BOOK REVIEW


Understanding the biology of arthropod vectors of human diseases such as malaria, river blindness, filariasis, West Nile virus, and Lyme disease is important because they pose a continuing threat to human health and well-being. The second edition of Biology of Disease Vectors covers all of the major groups of vectors of public health importance with the latest information on ecology, physiology, genetics, and molecular biology. The 57 chapters constitute a grand effort involving 72 contributors, mostly from North America, who are actively engaged in teaching and research in their respective areas. Everything from evolution of arthropod disease vectors through natural cycles of vector-borne pathogens, immune responses, molecular taxonomy and systematics, gene expression, insecticide resistance, and immunologic control of vectors is included. Following each chapter is a selected bibliography, some as recent as 2004, the same year the book was published.

This revised edition contains cutting edge information on relatively new topics, such as bioinformatics, geographic information systems, insect molecular biology and molecular epidemiology. One can no longer consider molecular biology research without the help of bioinformatics. This is a new field of science that relies heavily on the use of computers to transform raw sequencing biologic data into useful information. Since the first conference on bioinformatics in 1984, computer power has increased dramatically and programming has become more sophisticated. Research in microarray profiling and proteomics is unthinkable without the availability of sophisticated software that enabled the analysis of the complete genome of Anopheles gambiae, the principal vector of malaria in Africa. Chapter 47 in this book provides a nontechnical introduction to methods available for accessing and analyzing gene bank data for hematophagous arthropods. A list of URLs at the end of the chapter provides links to the databases and to most of the tools mentioned.

Detailed knowledge of the patterns and distributions of vector-borne diseases is essential in implementing control and preventive measures in affected populations. However, the accurate detection of disease pathogens and measuring distribution patterns is crucial in understanding epidemiology. Molecular epidemiology is the use of molecular and biochemical markers to detect disease agents and characterize homogeneity in the population. Chapter 18 clearly presents molecular and biochemical methods for detecting arthropod-borne pathogens and reviews epidemiologic tools used to assess the validity and reliability of these techniques. Several examples are used to demonstrate the applications of molecular and epidemiologic tools.

Digital technology is now being harnessed to monitor and predict diseases through space and time, and satellite sensor data promise the development of early-warning systems for vector-borne diseases such as malaria. Analysis of multivariate climatic factors detectable by satellite sensors has allowed predictions of the distribution of vectors of malaria in Africa. Geographic information systems, which are discussed in detail in Chapter 16, provide an excellent means of visualizing and managing spatial data. Techniques covered in this chapter include remote sensing, spatial analysis, modeling special data, and application of geospatial methods to research in vector-borne diseases.

Since the publication of the first edition of Biology of Disease Vectors in the mid-1990s, at least five mosquito species have been genetically transformed using transposable elements. In the light of concerns about bioterrorism, questions may arise about the abuse of new technology to create mosquitoes capable of spreading harmful pathogens through human populations. Dr. Peter Atkinson addresses these fears in Chapter 46, in which he discusses the risks arising from rearing genetically engineered mosquitoes.

Many other current issues are extensively discussed in this book, which is directed towards graduate students, postdoctoral fellows, and specialist researchers. It is not a specialized medical or veterinary text book. Its main strength is in the well-researched presentation of up-to-date fundamental information on arthropods of medical importance. An incredible amount of editorial work has gone into the compilation of this book, which is divided into seven parts with a different editor responsible for materials that would appear within a part. Dr. Marquardt and the seven section editors should be congratulated for a wonderful achievement.

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