marine mammal chapter provides a useful and impressive section on cetacean stranding by D. J. Needham, a cookbook list of successful pinniped anesthesia and hand rearing techniques utilized at the Marine Mammal Center by Laurie J. Gage, and review of clinical sample col-

lection and venipuncture sites in marine mammals by Jay C. Sweeney.

Three chapters containing twentyseven sections cover hoofstock—elephants, perissodactylids and artiodactylids. Richard A. Kock, Peter Morkel, and Michael D. Kock provide a good overview of etorphine immobilization in elephants, with comments regarding field anesthesia. Little information is provided regarding carfentanil, naltrexone reversal, tranquilization, or analgesia. Doses of antiinflammatory medications can be found in the later section on performing elephants by Richard Houck. A helpful step-by-step overview of elephant castration is provided by John H. Olsen and H. T. Bryon, Jr.. Black rhinoceros concerns are addressed in topical sections reviewing problems associated with capture and translocation by Michael D. Kock and Peter Morkel, and hemolytic anemia by R. Eric Miller.

Issues concerning free ranging artiodactylids covered in the last chapter include an excellent review of the pathophysiology of stress and capture myopathy by Terry R. Spraker, and strong sections by David A. Jessup on wildlife translocation, monitoring and remote treatment, and a review of diseases affecting wild populations of bighorn sheep in North America. Specific infectious diseases reviewed include malignant catarrhal fever by Werner P. Heuschele, babesiosis and theileriosis by Patricia A. Conrad and Kenneth A. Waldrup, and toxoplasmosis by Janet Stover. An excellent review of alpha-2 agonists and antagonists is provided by the late Harry H. Jalanka. Giraffid reproduction, including okapi, is well covered in a section by Paul Calle, Bonnie L. Raphael, and Naida M. Loskutoff including discussions of social biology, anatomy and physiology. Peracute mortality syndrome, resulting in deaths of 28 captive giraffes, is reviewed by Randall E. Junge and Teresa A. Bradley.

As with previous editions, *Zoo and Wild Animal Medicine: Current Therapy 3* is a necessary textbook for any veterinarian involved in the medical care of captive wild animals. The new format makes it imperative that this third edition be used in conjunction with the second edition, as it is not (and was not meant to be) a replacement of the older edition. The inclusion of information regarding free-ranging populations is a positive addition to the text. While several chapters specifically address free living animals, in other sections this information appears to be added almost as an afterthought. Wildlife veterinarians and wildlife health professionals may be frustrated by the sporadic nature of information on wild populations, but

should find many of the sections useful and helpful. Hopefully, emerging issues of concern in wildlife health will continue to be presented in future editions of this text.

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SUSTAINING ASSOCIATE MEMBERS . . .

The *Wildlife Disease Association* is pleased to recognize the following organizations for their assistance in the publication of the *Journal of Wildlife Diseases*. The *Association* gratefully acknowledges their contribution and support in promoting the dissemination of information on the recognition, impact, prevention and control of diseases in wildlife and fish populations.

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BOOK REVIEW. . .

Ecology of Infectious Diseases in Natural Populations, B. T. Grenfell and A. P. Dobson, editors, Published by the Press Syndicate of the University of Cambridge, 40 West 20th Street, New York, N.Y. 10011-4211, USA. 1995. 521 pp., \$59.95 U.S.

This book is based on a workshop conducted during the Isaac Newton Institute program on epidemic models in 1993, and represents an effort to provide a "synthesis of current knowledge about the quantitative ecology and epidemiology of infections in naturally-fluctuating animal and plant host populations." The book is organized into three sections which include chapters by individual participants and summary group reports. The first section entitled "Broad Patterns and Processes" begins with a review of current knowledge on the impacts of infectious diseases on wildlife populations. This is followed by chapters and group reports on observed patterns associated with microparasites (viruses, bacteria, and protozoan) and macroparasites (parasitic helminths and arthropods) in wildlife populations as well as two chapters which introduce deterministic models for both microparasites and macroparasites in wild animal populations. The section concludes with an extensive critical evaluation of existing wildlife disease models. The second section "Pathogens, Insects and Plants" shifts from wildlife populations to insects and plants and includes three chapters on vector-borne diseases, plant-pathogen interactions, and insect-pathogen interactions. The final section "Impact of Ecology and Genetic Heterogeneity" is a collection of chapters and group reports on environmental influences on host immunity, modeling of immuno-epidemiology as related to macroparasites in wildlife populations, and potential effects and considerations associated with spatial dynamics and genetic diversity. This section concludes with a chapter dealing with host-pathogen models in multiple host or pathogen systems.

