

BOOK REVIEWS

VAN DRIESCHE, R. G., AND T. S. BELLOWS, JR. 1996. *Biological Control*. Chapman & Hall, New York. xii + 539 p. ISBN 0-412-02861-1. Hardback. \$65.00.

Books on biological control are abundant, but this one merits a special look. First, it is designed to serve as a textbook for advanced undergraduates and graduate students. For example, when new and important terms are introduced, they are highlighted in bold type. Unlike many compendia containing chapters on specialized topics by multiple authors, this two-authored book attempts to cover the full range of biological control topics for beginners and does so in a unified manner.

The authors have organized the book into six sections: Origins and Scope of Biological Control; A Review of the Organisms Employed as Agents of Biological Control; Methods for Biological Control Implementation; Evaluation and Integration; Natural Enemy Biology; and a section at the end (Additional Topics) containing three chapters dealing with the role of grower education; government policy and biological control; and biological control in support of nature conservation. In Section I, the book begins with a discussion of pest origins, pesticides, and the history of biological control. The second chapter introduces the reader to biological control targets, agents, and methods.

The target pests covered in this book include insects, mites, other invertebrates, weeds, plant diseases, and vertebrates. As a result, the book would be suitable for courses in biological control in plant protection departments as well as in the more-traditional entomology departments. Natural enemy agents described include insect parasitoids; predators of invertebrates; pathogens and predators of vertebrates; pathogens and nematodes attacking arthropods; herbivores and pathogens of weeds; and biological control agents suppressing plant pathogens.

The Methods section describes conservation; principles and methods of introducing new natural enemies; augmentation of parasitoids, predators, herbivores, pathogens, nematodes, and plant pathogens. Throughout the book examples of successful programs are provided, although there is no exhaustive or encyclopedic compilation of past successes. Many of the examples cited are relatively recent, including the highly successful example of biological control of the cassava mealybug, *Phenacoccus manihoti* Matille-Ferrero by the parasitoid *Epidinocarsis lopezi* (DeSantis) throughout Africa. This classical biological control program, one of the largest and most carefully documented in the history of biological control, has helped to elicit support for biological control programs from numerous international aid organizations interested in increasing food production in the developing world.

The book has numerous useful tables and graphs throughout. There are also many photographs illustrating natural enemies, the impact of natural enemies, and methods for deploying them. Unfortunately, many of these photographs, all of which are in black and white, are rather fuzzy. It is not clear if this is due to transformation of color slides into black and white prints or to other aspects of the publishing process. In any case, the results are often disappointing, although the rest of the book is generally well produced.

The references cited section includes 74 pages of references, many of which are relatively recent (to 1994) and includes original papers, books, and review articles. The text is complete with an index. The last chapter talks about the future prospects for biological control. The authors conclude that biological control “. . . holds promise to provide solutions both to pest problems affecting agricultural production and to needs for environmental protection of natural ecosystems.” This point is critical to make with the recent concerns expressed about the introduction of natural enemies into

new environments. The authors also note that biological control may have an expanded role to play in the future within the urban environment, both in the landscape and within households.

The authors close with a plea for increased and continued training of biological control professionals. They make the argument that *ad hoc* attempts at biological control solutions are rarely successful because they usually require sustained effort, funding, and highly-specialized knowledge. Successful programs usually require the joint efforts of scientists with expertise in systematics, ecology, and rearing of natural enemies. International cooperation and exchange of information, natural enemies, and assistance is increasingly important in an age when global travel and commerce mean that new pests can invade agriculture and natural habitats regularly, despite quarantines and other regulatory efforts.

This text differs from that by Paul DeBach and David Rosen [*Biological Control by Natural Enemies*, Cambridge University Press, 2nd edition, 1991, New York, 440 pages (reviewed in Florida Entomol. 75: 166-167)] in several ways. DeBach and Rosen do not cover plant pathogens as target pests in their book. Also, DeBach and Rosen primarily discuss classical biological control, although they do briefly discuss conservation and augmentation, as well as other pest management methods such as host plant resistance, cultural methods, genetic methods, use of pheromones, and competitive displacement of pests by non-pests. Overall, *Biological Control* by Van Driesche and Bellows appears to be aimed at a more advanced student audience and provides a lengthier and generally well-balanced introductory overview of all of biological control. The plethora of multi-authored biological control compendia will remain useful sources for detailed discussions of specific aspects of biological control. *Biological Control* fills a nearly-empty niche and will introduce a new generation of students to the wonderful and complex world of biological control.

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