Book Reviews

Natural Enemies. An Introduction to Biological Control. By Ann Hajek. 2004. Cambridge University Press, New York. 378 p. US\$110.00 hardbound, US\$50.00 paperback. ISBN 0-521-65295-2 hardbound, 0-521-65385-1 paper.

Biological control (biocontrol) means many things to many people. When a range manager thinks of biocontrol perhaps the first thing that comes to mind is an open field with a couple St. John's Wort plants where once was a solid stand with little else, and the little Klamath beetle that created that now scenic and grazable meadow. To a nursery manager a ladybird beetle or lacewing feeding on aphids may be what comes to mind. The idea for the movie *Alien* likely came from parasitoid wasps laying their eggs inside their prey with the larvae hatching inside its host and eating it from the inside out.

Biocontrol is a rapidly growing area of interest and study in entomology. Dr. Ann Hajek discusses many of the driving factors including increased public awareness of pesticide residues and pest resistance to many of our commonly used insecticides. Unfortunately many members of the general public are oblivious to this concept, but education is growing through the often thankless efforts of nursery managers, county extension agents, and many others.

Natural Enemies has grown from a course that the author has taught for undergraduates at Cornell University. Dr. Hajek states "my intent in writing this book has been to present an introduction to the many different types of natural enemies used for biological control." She has succeeded. This book does an excellent job in giving the reader a broad scope of just what biocontrol is, being specific enough to give the reader thorough understanding, but not so specific that the reader gets lost in all the detail. The reader does not need a background in entomology, plant pathology, or weed science.

The author states that "the first major book focusing on biological control of insect pests and weeds was published in 1964 (DeBach, 1964a) and the first major book focusing on biological control of plant pathogens was published in 1974 (Baker and Cook). Since these early treatises, there have been numerous excellent books on biological control. The majority of these books are more detailed and are intended for professionals in this field." Many of the basic books on biocontrol are too focused

on a specific aspect. This book excels at covering the material in such a way that not only is understandable, but is thorough.

Natural Enemies is composed of an introduction, 5 parts, 19 chapters, numerous subsections, a glossary, references, and index. The first 2 chapters are entitled as follows: Chapter 1: Why use Natural Enemies?; Chapter 2: Introduction to Biological Control. Part I: Strategies for Using Natural Enemies, is composed of 3 chapters and covers material such as success in classical biocontrol, release strategies, commercial availability, and the economics of biocontrol. Part II: Biological Control of Invertebrate and Vertebrate Pests includes 7 chapters and covers material such as the ecological basis for use of predators, parasitoids, and pathogens, specialist versus general predators, insect parasitoids, parasitic nematodes, bacterial pathogens of invertebrates, viral pathogens, fungi and microsporidia. Part III: Biological Control of Weeds includes 3 chapters covering the biology and ecology of agents used for biological control of weeds, phytophagous invertebrates and vertebrates, and plant pathogens for weed suppression. Part IV: Biological Control of Plant Pathogens and Plant Parasitic Nematodes has 2 chapters discussing biology and ecology of antagonists, and microbial antagonists combating plant pathogens and plant parasitic nematodes. Part V: Biological Control: Concerns, Changes, and Challenges has 2 chapters, which communicate to the reader the importance of making sure the biocontrol organism is safe, and the present uses of biocontrol. There are numerous figures, photos, and drawings throughout all the chapters, which greatly enhance the readers understanding of the material being covered while making the information presented less daunting.

I have had a couple of courses that focused on biological control, but there were never any books required for them because of the lack of good books being printed that would suit the needs of the student. *Natural Enemies* eliminates this problem and I would recommend it to anyone interested in learning about biological control. My own M. S. project presents a particular approach and view of biological control. Volunteer potatoes are the primary pest weed in potato rotations and I am looking at using the Colorado potato beetle for their suppression. None of the potato rotation

crops in Washington are fed on by the beetle except the potato and it is easily suppressed with insecticides (it has not shown resistance in Washington.) With books such as this one there may soon be more individuals realizing that a weed is just a plant out of place or time and a pest may also be beneficial. New projects such as this may soon begin to spread due to increased cost of weed biological control projects involving agent importation and testing.

Biological control has come to mean many things to many people. Sheep are a biocontrol agent when being grazed on leafy spurge. *Gambusia* (mosquitofish), as its name suggests, is a voracious consumer of mosquitos. Biocontrol no longer means only parasitized caterpillars and aphids or Klamath beetles on St. John's Wort; it is generally "the use of living organisms to suppress the population of a specific pest organism, making it less abundant or less damaging than it would otherwise be" (Eilenberg et al., 2001). This book makes the knowledge of biocontrol more abundant and less damaging than the ignorance of not knowing of biological control. Our worship and the cost of the pesticide treadmill must be eliminated. Long ago farmers had to have an intimate knowledge of their crop and the ecology of their land to be successful; DDT and other chemicals led to the "just spray it" attitude, which still permeates much of agriculture and the cost of forgotten knowledge. How much longer can we afford our ignorance?

In the June, 2004 *Rangelands* "Listening to the Land," Thad Box wrote in "Of Birds, Bees, and a Land Ethic" that some hummingbird chicks died in their nest on his portico. He first thought that a cat had caught the mother, but while talking to a long time bee keeper he was told that it was likely that the mother and chicks had all died from systemic pesticides consumed by the mother while nectar feeding on roses. Many home owners as he pointed out think "if little is good, a lot is better".

This book, especially the paperback at \$50.00, seems cheap compared to the cost of ignorance, and is certainly cheaper than many textbooks. The price and the clear detail and care the author has taken while writing this book make this an invaluable resource for anyone who is unfamiliar with biocontrol.—Chase W. Metzger, Washington State University, Pullman, Washington.