The authors of this book are successful in presenting an honest appraisal of current knowledge relating to quantitative ecology and epidemiology as applied to natural populations. The wide-range of questions and potential re-

lationships addressed in this book, relating to impacts of disease on natural populations, density dependent effects, factors potentially affecting disease spread within a population, parasite distributions in host populations, genetic variation in host susceptibility and many others, are not new, and persist due to the extreme difficulty in testing related hypotheses under field conditions. The scope of these subjects and the paucity of field and experimental data relating to these questions forces much of the discussion in this book into a theoretical and general format. In many cases, broad and diverse subjects are covered in very superficial and speculative terms, with many statements unsubstantiated or only weakly supported by a few case studies. The authors openly recognize this problem and, if nothing else, these discussions draw the readers attention to some major deficiencies in the real proof behind our current knowledge.

The book contains a great deal of discussion on the use of mathematical models in the study of diseases in natural populations, much of which has application to the study of wildlife diseases. These models are presented in a simple straight-forward manner and become more complex as the additional considerations are introduced in the text. Although they soon become difficult to comprehend by mathematically challenged readers such as myself, there is a wealth of information presented. The references alone should prove to be a valuable resource for researchers interested in using models in their research.

With regard to wildlife disease, this book is not a reference from which information on the epidemiology of specific wildlife diseases can be obtained. Rather, it presents a general discussion of some fundamental questions relating to our current understanding of the epidemiology or ecology of disease in wildlife populations, and presents an extensive and critical review of some mathematical tools which may aid in exploring these questions.

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BOOK REVIEW. . .

Heartwater (Cowdriosis): A Review, by E. Camus, N. Barré, D. Martinez and G. Uilenberg, Office International des Epizooties, 12 rue de Prony, 75017 Paris, France, 1996, 2nd edition, 177 pp., US\$50.00/FF250.

This book is an excellent historical review of heartwater but a disappointing review of recent research and our current knowledge of the disease. The first two chapters of the book, entitled "General" and "Aetiology," are sound reviews of the disease in domestic animals and of the causative agent. Similarly, the fourth chapter entitled "The Disease" is an adequate review of the clinical problem in domestic animals.

The third chapter on "Epidemiology" is uneven. Since the first edition of the review in 1988, some important epidemiological discoveries have been made that have changed radically our understanding of the disease. These are at best tentatively mentioned in this review and, consequently, this chapter does not bring the reader up-to-date with our knowledge of the epidemiology of heartwater. In the section on "mode of transmission," the reviewers indicate that *Cowdria ruminantium*, the rickettsial cause of heartwater, is transmitted only by ticks. We know that *C. ruminantium* can also be transmitted vertically from infected dam to offspring (*Vet. Parasitol.* 61: 119-132, 1996), a fact mentioned without comment by the reviewers in the section on "susceptibility." Also, scant mention is made of the demonstration of the carrier state in heartwater (*Vet. Parasitol.* 34: 261-266, 1989) or of pheromone mediation of host selection by bont ticks (*Science* 243: 364-365, 1989), two factors of extreme importance to the infection of vector ticks and to the maintenance of *C. ruminantium* infection in nature.

The fifth chapter on "Diagnosis" is similarly strong on old literature and weak on new discoveries. The section on serological methods, while extensive, fails to discuss the immunoblotting assay (*J. Clin. Microbiol.* 31: 2729-2737, 1993) and is inadequately critical of the serious problems with ehrlichial cross-reactions. The real breakthroughs in heartwater diagnosis since 1988 have come with the development of sensitive and specific nucleic acid probes and the PCR assay (*J. Clin. Microbiol.* 33: 166-172, 1995), and yet they only command one small paragraph in the review.

The sixth and final chapter on "Control" is very disappointing, providing the reader with no critical review of the control options available. In the absence of an acceptable vaccine

for heartwater, tick control will remain the mainstay for heartwater control. Consequently, a critical review of tick control options, including the attractant tick decoys (*Exp. Appl. Acarol.* 20: 31-46, 1996) developed by the University of Florida since 1989, would have been expected. Furthermore, current tick control in much of Africa is moving towards the concept of development and maintenance of endemic stability, an important concept not discussed in this review. The two most promising areas in vaccine development are the development of a first-generation inactivated vaccine and a second-generation recombinant vaccine. Research on development of an inactivated vaccine receives only one paragraph of discussion, whereas recombinant vaccine research, which has been on-going on three continents for several years, receives virtually no mention.

