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BOOK REVIEW . . .

Avian Botulism, M. W. Eklund and V. R. Dowell, Jr. (eds.). Charles C Thomas Publisher, 2600 South First Street, Springfield, Illinois 62794, USA. 1987. xxi + 405 pp. $64.50 U.S.

The occurrence of "duck sickness" in wild birds has long been recognized, but it was not until approximately 50 yr ago workers first realized that many of the massive waterfowl die-offs that had occurred were the result of avian botulism, a poisoning resulting from the ingestion of toxin produced by *Clostridium botulinum* type C bacteria. This bacteria also has been recently identified as an infection in humans, when ingested organisms colonize the gastrointestinal tract and elaborate toxin in vivo. It was this realization that prompted the Toxic Micro-Organisms Panel of the Joint United States–Japan Cooperation on the Development and Utilization of Natural Resources Program (UJNR) to assemble an international group of researchers, ". . . to meet the overwhelming need for a global view on the scientific, ecological, and economic aspects of avian botulism that would provide a better understanding of the disease, the etiologic agent, the epidemiology and approaches to the control and prevention."

Avian Botulism is the seventh book to be published since 1964 under the auspices of UJNR. The activities of this group center around toxins of various microorganisms and their potential for contamination of human foods or animal feeds, thus resulting in a threat to public health or economic losses. The potential wildlife disease reader should, however, not be misled by this statement because the volume is a gold mine of information on the impacts of botulism on wildlife.

The book is subdivided into six major parts: I. Introduction; II. General Considerations; III. Epidemiology of Avian Botulism; IV. Bacteriophage Conversion and Effects of Botulinal Toxins; V. Laboratory Investigations; and VI. Control and Prevention of Avian Botulism. There are 26 chapters; each has an abstract, all of which are succinct but quite useful, and a "key words" section that is an added plus for a rapid perusal of this book. The 41 authors of these chapters represent 10 countries from every populated continent, thus providing an unique international perspective of botulism. The book does place some emphasis on the impacts of botulism in domestic poultry and humans, but the volume also contains sufficient information on wildlife so that it should prove quite beneficial to the wildlife disease worker.

One of the few drawbacks to this volume is the organization. Part I, a single introductory chapter by C. Lamanna, was supposed to provide an overview on the scope of the avian botulism problem, but falls far short of this objective. In Part II, Chapter 2 provides all the information that anyone would need on poultry as a source of food for humans to determine why, for the first time in the history of the United States, the average consumer will eat more white than red meat this year. It is not until Chapter 3 (by Jensen and Price), that information useful to the wildlife disease worker first appears. This chapter is by far the best account written on a global perspective of avian botulism, and points up why this volume is appropriately dedicated to Wayne L. Jensen. There is also an extremely useful table in this chapter listing all species of birds believed to have been infected with type C botulism. The remaining two chapters under "General Considerations" deal with overviews of host susceptibility plus predisposing factors, and botulism's relation to comparative medicine which provides some information for those readers interested in zoo-botulism interactions.

Part III will undoubtedly be of most interest to wildlife disease workers. It is composed of six chapters which cover the present day knowledge of botulism epidemiology around the world. Chapter 6 (by W. E. Clark) serves as an excellent second introduction on the history of botulism, but some redundancy is to be expected in multi-authored works. Clark does, however, have a management recommendation section to which all avian wildlife managers should pay particular attention. The next two chapters outline the present state of knowledge on botulism in Scandinavia and the British Isles. Chapter 9 by B. C. Jansen of South Africa is, unfortunately, another example of the book's poor organization. Jansen's contribution is solid, but the content deals primarily with the detection, isolation, and identification of *Clostridium botulinum*. His inclusion in this part suggests that he was assigned to cover the epidemiology of this disease in Africa, but did not. The editors apparently chose to leave this chapter where it was originally planned, rather than look at the content and place it at a more appropriate location earlier in the book. The last four chapters of Part III cover botulism in the Pacific (Australia, New Zealand and New Guinea), South America, Netherlands, and Japan. The strength of this part, not to ignore the excellent writing in each chapter, lies in the extensive and in depth coverage of botulism literature from around the

world. Much of this information would not otherwise be available in one place, and in English, to wildlife disease workers.

