

## **Invasive Species Reconsidered**

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Source: BioScience, 62(3) : 305-306

Published By: American Institute of Biological Sciences

URL: <https://doi.org/10.1525/bio.2012.62.3.12>

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## Invasive Species Reconsidered

**Invasive and Introduced Plants and Animals: Human Perceptions, Attitudes, and Approaches to Management.** Ian D. Rotherham and Robert A. Lambert, eds. Earthscan, 2011. 352 pp., illus. \$99.95 (ISBN 9781849710718 cloth).

**Encyclopedia of Biological Invasions.** Daniel Simberloff and Marcel Rejmanek, eds. University of California Press, 2011. 792 pp., illus. \$95.00 (ISBN 9780520264212 cloth).

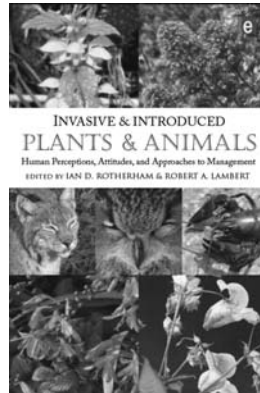
*“Nowadays we live in a very explosive world, and while we may not know where or when the next outburst will be, we might hope to find ways of stopping it or at any rate damping down its force.”*

Charles S. Elton, from  
The Ecology of Invasions by  
Animals and Plants (1958)

In his seminal work on invasion ecology, Charles Sutherland Elton still challenges us more than 50 years later. The fact that his statement is still valid reinforces our understanding of the problem of invasive species as being even more complicated than we—and he—first thought.

I often feel that conservationists are either whole-hearted optimists or doom-and-gloom pessimists about the state of the world. As a steward of our natural heritage, I try to protect the native biota, and although I generally strive to be hopeful, I do encounter species, ecosystems, and topics that threaten my optimism about rare-species protection and habitat management. Ever present and extremely varied, invasive species are the second major threat to worldwide biological diversity after habitat alteration and destruction, and there is no shortage of controversy over their impact and our responsibility (or lack of it) regarding this phenomenon. I stand somewhere between the two entrenched camps representing opposing views—the first, that invasive species

are inevitable and to be tolerated; the other, that every effort should be taken to eradicate them. I recognize that certain established invasive species will likely not be eradicated and—yes—that they should even be tolerated. I must balance



the cure with the symptoms. The ecology of invasion—the pros and cons of invasive-species management, as well as the evaluation of treatments—is a healthy, if not rigorous, debate, and the books *Invasive and Introduced Plants and Animals: Human Perceptions, Attitudes, and Approaches to Management* and *Encyclopedia of Biological Invasions* enter this debate in different ways.

Even the basic terminology is part of the discussion. *Weed* and *invasive* do not always convey the same origin or impact, and scientists have tried to comply with the politically correct terms of *nonindigenous*, *alien*, and *nonnative*. In *Weed Ecology in Natural and Agricultural Systems* (2003), Barbara D. Booth and her colleagues made a valiant effort toward terminological neutrality, although, as researchers in agricultural systems, they eventually circled back to “weed” ecology. Judging from the terminology used in these later two books, our changes in perception are reflected in our vocabulary.

How to efficiently yet effectively manage invasive plants and animals has been the subject of much research. As a scientist, I avoid a one-strategy-fits-all mentality, but I also bristle at the unsubstantiated criticisms of the applied efforts toward

invasive-species eradication. I am not a blind convert to the ivory tower approach to invasion research, but I also know that the spread of misinformation can travel faster than kudzu in North Carolina on a warm day. Although both books are admirable scholarly treatments of this broad topic, editors Ian D. Rotherham and Robert A. Lambert have made the more overt attempt to address alternative views toward invasion ecology. In *Invasive and Introduced Plants and Animals*, they dissect the subtleties of perceptions and attitudes and examine the approaches by some to control proliferation.

Although it is inextricably linked to many ecological issues, the human element is difficult to examine objectively using traditional scientific methods. Therefore, I also admire the Herculean efforts of Rotherham and Lambert to cover the subjective aspects of the issue in their book. In a particular graduate course, I once learned about conservation without any direct discussion of specific species. The concept was discussed, instead, using world economic theory, anthropology, and human culture. This approach broadened my perspective of the issue, and I am reminded of this in the way that Rotherham and Lambert address the concept of invasive species. They argue that invasion ecology research and the actions toward invasive species are based on human bias and perception. It is sobering to be reminded that what is considered an “acceptable” species continues to change over the years. According to Rotherham and Lambert, invasive species “will have increasingly important roles and functions in future landscapes.” This is the concept of *recombinant ecology*, a slowly growing viewpoint in European ecology, and specialists in the field as well as resource managers facing invasions should read this material.

