

REVIEW

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Parasites and Diseases of Wild Birds in Florida.—Donald J. Forrester and Marilyn G. Spalding. 2001. University Press of Florida, Gainesville, Florida, USA. ISBN 0-8130-2560-5/113-2. 1132 pp. \$125.00, hardcover.—The impact of disease on the ecology and conservation of wild birds is potentially great, yet we understand little about avian diseases at either the individual or population level. Laboratory studies of captive birds often fail to adequately mimic natural conditions and measuring the impacts of disease on wild populations is notoriously difficult. Sick individuals are not easy to monitor in nature and in cases of mortality, carcasses are quickly consumed by scavengers and seldom found by researchers (Wobeser and Wobeser 1992). Agents of disease and environmental conditions likely interact with each other in ways that complicate and blur our understanding of their impact. For example, diverting resources towards fighting one disease-causing factor may render hosts more susceptible to other factors such as pathogens or predators. The results of avian disease studies are dispersed throughout the ornithological, entomological, parasitological, ecological, and medical literature and negative data often are considered uninteresting and buried in the gray literature if published at all.

In *Parasites and Diseases of Wild Birds in Florida*, Donald Forrester and Marilyn Spalding provide an unparalleled summary and interpretation of both published and unpublished data on diseases of Florida's birds. This wonderfully refreshing departure from the list-format of a typical disease manual summarizes our current knowledge of the ecology and pathology of the diseases of Florida birds. Amateur and professional ornithologists, wildlife managers, conservation biologists, public health workers, and disease researchers will find this reference book invaluable with clear and concise prose that is easily accessible and engaging for all.

Readers less familiar with disease will find the text pleasantly user-friendly. The authors begin with an introduction that explains their broad approach to disease. They then welcome readers unfamiliar with terminology commonly used in disease literature by providing a definition of frequently used and often abused terms including the term "disease" itself, defined for the purposes of this book as "any impairment that interferes with or modifies the performance of normal function." In the first table the authors list and comment on the 13 fundamental categories of morbidity and mortality in wild birds, some of which might not typically be considered for inclusion in a book with this title, such as categories on trauma and human disturbance, in addition to the familiar infectious agents of disease, such as viruses and bacteria. Thereafter, chapters are generally ordered by avian taxonomy according to Robertson and Woolfenden (1992) and the Checklist of the American Ornithologists' Union (AOU 1998). Chapters vary in size and taxonomic breadth depending upon the amount of available information. Species that have been studied extensively, such as the Wild Turkey (*Meleagris gallopavo*) are afforded entire chapters. Other chapters cover multiple species within a single family (e.g., owls), multiple families (e.g., cormorants and anhingas) or entire orders (e.g., perching birds). An additional chapter entitled "Miscellaneous Birds" reports on an additional 33 species from 6 orders about which little is known. In the final chapter, "Summary and Conclusion," for each species of wild bird in Florida, the authors summarize the degree to which health has been studied, number of identified diseases or disease agents, as well as the major threats to the health of each species. Agents of avian disease in special need of research are identified as well as those that are major threats to domestic animals and humans.

Disease researchers will be pleased with both the breadth and depth of this work. The structure of each chapter is especially useful for quick reference of disease agents.

Chapters are divided into subtitled sections according to factors causing morbidity and mortality. Each chapter begins with cited information on natural history, status of threatened or endangered species, as well as an overview of disease and general health information from other regions. Sections occurring thereafter vary from chapter to chapter in the number and type of disease-causing factors depending on the available data. Most chapters include sections on parasites and other infectious agents including viruses, bacteria, biotoxins, fungi, protozoan, trematodes, cestodes, and gastrointestinal nematodes. These sections include the results of case studies as well as surveys of wild populations and experimental lab work. Also frequently included are sections on neoplasia (benign and malignant tumors) and anomalies (rare conditions confined to a single bird). Avian pathologists will appreciate the detailed descriptions and illustrations of microscopic and gross lesions.