The next two sections of the book contain eight chapters that deal primarily with laboratory investigations of *C. botulinum*. The subjects covered in these chapters range from molecular structure, through relationships of bacteriophages to toxin and hemagglutinin production, to experimental laboratory investigations on pheasants, wild birds, and poultry. It is only through carefully conceived and controlled laboratory experiments, like the ones presented in this book, that we will be able to determine the effect of botulism toxins in different avian species. For those interested in methods of detecting *C. botulinum*, T. Midura (Chapter 20) outlines the use of fluorescent antibody techniques, and the following chapter (Notermans and Kozaki) delineates two in vitro techniques, an enzyme-linked immunosorbent assay (ELISA) and an agglutination test.

The last portion of this book (Part VI) deals with the control and prevention of avian botulism. However, other than Chapter 22 by G. Wobeser, there appears to be little of interest to the wildlife disease worker. Wobeser does a creditable job of succinctly outlining steps necessary to control botulism in wild birds. He provides background of all biotic and abiotic parameters necessary for this disease to occur, and summarizes his chapter with enumerated steps outlining measures used to prevent botulism, as well as control procedures to employ in the event of an outbreak.

I did find a few minor aspects of this book disconcerting. All of the references are identified in the text by number, a style from which many publications are now moving away. In addition, there are only common names given for host organisms, which at times leads to confusion. In some instances the host family is given, thus providing the reader some information on the identity of the specific host organism. The diseases, however, have genus and species provided after a common name. But the many positive aspects of this book greatly overshadow these minor distractions.

Other than the few problems that have been pointed out above, the editors are to be commended on their efforts in producing this book. The text covers complex material, flows smoothly, and the varied works of the authors, many of whose first language is not English, is blended for easy reading. Attention to detail is exhibited in the thoroughness of the author and subject indices. The latter is quite complete at 15 pages. This is often one of the glaring deficiencies in many current books, and further attests to the rigorous editorial scrutiny to which this volume was subjected. The author index contains over 1,000 entries and thoroughly covers the extant international avian botulism literature.

Not only is the scientific content of this book outstanding, but the production quality is exceedingly high. The pages are high quality glossy paper which facilitates reading. The volume also has a sturdy binding which will enable it to stand up to considerable use. There are few typographical errors and the figures have good resolution. Particularly important is the price ($64.50), which is commensurate with present market values for a book of this size, but a real steal for the amount of information that one is purchasing.

In summary, the book is well written, easily readable, and presents much useful information on botulism in wildlife around the world. A major strength of the book is that it brings together, for the first time, a global perspective of the impact that avian botulism is having on wildlife. This book is currently the most useful avian botulism reference available to wildlife disease workers.

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BOOK REVIEW . . .

Veterinary Virology, Frank Fenner, Peter A. Bachmann, E. Paul J. Gibbs, Frederick A. Murphy, Michael J. Studdert, and David O. White. Academic Press, Inc., Orlando, Florida 32887, USA. 1987. 660 pp. $59.00 U.S.

This excellent text is a fitting tribute to Peter Bachmann, who died unexpectedly and prematurely in May 1985 at the peak of his career. The book follows the format of the well known, and greatly appreciated, Fenner and White's *Medical Virology* which has served teachers of virology through three editions. This text differs in that its structure and content are consistent with the developments in modern virology and focuses on viruses and viral diseases of importance to veterinary medicine.

The book fulfills the need for a text that succinctly brings together biomedical virology with infectious diseases. The authors represent a wealth of experience in basic medical and veterinary virology and their efforts have resulted in perhaps the most useful textbook of veterinary virology available. It is a book that can serve as reference for busy students, veterinarians and animal virologists who wish succinct, but definitive, information on a particular virus without wading through details that would be of interest mainly to academic virologists. The book is well written and illustrated.