Two dozen contributors to *Invasive and Introduced Plants and Animals* tackle sticky topics such as the hybridization between natives and nonnatives, surrogate values provided by invasive species, and humans cohabitating with invasive

doi:10.1525/bio.2012.62.3.12

species. Some of the species discussed fall into a murky pool of perception and reaction strategies. For example, *Sus scrofa* (wild boar) are naturally recolonizing areas of Great Britain, where the species had long been absent. This “new” species is a concern to some land managers, and it highlights the debate over *nativeness*. Another chapter grapples with the issue of species that have become part of the economy and customs of certain cultures, such as the introduced horses of New Zealand’s Maori.

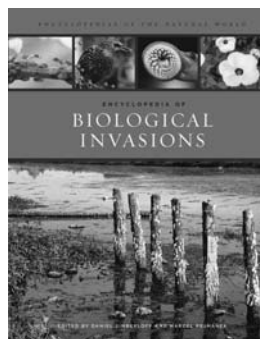
Admittedly, neither *Invasive and Introduced Plants and Animals* nor *Encyclopedia of Biological Invasions* is a book for the casual reader or even the most enthusiastic natural historian. These tomes are exhaustive scholarly investigations on current views on invasion ecology. Both books would be well applied in upper-undergraduate- or graduate-level courses. Rotherham and Lambert’s volume would be a great stand-alone textbook or jumping-off point in a course on invasion ecology or even conservation. As the name suggests, the *Encyclopedia* edited by Daniel Simberloff and Marcel Rejmanek works most effectively as a reference source, but each topic offers more than a semester’s worth of discussion and suggested literature. I will be sharing my copy with my students in my introductory ecology course.

Encyclopedias are challenged more than most book formats to be relevant and useful once they are published. The notion of an encyclopedia conjures up images of an exhaustive treatise, yet even they must be selective in their production; this is no easy task. Simberloff and Rejmanek masterfully execute a balance of the general with the specific, the foundation with the popular, the new with the old. Textbook ecology topics such as carnivores, competition, forestry, mutualism, and succession can be found in discussions on invasion, yet current topics such as ecotourism and bioterrorism also get attention. Well-established material is covered along with material reflecting recent changes in the world.

Certain chapters in the *Encyclopedia* seem daunting but deserve perseverance, such as “Acclimatization societies” by Christopher Lever or Ragan Callaway’s

treatment of “Novel weapons hypothesis.” The latter illustrates the growth of invasion-ecology research and the synthesis of decades of inquiry. Callaway uses *Alliaria petiolata* (garlic mustard) as one example of this intriguing aspect of invasion where invading species’ impacts may involve phytotoxicity, defensive chemicals, or suppression of often-overlooked symbionts. One way that *Alliaria* invades is through inhibition of the native mycorrhizal community within invaded soils. Depending on your viewpoint, this is another example of the often-subtle ecology and impacts of biotic invasion or it demonstrates the fascinating survival skills of a successful colonist.

Simberloff and Rejmanek’s *Encyclopedia* gets high scores for access and user-friendliness. After the traditional table of contents, there is a “Contents by subject area” section. The book concludes with



more lists and references, including “100 of the world’s worst invasive alien species,” just before its extensive glossary. The reference section is not exhaustive and is organized by subject area. Attractive photos, supportive tables, and illustrative figures complete the helpful presentation. I am curious, however, about how a hard-copy encyclopedia will rank among the new generation of resources and among the newer generation of consumers. The price of either book is a hurdle for some, even for a specialized volume.

When my students discuss the grass carp invading the Mississippi River system, zebra mussels clogging our waterways, or the countless Eurasian weeds possibly contributing to the decline of grassland birds—the fastest disappearing group of native North American birds—I

offer examples of intercontinental cross-transfers of biota, such as the invasion of our common gray squirrel into Europe, as reminders to all that invasion ecology has many victims. As Rotherham and Lambert try to convey, it is human action and reaction that is at the core of species vilification. Invaders do what species are supposed to do: They colonize new areas, increase their fitness, and carry on.

I have been a gardener most of my life—longer than I have been a conservationist and practicing restoration ecologist—so I am aware of the great diversity of introduced ornamental and edible plants. At home, in my small suburban landscape, I accept the melting pot of newcomers while excluding the aggressive animal and plant interlopers as well as I can. I garden for wildlife. I garden for bees. I garden for my daughters, who deserve the right to play without harmful chemicals and the right to watch the fascinating interactions of plants and animals. Still, I am not a purist. I would love to garden only with native species, but I confess that the palate of horticultural options would be less brilliant.

Charles Elton felt in 1958 that “ecological explosions differ from some of the rest by not making such a loud noise and in taking longer to happen.” Although scientists now do not typically use the word *explosion* when describing biological invasions, some invasions are indeed faster and “louder” than expected. But no matter how we measure invasion, it is done on a sliding scale. Both *Invasive and Introduced Plants and Animals* and *Encyclopedia of Biological Invasions* are at the threshold of a paradigm shift in viewpoint and in strategy toward the worldwide issue of invasion ecology. In reading either title, experienced ecologists and novice conservationists alike will come away with an expanded perspective of this often-thorny issue and be better prepared for “where or when the next outburst will be.”

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