Two aspects of heartwater, both of which have only started to receive serious attention in the past few years, are the immunology and economics of the disease. Despite the importance of these fields and the new data on both coming out of various laboratories, immunology receives only scant attention in the chapter on epidemiology, and economics is ignored. Finally, we were disappointed to see little discussion of the heartwater situation in the Caribbean, especially since the two senior authors have worked in the Caribbean since the early 1980's.

Having given a general review of the book, it is relevant to ask the question what is its utility to scientists and others interested in the field of wildlife diseases? The short answer is that the book has little to offer the wildlife scientist, not so much because of its coverage of the subject but due to the paucity of research that has been done on heartwater in wildlife.

In the first chapter, the cases of heartwater in wild animals are reviewed. The authors' propensity for listing every reference to heartwater in wildlife in an uncritical fashion is dangerous, especially when they cite even unpublished results that apparently utilized non-specific serological tests, because such dubious results have a tendency to become "fact" in time when quoted in a major review of the disease.

In the third chapter, the authors discuss the role of wild animals as reservoirs of *C. ruminantium*. They state that "the role of antelope as reservoirs is unquestionable" without providing references and then, later on the same page, mention that "the actual role of these animals in the epidemiology of the disease [heartwater] remains to be proven." The latter statement is correct. There is indeed a need to de-

termine the role of wild animal species in the epidemiology of heartwater, especially with the rapid increase in mixed farming ventures in southern Africa and elsewhere where domestic ruminants and wild ungulates are grazed together, and this is one of the current objectives of the heartwater research program at the University of Florida. Later in the same chapter, the suspected role of birds, and in particular the cattle egret, in the spread of the tick vector of heartwater in the Caribbean is mentioned. The topic is of such importance in the Western Hemisphere that it is unfortunate that the role played by birds in the dissemination of heartwater is not given more than just a few lines of coverage in the review.

In summary, the review remains a good source of information on heartwater from the historical perspective but fails to provide an adequate review of the recent advances in heartwater research. The review confirms the pau-

city of data on heartwater in non-domestic species, and as such has little to offer the wildlife scientist.

Finally, I must comment on the list of "principal laboratories conducting heartwater research" which appears on page ix of the review. It is inaccurate and gives the reader no insight into the relative significance of each laboratory in terms of advancing our knowledge of heartwater and its control. For example, the University of Florida (misnamed the "University of Gainesville" in the review) runs the large heartwater research program at the Veterinary Research Laboratory in Zimbabwe (unmentioned in the review) and collaborates with Washington State University (omitted from the review).

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BOOK REVIEW . . .

Proceedings of the SASOL Symposium on Wildlife Rehabilitation, Onderstepoort, 27–28 October, 1995, Edited by B. L. Penzhorn. Published by the Wildlife Group of the South African Veterinary Association in collaboration with ARC (Animal Rehabilitation Centre). 149 Pages. Price: US \$40; R50 (RSA); R55 (elsewhere, if paid by bank draft in S A Rands)

This soft-bound volume reflects the contents of thirty presentations given at a conference on wildlife rehabilitation held in South Africa in 1995. The authors and presenters represent a variety of South African organisations and institutions, including rehabilitation centres, conservation organisations, small businesses, private veterinary practice, the veterinary Faculty at Onderstepoort, the Department of Social Work at the University of Pretoria, the Southern African Ornithological Society, and the Tygerberg Zoopark, Kraaifontein.

The papers address a variety of topics of relevance to wildlife rehabilitators, are more than abstracts, some with tables and figures, and range from two to nine pages in length, with an average between four and five. The papers tend to be well-referenced, providing avenues for more information for interested readers. As the presenters represent a range of profession-

als dedicated to wildlife rehabilitation, the topics and styles of presentation vary accordingly. Some papers address issues of direct relevance to South Africa, while others are more general and discuss concerns that could be applied in other regions. Topics include operating guidelines for rehabilitation centres, the roles of different facets of society in rehabilitation (including conservation organisations, farmers and the community), financial constraints of rehabilitation, media management on sensitive issues, ethical considerations, veterinary aspects and involvement in rehabilitation, zoonoses, nursing, nutrition, animal behaviour, and the use of animals unsuitable for release for the rehabilitation of people.

In general, I feel these Proceedings would provide some useful guidelines for those directly involved with rehabilitation. The range of topics is considerable, and although many papers relate only to South African needs, concerns and species, others provide information that could be of use elsewhere.

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