

ZHANG, ZHI-QIANG. 2003. *Mites of Greenhouses, Identification, Biology and Control*. CABI Publishing, CAB International, Wallingford, Oxon, UK. 240 pp. Hardback. ISBN 085199590X. US\$80.00.

Mites are important pests in greenhouses around the world, yet the number of people trained in mite taxonomy is decreasing. Fewer and fewer entomology departments in the USA provide training on mite management. As a result, many pest managers will be given the task of managing mites in greenhouses without formal training in the study of mites (acarology). This book thus identifies a real need.

According to the preface, this book is "based on a training manual prepared by the author for a 'Short Course on Mites of Greenhouses'. . . . primarily designed to help students, entomologists, pest control workers, and growers to identify mites that commonly occur on greenhouse crops, although the biology and control of major mite pests were also covered. The focus of the course on identification was warranted because any successful management of pests starts with the correct diagnosis of pest damage and identification of pest species. . . ."

The book is divided into three parts: I. An introduction to greenhouses, crops and mites, mite classification, morphology and biology, methods for collecting, preserving and preparing mites. Part II includes identification, biology and control of pest mites, including spider mites, false spider mites, tarsonemids, eriophyoid mites, acarid mites, and others. Part III covers the identification, biology and application of beneficial mites in biological control, including chapters on phytoseiids, laelapids and other predatory mites. The book includes a glossary of terms and an appendix with information about acarological journals, societies, courses, websites, and an index.

Chapter 2 provides an introduction to the major taxonomic groups of mites, but the line drawings and keys provided require that the student have cleared, slide-mounted specimens to examine under a compound microscope. Many pest managers and growers will be unable to use these keys because they lack the necessary chemicals to process specimens and compound or phase-contrast microscopes to see morphological traits. It is only in Chapter 3 that students are told how to

collect, preserve, and prepare mites for microscopic study. The novice is not told that these keys only work on adults and that key traits may be difficult to discern if the specimens are incorrectly mounted. I don't believe this section will allow many students to key out mites without additional assistance. However, the keys themselves are useful and concise.

Chapters 4-9 describe the morphology, biology, and damage caused by plant-feeding mite families. Each includes an illustrated key to the genera and species found in greenhouses. Again, without additional training, I doubt a novice could use the keys, although they are concise and useful for somewhat more experienced workers. Similarly, chapters 10-12 provide information on the morphology, biology, and role each beneficial predatory species plays in the control of plant-feeding mites in greenhouses. However, anyone requiring details on how to release, when to release, or how to monitor the effects of such releases will not find this information. Monitoring methods and information on compatible pesticides (or how to determine which pesticides are compatible with natural enemies) are lacking.

This book contains a wealth of information particularly useful for entomologists and students with training in microscopy and monitoring methods. It provides pest managers and growers with a concise summary of useful information on mite biology and damage, as well as information on websites with color photos and additional information. It is not, however, an adequate source of information on the "nuts and bolts" of managing mites in greenhouses. The pest manager and grower will need additional training to identify pest mites and to deploy the available mite management tactics in greenhouses.

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