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The Toxicology and Biochemistry of Insects, 2nd Edition

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Yu SJ. 2015. The Toxicology and Biochemistry of Insects, 2nd edition. CRC Press, Boca Raton, Florida, USA. 358 pp. ISBN 978-1-4822-1060-6, US$ 89.96 (hardback)

Book reviews normally are written by authorities in the subject matter treated by the book. The perspectives of subject-matter authorities are valuable in discerning whether or not the subject is treated accurately, and if the treatment is up to date. But when the book is designed to be used as a textbook, perhaps a different perspective is equally valuable: the perspective of a novice. After all, most of the readership likely would consist of students who need some fundamental knowledge of the subject matter. Well, I'm not qualified as a toxicologist, or as a student, but my knowledge of toxicology is superficial, so I believe that my perspective is closer to that of novices (students) than to authorities (toxicologists). So this review will assess how understandable the material is to a novice who lacks a strong background in organic chemistry, but who needs to know something about the chemistry, mode of action, usefulness, and hazards associated with insecticides. In case you are wondering about the perspective of authorities on the topic, you should know that the 1st edition of this text was reviewed favorably by experts in the field (Siegfried 2009; Peterson 2011), so there is every reason to believe that the 2nd edition is also an authoritative treatment.

Anyone comfortable with the contents of the 1st edition will be pleased to see that the approach and layout of the 2nd edition are the same. Simon Yu opens with information on why insecticides are important, explains how insecticides are formulated, and gives information on the legal constraints of insecticide use. This is followed by the longest chapter, which is devoted to classification of insecticides. This chapter is largely based on the chemistry of the toxicants, though there is some element of chronological order to the treatment of insecticides, and the acaricides are handled separately from the "true" insecticides. Here he identifies what aspects of the chemistry make each group unique, the host range, toxicity, and in some cases the mode of action. Interestingly, the number of traditional insecticide classes has now been eclipsed by the new and diverse "miscellaneous" insecticide classes, making it challenging for students to grasp the chemical organization of these numerous bioactive molecules. Dr. Yu then discusses how toxicity is assessed, the uptake of the toxicants by target organisms, their mode of action, and metabolism. Reflecting the advent of new chemical classes of insecticides, the sections on mode of action and metabolism are expanded considerably in the 2nd edition. These chapters will likely be the most challenging to students, as they are more chemically oriented than the others. Dr. Yu devotes an entire chapter to differences in metabolism among species; another author might relegate this topic to the end of the metabolism chapter, but this is an area of particular expertise of the author, and he does a good job justifying why it is important. Yu closes with what I believe will be among the most interesting chapters to most students: a unit devoted to insecticide resistance, and another to insecticides in the environment. However, the chapter on toxicity assessment will eventually be of great value to students interested in careers in pest management, as will the chapters on uptake and resistance. Thus, Simon Yu brings together many valuable and diverse aspects of pesticide science, presenting much more than the chemistry of insect poisoning.

Nearly all of the material from the 1st edition is recycled into the 2nd, though as noted previously, the contents are expanded in some sections, mostly to reflect the addition of new insecticides and classes of insecticides. Although the book is well written and quite understandable, readability varies among the chapters. For example, the chapter devoted to classification is rather encyclopedic; it will be difficult for a student to digest and retain the information on target insects and LD_{50} values for the hundreds of products mentioned, let alone the chemical structures. However, it is important to have this information included, even if it makes for difficult reading. On the other hand, I found the section on evaluation of toxicity to be very understandable, and am confident that most students will appreciate the importance and usefulness of this material.

The appearance of the 2nd edition of the book is slightly changed, and improved. All the figures have been redrafted and are much cleaner and crisper. Also, the section and subsection headings are bolder, making it easier to navigate the book. A considerable number of new references have been added, bringing the content up to date. As with all publications, there are some mistakes and typographical errors, though they are very minor and do not detract from the usefulness of the text. The only thing I think is missing is mention of the International Resistance Action Committee (IRAC), and perhaps an appendix with the common products, their most common trade names and manufacturers, and their IRAC classification. But, like insecticide application methodology, it may be beyond the scope of the book. Overall, this is a carefully crafted treatment of a difficult subject, and Simon Yu has successfully walked the fine line between too much and not enough detail. Importantly, he does an excellent job explaining why certain things are important to toxicologists, and what should be of interest to managers of insect pests. Also, he provides a holistic treatment that has something of interest for everyone, and it is presented in an easily comprehended manner. If you work with insecticides, and especially if you don't, you need to read this book. There is a great deal of misinformation about pesticides in the world, but this book is a great source of enlightenment.

References Cited

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