

## BOOK REVIEW

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### Review of: *Forensic Entomology: The Utility of Arthropods in Legal Investigations*

**REFERENCE:** Byrd JH, Castner JL editors. Forensic entomology: the utility of arthropods in legal investigations. CRC Press, Boca Raton, Florida, Hardcover, 2001, 418 pp.; ISBN 0-8493-8120-7.

Insects and related arthropods are the most abundant organisms on the planet Earth and found in almost all conceivable habitats, including those associated with human inhabitation. These animals are intimately involved as major players in sustaining ecological functions and ecosystem processes. Accordingly, these arthropods are often found associated with human activities, including homicide, as we encounter them in our daily lives. Forensic entomology is the application of entomological evidence to resolving litigation (civil cases) and solving crimes, most often those of violence and death (medicocriminal cases). This book, *Forensic Entomology: The Utility of Arthropods in Legal Investigations*, focuses on the criminological application of entomology and provides a smorgasbord of medicocriminal entomology and associated practices prepared by leading practicing scientists in this and related disciplines. This is the first comprehensive treatise of medicolegal entomology to bring together archival and new information for forensic practitioners since publication of Smith's *A Manual of Forensic Entomology* (1986).

The volume begins with an introductory chapter by Robert Hall to the current perspectives of medicocriminal entomology followed by 14 chapters prepared by 19 contributors, of which the last three chapters deal with general subject areas of forensic science: DNA techniques, bloodstain evidence, and expert witness. Three chapters provide new information not found in contemporary references: Chapter 6 on the role of aquatic insects in forensic investigation; Chapter 10 on the computer modeling of insect growth and its application to forensic entomology; and Chapter 11 on the impact of drugs and toxins on insect development. This book provides a glossary for entomological and forensic terms for readers with a comprehensive general index.

Practitioners of medicolegal entomology must have a sound knowledge of entomological science to collect necessary data and accurately interpret forensic evidence involving insects and related arthropods. The subjects of general entomology and arthropods of forensic importance presented in this book do not serve

the purpose intended by the authors, as the audience is not clearly targeted. Chapter 1 (author Castner JL) on *General Entomology and Arthropod Biology* does not provide the necessary entomological information for forensic investigators not trained in the entomological sciences. At the same time, information in the chapter is too superficial and elementary for practicing forensic entomologists. Some data are outdated and inaccurate. For example, the recent global figure of described insect species is >950,000 (Kosztarab and Schaefer 1990), not 300,000. In North America over 100,000 insects and arachnids have been described. Many photographs and illustrations lack high quality and fail to show what the author intended.

The second chapter (Byrd JH) on *Insects of Forensic Importance* provides a useful guide to 18 taxa (ten families of flies and eight families of beetles) with a short synopsis of major species and corresponding color plates. These plates are useful for initial sight identification of selected important forensic players by scene investigators. However, accurate identification of species requires more than visual recognition, as many species of adult flies (including common species) have considerable variation in coloration and other recognizable characters by which the species are identified. It is important to recognize that misidentification may lead to inaccurate interpretation of entomological evidence, and experienced specialists should verify preliminary identifications of highly variable species.

The next four chapters cover basic aspects of medicolegal entomology. Chapter 3 (Haskel, NH, Lord WD, Byrd JH), *Collection of Entomological Evidence during Death Investigation*, and 4 (Byrd JH), *Laboratory Rearing of Forensic Insects*, provide a good review of tools and procedures for collecting entomological and environmental data at the scene and post-investigative rearing of live insects for entomological analysis. The fifth chapter (Anderson GS) presents an excellent account of the *Insect Succession on Carrion and its Relationship to Determining Time of Death*. Chapter 6 (Merritt RW, Wallace JR), *The Role of Aquatic Insects in Forensic Investigation*, introduces for the first time the use of aquatic insects and related invertebrates in forensic investigation in depth. This chapter includes useful pictorial keys to functional feeding groups of lotic macroinvertebrates. Chapter 7, *Recovering Buried Bodies*

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and Surface Scatter: *The Associated Anthropological, Botanical, and Entomological Evidence* (Gallaway A, Walsh-Haney H, Byrd JH), deals with standard procedures for forensic excavation and recovery techniques for buried human remains and for collection methods of forensic evidence. This chapter is useful for those forensic entomologists whose practice rarely involves scene investigation.

The next three chapters along with Chapter 6 on aquatic insects discuss the intricacies and difficulties of estimating the post-mortem interval (PMI) related to insect development. Wells and Lamotte (Chapter 8, *Estimating the Postmortem Interval*) present an excellent account of the principle of postmortem interval estimation. Higley and Haskel (Chapter 9, *Insect Development and Forensic Entomology*) and Byrd and Allen (Chapter 10, *Computer Modeling of Insect Growth and Its Application to Forensic Entomology*) provide considerable detail on computer modeling of insect development and its practical application to forensic investigation. The final chapters (11–14) introduce four new areas not usually treated in contemporary forensic entomology literature. Goff and Lord (Chapter 11, *Entomotoxicology: Insects as Toxicological Indicators and the Impact of Drugs and Toxins on Insect Development*) discuss current information on the impacts of drugs and toxins on insect development and how insects can be used as indirect toxicological indicators. As the incidence of drug-related deaths appears to be increasing, this chapter provides invaluable information for forensic investigators. Chapter 12 (Bennecke M, Wells JD *DNA Techniques for Forensic Entomology*) provides a short, elementary overview of DNA techniques used in forensic science with special attention on forensic entomological application. Brown et al. in Chapter 13 (*Entomological Alteration of Bloodstain Evidence*) discuss bloodstain analysis with respect to its history, protocols and techniques, and how insect movement may alter the natural bloodstain pattern. In the final chapter (14,

*The Forensic Entomologist as Expert Witness*) Robert Hall, a practicing forensic entomologist with a Jurisdiction Degree, expertly presents a great insight into the principle of court testimony and the world of expert witnesses with realistic case testimonies and cross-examinations of forensic entomologists.

This book certainly brings together the results of research by the leading forensic entomologists for the last 25 years and gives the audience up-to-date information on medicocriminal perspectives of forensic entomology. Yet, it is somewhat confusing as to which audience the volume is targeted. For medicolegal entomologists and professional forensic scientists this book provides a rich source of information for the application of entomological knowledge and the use of entomological evidence in criminal investigations. On the other hand, practicing medicocriminal entomologists still would need to consult Smith's *A Manual of Forensic Entomology* (2) and other taxonomic reference for forensic entomological analyses. Many forensic investigators lacking an adequate entomological background may find the contents of many chapters overbearing for practical information, since the volume does not provide adequate coverage of entomological basics and tools—they may find that Catts and Haskel's *Entomology and Death: A Procedural Guide* (1) remains a useful guide for forensic investigators, although it is in need of revision.

## References

1. Catts EP, Haskel NH, editors. *Entomology & Death: A Procedural Guide*. Clemson, SC: Joyce's Print Shop, Inc. 1990; 182.
2. Smith KGV. *A Manual of Forensic Entomology*. London: British Museum (N.H.); Ithaca: Comstock Publishing Associates, Cornell University Press. 1986; 205.
3. Kosztarab M, Schaefer CW, editors. *Systematics of the North American Insects and Arachnids: Status and Needs*. Virginia Polytechnic Institute and State University, Virginia Agricultural Experiment Station Information Series 90-1. 1990.