

ABROL, D. P. [ed.]. 2014. Integrated Pest Management: Current Concepts and Ecological Perspective. Academic Press, San Diego, California, 561 pp. ISBN 978-0-12-398529-3, US\$99.95 (hardback)

The integrated pest management (IPM) concept is interpreted in various ways, but it usually means the application of different pest management tactics simultaneously or sequentially, and quite often emphasizes population sampling, and decision-making based on economic projections. This book provides little of these traditional approaches. Instead, the authors mostly treat individual tactics, with only a small number of chapters (e.g., management of mites, or of rodents) discussing the potential of using multiple tactics. Similarly, with the exception of population forecasting models and use of pheromones, pest population sampling/monitoring and the economics of pest management are notably absent. In the 'Preface', the editor described the contents as "chapters on diverse aspects of integrated pest management", and he certainly delivered on this promise. So although this book did not meet my expectations, it contains some valuable contributions.

"Integrated Pest Management" contains 23 chapters authored by 56 scientists from around the world, though nearly half of the authors work in India. Most of the authors are entomologists, or at least address entomological issues. Exceptions include chapters on bioherbicides, and on rodents, whereas the chapters on weather-based forecasting, breeding for host resistance, pesticides used for invasives, and the role of extension programs in IPM are broad-based, and not limited to insects. The topics addressed in this book can be summarized as:

- Host plant resistance – 5 chapters on constitutive and inducible resistance, especially application of biotechnology to create genetically modified crops, though a portion of the chapter on semiochemicals also addresses induction of plant defenses.

- Pesticides – nominally 3 chapters, with one on bioherbicides, another on plant-based insecticides, but the third mostly discusses the economic costs of invasives.

- Biological control – 6 chapters, of which 2 are fairly general (traditional approaches to implementation, and control of invasives), and 4 are taxon based (fungi, nematodes, viruses and bacteria, spiders)

- Forecasting – 3 chapters addressing remote sensing (actually more discussion of a simulation model than remote sensing), weather-based pest forecasting, and a forecasting model for Colorado potato beetle

- Semiochemicals – 2 chapters, with considerable overlap in content

- Other pests – 2 chapters, one each on rodent and mite pests, nothing on plant disease other than breeding methods, weed discussion is limited to use of bioherbicides, but with pest mites and plant-parasitic nematodes also addressed in one of the biotechnology plant resistance chapters.

- Other topics – 2 miscellaneous chapters address climate change, and a global view of extension programs that address pest management.

As is often the case with edited books, the approach and quality are variable among contributed units. I found several to have excellent content, including but not limited to: semiochemicals in IPM, entomopathogenic fungi, entomopathogenic nematodes, entomopathogenic viruses and bacteria, bioherbicides, biological control of invasive insects, spiders, biotechnological approaches for IPM, implications of genetically modified crops, and rodent management. Also, the chapter on mite management was quite good, but lacked discussion of standard chemical miticides.

Most chapters were well written or edited, but some suffer from lack of attention. For example, in the chapter on implications of genetically modified crops, *Helicoverpa armigera* is called both American bollworm (p. 371) and cotton bollworm (p. 373), and the first citation I checked (Stylen 1968) was not cited accurately. The chapter on remote sensing in IPM looks like it was written for journal publication; unlike the other chapters, it has sections labeled "methods", "results", and "discussion". Also, the sequence of the chapters seems odd at times. For example, the plant resistance chapters are numbers 1 and 16-19, and the biological control chapters are numbers 14 and 23. These are minor issues, of course, and any tome of this size will have some errors.

Overall, I found this book to be quite informative, a useful modern synthesis of many aspects of IPM. Anyone who teaches a course in pest management, especially insect management, will find this to be a handy reference for selected topics. Many of the chapters make a concise introduction to the subject, and are quite suitable for student reading. I would readily assign some of the chapters as required reading for university undergraduate and graduate students. As noted previously, not all aspects of IPM are covered, so this book would not make a suitable stand-alone textbook for a university course, but it would be an excellent source of supplemental readings, including some new approaches and technologies.

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