

BOOK REVIEW

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Book reviews express the opinions of the individual authors regarding the value of the book's content for Journal of Wildlife Diseases readers. The reviews are subjective assessments and do not necessarily reflect the opinions of the editors, nor do they establish any official policy of the Wildlife Disease Association.

Sturkie's Avian Physiology. 6th Ed. By Colin Scanes (editor). Elsevier Inc., Waltham, Massachusetts. 2015. 1056 pp. ISBN 978-0-12-0407160-5. US \$120 hardback.

Mark E. Cook

We all have our core trove of reference books that sit within arm's reach. The good ones are binder-worn, and more than often, our students or lab mates have borrowed them and we have to track them down. How often do we turn to a reference book for a key bit of information instead of diving into the morass of online searching? If you're like me, you probably can beat your new student every time in finding a key piece of information or key words from your tried and true reference books as they set off on a long journey of database searches.

Unlike our predecessors, our libraries of reference texts cover broader fields of inquiry and are more numerous. New discovery is at the interface of disciplinary subjects and our bound library must increasingly reflect our attempts to be a polymath. Often our most-used reference books are not our subject of expertise, but the subject we never took a class in, and new editions rarely replace the old editions, they just update topics, dropping key pieces of information that should always remain at our finger tips.

When it comes to the study of avian species and their biology and pathology, we all have our core reference books on nutrition, genetics, disease, reproduction, physiology, anatomy, and perhaps specialized areas such as welfare and management. The more compar-

ative the text, often the more useful, and the index, tables, and figures are quintessential as we increase our expertise in that new field of inquiry or get last minute tidbits for a lecture.

One of the bibles for avian biology that sits on my shelf, or is always floating around my lab, is *Sturkie's Avian Physiology*, originally edited by Paul Sturkie. I keep the older and newest editions, and they are core to my research, teaching, and outreach as a university professor. Not knowing if my custom of using hard copies of references books like *Sturkie's Avian Physiology* was dated or trending, I polled some of my colleagues across multiple disciplines (mine is nutrition and immunology) to see if they had heard of or used *Sturkie's Avian Physiology*, 6th edition (or prior) edited by Professor Colin G. Scanes in 2015. I polled only a handful of colleagues in the areas of poultry science, avian diseases, wildlife ecology, and wildlife diseases. An interesting pattern emerged. My wildlife/disease colleagues, unless they specifically worked in the area of physiology, generally were not aware of the reference text. Those who specifically taught or researched wildlife physiology praised the text.

K. C. Klasing, professor of avian biology at UC Davis, an instructor of avian physiology, and author of *Comparative Avian Nutrition* replied:

I do not require a textbook for this class but *Sturkie's Avian Physiology* is on reserve as the primary reference text. For many lectures in the class, I provide specific chapters that should be consulted if students need additional background information or if they are interested in obtaining more depth. I am always on the search for

books to help students with avian physiology and Sturkie's has been the best option for several decades. I also consult each new edition of Sturkie's to see how I can incorporate new information and synthesis into my lectures.

I think it is crucial to maintain continuous publication of authoritative reviews of subdisciplines of avian biology, such as *Sturkie's Avian Physiology*. The *Avian Physiology* book fulfills a very important teaching and reference role that cannot be fulfilled by any other book or journal.

M. E. Berres, an up-and-coming researcher at the Biotechnology Center in Advance Genome Analysis, University of Wisconsin-Madison, an instructor of ornithology and avian physiology for at least 5 yr, and a leader in the study of the Red Jungle Fowl (*Gallus gallus*) in Vietnam replied:

I can always count on finding what I am looking for, no matter how obfuscated my search topic may be. It may take a little extra time—because the information content is so high, but that is a perk of this volume—I always find myself following new leads, often along tracks I would have not otherwise considered.

R. "Mick" Fulton, DVM, PhD, diplomate, American College of Poultry Veterinarians, associate professor of Avian Diseases at Michigan State University, and a colleague who coteaches Management of Poultry Health with me to students across the midwest as well as avian diseases in The College of Veterinary Medicine at Michigan State University wrote:

The basis for understanding disease in poultry and other birds is to begin at the basic level of the interaction between disease agents (bacteria, viruses, parasites, etc.) and the animal's anatomy and physiology. Whenever I have questions concerning disease development as it relates to physiology, I always reach for *Sturkie's Avian Physiology*. *Sturkie's Avian Physiology* has always been my resource as a student, graduate student and as an academician. The most recent version has been updated to include recent research findings that have developed since the previous edition.

