

YU, S. 2008. *The Toxicology and Biochemistry of Insecticides*. CRC Press (Taylor & Francis), Boca Raton, FL. xv + 276 pp. ISBN 978-1-4200-5975-5, hardback, \$99.95.

In recent years, insecticide toxicology has become a largely neglected discipline of entomology both in terms of academic departments that continue to offer a course and the availability of updated textbooks. In spite of this neglect, there have been a number of recent developments that make insecticide toxicology both relevant and critical to the broader issues of pest management. The identification of novel and specific target sites and the emergence of highly selective insecticides that affect processes other than neural function have expanded the arsenal of available pest management tools with unique and specific modes of actions. Additionally, an understanding of target sites that have previously been exploited provides important information relative to identification of novel chemistries that can be deployed without complications of cross-resistance. Moreover, the consequences of insecticide misuse including resistance evolution and environmental contamination have not abated and continue to influence regulatory policies and insecticide discovery. It is therefore appropriate and timely that a new textbook becomes available that is applicable to a diversity of students from entomology, pest management and related agricultural disciplines.

The recently published text by S. J. Yu provides an updated and comprehensive introductory textbook for students of insecticide toxicology that incorporates traditional toxicological concepts including uptake, mode of action and principles of xenobiotic metabolism with an up-to-date cataloging of both historically important insecticide classes and novel chemistries and their mode of action. This information provides a solid foundation for developing more complex issues such as the role of xenobiotic metabolism as it relates to selective toxicity and resistance evolution.

The book begins with an overview of the need for pesticides, their pattern of use and the importance of pest insects with regard to agricultural production and transmission of vector-borne diseases. While this is an important component of a basic introduction to insecticide toxicology, this chapter is lacking with respect to the potential adverse consequences of insecticide use. While these topics are covered in more detail in later chapters, a discussion of these points in the introductory chapter would have provided a more unbiased overview of insecticides and equal weight to the potential risks associated with their misuse. The second chapter provides a basic introduction to the diversity of insecticide formulations as well as the non-pesticidal components of these formulations. Chapter 3 provides a similar basic introduction to pesticide regulations but is somewhat limited by its focus on U.S. laws and legislation.

A major contribution of the text both in terms of importance and page length is Chapter 4 which provides a comprehensive listing for major and minor insecticide classes. The classification is based strictly on chemical structure and although never specifically identified, appears to be loosely organized according to chronology of discovery. While this chapter provides a valuable reference for finding information related to structure and physical and chemical properties of specific active ingredients, it lacks a general description of insecticide mode of action. This topic is covered in Chapter 7 and is organized by specific target sites. Each section provides a general background for specific target site followed by a listing of the general insecticide class or specific active ingredient that interacts with that target.

The chapter on evaluation of toxicity (Chapter 5) provides a descriptive outline of various bioassay methods for both insects and higher animals and importantly provides insight into calculation and interpretation of probit analysis. I believe this is one of the more important aspects of coursework in insecticide toxicology, and this chapter provides a foundation for students to explore the topic in greater detail and to pursue their own bioassay experiments.

The chapters on insecticide uptake (Chapter 6) and metabolism (Chapter 9) offer introductory information that provides a necessary background for the more interesting and more developed topics related to species differences in xenobiotic metabolism (Chapter 9) and resistance evolution (Chapter 10). The final chapter on pesticides in the environment (Chapter 11), like many of the other chapters, provides the reader with good basic information on topics such as environmental fate and impacts on non-target organisms.

In general, the author presents material in an easy to read outline that is well-organized and with typos hard to find. The references that accompany each chapter appear to be accurate and the 25-page index is for the most part thorough and useful. In many of the chapters, the author provides a list of relevant reviews for the reader to consult if more detailed information is needed. The book is illustrated with many line drawings and tables providing the reader with ample opportunity to interpret data that enhances understanding of a certain topic. This is especially true for Chapters 9 and 10 where information is derived from recent literature. The drawings are detailed, sometimes complex and a little small but are generally supportive of the concepts described in the text.

In conclusion, I believe that this text is a valuable basic reference for students of insecticide toxicology. There are certainly topics that could be

covered in greater detail but as an introductory textbook, I believe that all the necessary topics are introduced. I have recommended the text for my own course and have received positive feedback from a diversity of students.

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