The sections described above provide new perspectives on disease for ornithologists, wildlife managers, and others less familiar with the disease literature. In addition, avian ecologists and wildlife managers will be especially interested in the frequent inclusion of sections on nutritional diseases and the effects of inclement weather and predation on morbidity and mortality. For example, there are accounts of destruction and abandonment of Wood Stork (*Mycteria americana*) nests because of cold temperatures and high winds and the effects of fire ant predation on American Kestrel (*Falco sparverius*) chicks and pipping eggs. Sections on brood parasitism, disease risk from pen rearing, and birds as pests and public health hazards also are included when appropriate. Conservation biologists might be particularly interested in the various forms of human disturbance from the impact of the plume trade to the effects of dredging of mud flats on avian food sources. Effects of environmental contaminants, one of Spalding's primary research interests, are presented in all chapters. In other sections the authors document trauma "associated with exposure to manmade objects and habitat change", electrocution, oiling, and human disturbance. Each chapter ends with a summary of the most important disease agents and provides the reader with suggestions for priorities for future research. An extensive literature cited section also is provided after each chapter.

How does disease impact avian populations? This is perhaps the most important question, yet the most difficult to answer. In each chapter, the authors repeatedly cite the literature in an attempt to provide discussion on this topic. When appropriate, they speculate on how populations *might* be impacted given our current knowledge and suggest areas for future research. Therein lies perhaps the greatest service that Forrester and Spalding provide their readers.

Documenting the absence of disease agents also is of great importance. Three cheers for the authors' inclusion of negative data throughout the book! By including these, they provide important baselines for future studies and convey, especially to young scholars, a sense of the importance of reporting surveys that document few or no positive results. Too frequently such data become buried in obscure journals or worse, remain unpublished and inaccessible for future reference.

Similarly, another of the major strengths of the book is the authors' willingness to discuss mortality patterns even when they are unable to identify a causative agent. Unexplained die-offs have been observed in a number of species. These observations are rarely published, yet invaluable when attempting to understand similar events in the future. Such documentation provides a basis for retrospective studies and emphasizes the need for long-term avian demographic studies with disease-monitoring components.

The authors frequently cite examples of disease causing agents that interact to impact an individual or population. I especially appreciate the many points at which the authors speculate about possible physiological effects of such synergies, for example between malaria and pox in Wild Turkeys, and suggest important topics in need of further study.

Another feature that makes the book especially helpful is the frequent use of illustrations. A variety of black-and-white photos of microscopic and gross lesions, field sites and

instrumentation are scattered throughout the book. Images vary in quality with some being slightly underexposed, however most are of high resolution. Those documenting microscopic lesions are especially good. Photos of gross lesions and neoplasms will be of great interest to ornithologists, especially those who frequently observe or handle wild birds. However, in the Preface, the authors caution that this book is not to be used for diagnostics and refer the reader to the manuals by Davidson and Nettles (1997) and Friend and Franson (1999). Even amateur birders will find the photos provocative. In fact, I had difficulty reading this book while traveling because on three separate occasions I was interrupted for long periods by flight attendants who were intrigued by the photographs including "Radiograph of a fishing lure in the esophagus of a whooping crane from Lake County"! Maps depict distribution of various disease conditions throughout the state and numerous data graphs are quite helpful. The abundant tables are, like the prose, well referenced and provide both raw and summarized data for quick reference.

Those interested in Florida birds or avian diseases, regardless of geographic location, will find this a well written, thought-provoking volume and an important addition to their library. Forrester and Spalding meticulously summarize our current knowledge of avian disease and provide the reader with their assessment of how these diseases impact avian populations, domesticated animals, and humans. In doing so, they contribute substantially to our understanding of the ecology and conservation of the birds of Florida and provide invaluable guidance for those undertaking studies of avian disease regardless of geographic location. Forrester and Spalding have done a tremendous service by sharing this collection of their lives' work and knowledge of the literature with those of us who study avian diseases or have a more general interest in the birds of Florida.—Mary C. Garvin, Department of Biology, Oberlin College, Oberlin, OH 44074.

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