Professor emeritus Robert Wideman, University of Arkansas, Fellow of the Poultry Science Association, and one the most highly cited avian physiologists replied:

Sturkie's Avian Physiology provides a state-of-the-art compendium of our current knowledge regarding the structure and function of avian organs and tissues. Chapter-by-chapter, key experts comprehensively review the function of each organ system and cite the pertinent scientific literature. Throughout my career, various editions of *Sturkie's Avian Physiology* have proven uniquely valuable for teaching as well as for research. I consider this book to be a must-have resource that should be immediately accessible to scientists, teachers and students interested in poultry and animal science, avian biology, veterinary medicine, and wildlife science.

Professor Ramesh Selvaraj, recently tenured professor in immunology in the Animal Sciences Department at Ohio State University suggests that even younger professors are counting on referencing the text in their educational processes in his comment:

Sturkie's Avian Physiology (5th edition) is the most comprehensive book available on avian physiology. As an instructor of a nutritional immunology course, which is often taken by students with very little immunology background, I encourage my students to read the "immunophysiology" section by Dr. Glick so that they will have a comprehensive understanding of immunology. I often refer to the "Gastrointestinal Anatomy and Physiology" by Dr. Denbow to my graduate students interested in physiology of gut with its microbes. *Sturkie's Avian Physiology* is one book I would rank in the top three books for avian physiologists and would "highly recommend" this book for anyone in avian industry.

I have to conclude that my custom of reaching for a reference such as *Sturkie's Avian Physiology* is not a dated strategy, but one used by many leading avian biologists. What was surprising was that some leaders in the field (not to be named) were unaware of

Sturkie's Avian Physiology, hence there is a need to introduce my perception of the book.

When I was first asked to write this review, about a year ago, I decided to let the new edition sit on the shelf and observe how I used it. I have not sat down and read the 1000 plus pages of this new edition; that is the task for the student in an avian physiology course or that student preparing for their PhD comprehensive exams. I used pages 1003–1028, the Index, in understanding the text content. Having read a previous edition cover to cover, I knew the language and could quickly get to the core topic or question I needed in short order, whether to answer a question from a colleague or simply to rehearse and not look stupid before a class of graduate students or on a PhD defense committee. I could quickly get to the meat of the inquiry, and if necessary, read a section or chapter if I felt my knowledge was weak, or delve deeper using the extensive citations provided.

Earlier editions of *Sturkie's Avian Physiology* depended heavily on research involving chickens, and rightly so, because for decades the number of poultry scientists studying the domestic fowl was considerable. Edition 6 is a comparative avian physiology work with considerable references to wild species. On a deeper analysis, do not expect to find chapters of your favorite fowl species, even though the index includes reference to over 20 wild species. Yes, there are indexed references to works involving genera from *Anas*, *Anser*, and *Aythya* to *Sturnus* and *Zootrichia*; hence, there is much to find involving the comparative basis across a breadth of avian species. Examples of comparative analyses include comparisons of domestic and wild species based on brooding and rearing, hearing, and chemosenses, as well as precocial versus altricial differences. There are additional chapters that are solely based on the wild species, including flight/migration, physiological adaptation to the environment, magnet-

icoreceptors, and seasonal effects on gonadal responses, to name a few. Clearly from the text, the contributions of wildlife avian scholars are quite apparent.

Of course a good text without critical citations to original works of science leaves the reader wanting more or requiring additional database searchers. Each chapter of the book is clearly founded on fundamental science and the reference list per chapter is substantial. The reference section makes it easy for the reader/user to dive much deeper into topics by tracing the key references or by finding and using key words in the reference for a more thorough web-based search on a given topic in avian physiology.

Why might an avian pathologist want this book in their library? Perhaps there is the need to understand a major organ system affected by a disease agent to explore the cause of clinical signs. Physiology can help us examine mechanisms of pathogen physiology interactions that lead to strategies in controlling the pathogen. In some cases, these disease strategies include host targets to minimize pathogenesis. To find host targets (an area hot in cancer immunotherapy) one must understand the target and the function of the target within the animal. Most importantly, one does not want to appear weak in knowledge when giving lectures or as speakers in symposia. Of all scientists, the veterinarian and the avian pathologist are expected to be polymaths. Breadth alone is inadequate without evidence of depth. The most efficient way to build breadth and depth on a topic is to take advantage of a comprehensive, yet condensed, compilation of the scientific literature. *Sturkie's Avian Physiology* is an important tool in achieving these goals.

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