

Book Reviews

Nematodes as Biocontrol Agents. P.S. Grewal, R. Ehlers, and D. I. Shapiro-Ilan (eds.). 2005. CAB International, Nosworthy Way, Wallingford, Oxfordshire OX10 8DE UK. 505 pages with 63 tables and 77 figures. \$75.91 (£39.95), softcover, ISBN: 978-1-84593-454-5. \$172.90 (£91.00), hardcover, ISBN: 0-85199-017-7.

There is a general interest, worldwide, in reducing the use of pesticides in agricultural and horticultural cropping systems. As such, an emphasis now occurs on implementing alternative management strategies, including biological control, to deal with insect and mite pests that are encountered in agriculture and horticulture. Biological control involves the use of parasitoids, predators, pathogens, and entomopathogenic nematodes. The book *Nematodes as Biocontrol Agents*, edited by Parwinder Grewal, Ralf-Undo Ehlers, and David Shapiro-Ilan, is really the first comprehensive book available to provide an abundance of information pertaining to the many facets of entomopathogenic nematodes. The book contains 28 chapters written by approximately 50 contributing authors, including the editors. The first third of the book covers topics such as morphology and systematics of nematodes used in biocontrol; biology and behavior; mass production; formulation and quality; application technology; and forum on safety and regulation. Approximately half of the book includes chapters on the application of entomopathogenic nematodes in various cropping systems, such as turfgrass and pasture; glasshouse; nursery and tree; mushroom; orchard; soft fruit; vegetable and tuber crops; cereal, fiber, oilseed and medicinal crops; forestry; humans and animals; and social insects. The remainder of the book contains chapters on systems approach to conservation of nematodes, including interactions with plant-parasitic nematodes; compatibility and interactions with agrochemicals and other biocontrol agents; application of *Beddingia siricidicola* for sirex woodwasp control; entomophilic *Thripinema*; mermithid nematodes; biology, production and formulation of slug-parasitic nematodes; application of slug-parasitic nematodes; potential of predatory nematodes to control plant-parasitic nematodes; potential of fungal-feeding nematodes for the control of soil-borne plant pathogens; and critical issues and research needs for expanding the use of nematodes in biocontrol.

Each chapter provides in-depth descriptions of the topic with a listing of pertinent references to which readers can refer for further information. For example, I found the references in the formulation and quality and glasshouse appli-

cations chapters to be very useful for my research and extension programs. In addition, the references may be helpful to extension entomologists and other professionals in explaining to producers how to utilize entomopathogenic nematodes appropriately when dealing with specific insect pests. One section that was of particular interest to me was the chapter on formulation and quality since we have conducted research in this area. In fact, one of the most important components in ensuring the success of using entomopathogenic nematodes is a clear understanding of formulation and quality assessment.

The book *Nematodes as Biocontrol Agents* is an extremely valuable contribution to the understanding of entomopathogenic nematodes. Despite costs associated with the hardcover (\$172.90) and softcover (\$75.91) versions, there is no doubt that this book should be purchased by anyone conducting research with entomopathogenic nematodes.

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The Vertical Farm. Feeding the World in the 21st Century. Dickson Despommier. 2010. Thomas Dunne Books, St. Martin's Press, New York. 305 pages. \$25.99, Hardcover, ISBN 978-0-312-61139-2.

The Vertical Farm expands on the futuristic idea of creating hydroponic high-rise greenhouses in urban areas. From start to end, the vertical farm is described as a way to solve food supply problems in the world. The target audience for this book is the general public. However, there are many interesting ideas useful for students of horticulture and anyone interested in farming and urban development. A lucid style and high readability are both major plus points. There are 24 color plates with many artists' renditions of how future vertical farms will look. Despommier begins the book with a historical account of how agriculture developed and how most practices in today's agriculture are bad for the environment. Some of these accounts appear naive as a gloomy picture is painted as though all modern agricultural practices are bad for environmental sustainability.

In the chapter detailing the elements of vertical farms, the author comes up with a very long list of possible advantages, many of which remain unproven or even pretty much impossible. The writings in this section would benefit if real experiences of growing crops, whether in hydroponic farms or traditional

farms, were included. Many near-impossibilities have been claimed to support the main idea of the book. While in a dream structure anything can be assumed, vertical farms designed with current hydroponic greenhouse technologies cannot completely avoid weather-related or pest-related crop failures. One of the advantages for a vertical farm is listed as "No use of pesticides, herbicides or fertilizers." Greenhouse crop producers will notice immediately that this action is almost impossible. The suggested solutions, such as the use of human or other recycled waste for plant nutrients and strict quarantine measures from pests, will take a long time and effort before becoming practical, if at all.

Many different futuristic ideas on urban farming are interesting to read, but there was one major disappointment: this book appears premature, since no vertical farms currently exist. If someone had built and operated even a small, two-storied hydroponic greenhouse to test the proof of at least some of the energy-efficient technologies discussed, this book would have much more merit and value. The pictures of vertical farms shown in this book are all computer graphics of dream structures. Although there were a few pictures of real-world hydroponic production and a list of resources in the appendix, current commercial hydroponic greenhouse production details have not been well connected with the futuristic dream farms. However, the list of about 50 annotated websites represents a good measure of collective wisdom.

Although several years were spent researching for this book, there are erroneous or ambiguous statements here and there. In a description of grain harvest in Bhutan (p. 68–69), it is not clear whether the author saw the harvesting of buckwheat or wheat, as both are mentioned. It is said that maize is old-style corn (p. 113), but in reality corn and maize are interchangeable terms. There is a discussion spanning several pages on the environmental problems created by the use of the herbicide atrazine (p. 96–98), but the topic begins with a statement "Atrazine, an antifungal agent, is widely used to control a variety of crop-specific fungal infections, mainly wheat rust." When referring to agrochemicals, the author implies that herbicides are not pesticides (p.151, 161, and many other places). In a section teaching the reader about how plants make food, the author states "In the process of photosynthesis, plants discard the oxygen portion of carbon dioxide into the atmosphere ..." (p. 185), but in reality, oxygen released is from the splitting of water. Despite these shortcomings, the book succeeds in being the first to popularize a futuristic idea in farming and in making people think about the world's food supply.

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