Veterinary Virology is divided into two general sections. The first part deals with basic structure, composition, classification, cultivation, assay, viral replication, genetics, evolution, pathogenesis, host immune response, acute infections, viral persistence, tumorigenesis, diagnostic methods, immunization, epidemiology, control and eradication of viral diseases. The second portion deals with the families of viruses that cause disease in domestic animals. Both sections are well composed, but specialists in a particular field might criticize the extent to which a certain disease of interest to them is condensed. Notwithstanding, the authors have included those materials essential to the appreciation of each virus and general references are included at the end of each section. The major "faults" of the book, if such is the case, would be those of omission—mostly apparent to the experts. The "editor," whoever he may be, is to be congratulated for unifying the writing; the text appears as though written by one author. Few errors were found; but again, specialists might quibble with the space dedicated to particular subjects or to specific diagnostic procedures that have been recommended.

I regard this book as the text of choice for veterinary virology courses; it is in a format that is easily amplified according to the instructor's requirements. The book also is a concise reference for veterinarians and all interested in viruses that affect domestic animals.

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BOOK REVIEW . . .

Host Regulated Developmental Mechanisms in Vector Arthropods: Proceedings of the Vero Beach Symposium, Vero Beach, Florida, USA, 3–6 February, 1986, Dov Borovsky and Andrew Spielman (eds.). University of Florida—IFAS, Florida Medical Entomology Laboratory, 200 9th Street S.E., Vero Beach, Florida 32962, USA. 1986. 217 pp. $18.00 U.S.

The present compendium is a valuable contribution to the literature on host-vector interactions and the role they play in the developmental processes of vector arthropods. As stated in the preface by the editors, "Recent advances in our understanding of the physiology and biochemistry of the arthropods that transmit disease have been gratifying, such that a body of information detailing the interface between vector and host has begun to emerge." Such information may be essential for defining basic mechanisms regulating vector competence. On a more practical level, recent developments in technology such as the use of hybridoma antibodies as specific probes to insect vitellogenin may find application as a means of differentiating field-collected mosquito eggs of targeted species such as *Aedes aegypti* and *Aedes albopictus*.

The contents are divided into four sections. The section on chemistry, biochemistry and physiology of vitellogenesis, contains nine papers dealing wholly or in part with mosquitoes, two papers on ticks, and one on *Musca domestica*. Several of the papers on mosquitoes reflect the current interest in defining the roles of juvenile hormone and 20-hydroxy-ecdysone in stimulating vitellogenin synthesis.

The section on digestion, salivation, and spermatogenesis contains five papers on ticks, four on mosquitoes, and one, that fits somewhat uncomfortably under the section heading, on metabolic rates and aging in insects. During the past several years, researchers have found that antihemostatic activities that facilitate blood location and prevent hemostasis during feeding are common to many blood-sucking arthropods and are mediated by saliva. Consequently, major emphasis in this section is on salivary glands and their secretions. There also is an excellent paper describing the intracellular localization of mosquito trypsin in *A. aegypti*.

The section on blood feeding, sexual and host-seeking behavior contains four papers on mosquitoes, two on ticks, two dealing with fleas and one with hematophagous arthropods in general. In an excellent paper on the hormonal regulation of receptor sensitivity and host-seeking behavior in mosquitoes, E. E. Davis and M. F. Bowen used electrophysiological procedures to confirm Marc Klowden's finding that sugar-fed female *A. aegypti* receiving fat body from a blood-fed female will not seek a host. The demonstration of humoral regulation of host-seeking behavior in *A. aegypti* is an important milestone in establishing a physiological basis for this segment of the sequence of events that lead to blood feeding.

The final section on sex pheromones, gene transfer and host parasite interactions contains six papers on diverse subjects ranging from DNA-mediated gene transfer or transfection of cultured mosquito cells to regulation of sex pheromone activity in ixodid ticks.

The author index lists 62 contributors, many of whom are leaders in their fields. The lack of a subject index is not a serious shortcoming of such a brief compendium with descriptive titles. A synthesis of the symposium proceedings by the editors and a prospective for further research would have been helpful.

These Proceedings are the result of the third in a series of recent workshop/symposia sponsored by the Florida Medical Entomology Laboratory on timely research topics concerning vector arthropods with an emphasis on mosquitoes. The editors and organizers are to be commended for the fine service they have performed for the entomology community in general and those interested in vector arthropods in particular. This volume is a moderately priced soft-bound edition and should find a place on the shelf of all those interested in the physiology and biochemistry of vector arthropods. It should be on the required reading list of undergraduate and graduate courses dealing with vectors and vector-borne diseases.

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