

INVASIVE CONTROVERSY

As a biologist, I was initially excited about the *Specious Claims?* article in the Spring 2008 issue of *ROM* magazine, but was subsequently disappointed upon reading it. Unfortunately, I found the author's arguments to be flawed. These flaws ranged from the pedantic to the biased to the misleading.

In the article, the terms "non-native," "exotic," "introduced," "alien," and "invasive" are used interchangeably to identify species that are not native to an area. Although the differences may seem pedantic, these terms all mean something different to biologists. The term "invasive species" is the most relevant to the article as it is used by biologists to mean those species that have a significant negative impact on the ecosystems in which they are introduced. The other terms relate to species not native to an ecosystem but not identified by biologists as having negative impacts. The potential impacts of such species may well be overblown by the media, but not typically by biologists.

The author argues that invasive species may actually enhance biodiversity through increases in species richness, ecosystem services, and speciation events. However, these enhancements may be short-lived as invasive species may cause the extirpation of native species; invasive zebra and quagga mussels have caused the extirpation of several globally endangered native mussels in Lake Erie. In general, these invasive mussels have caused a total upheaval of native Great Lakes ecosystems through wide-ranging effects, including extirpation of native species, re-emergence of dead zones, and toxic algal blooms. These effects have facilitated the invasion of other species, such as the round goby, which, in turn, has led to the further extirpation of native species and

an increase in avian botulism. If these invasive species benefit native predators as prey, it is usually at the expense of the original native prey, which leaves the native predators susceptible to the unpredictable fluctuations in abundance more common to invasive prey species.

It is clear that the purported benefits of these invasive species are far outweighed by ecological, economic, and human health costs. A comprehensive overview of the world's worst 100 invasive species can be found at www.iucn.org/places/medoffice/invasive_species/docs/invasive_species_boklet.pdf. This short document leaves no doubt as to the devastating impacts that invasive species can cause.

One area in which the author and I agree is that programs to eradicate established invasive species are not the best solution. It is much better to identify invading species that may have significant negative impacts on our ecosystems before they are introduced into the wild and prevent them from becoming established. This is best done through a formal process that assesses the risk of arrival, survival, and impact of species, and identifies ways to minimize these risks before the species is introduced into the wild. If such a process were consistently implemented, we would have fewer debates on the true nature of the impacts of invasive species and their control.

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THE AUTHOR REPLIES:

I was disappointed in the lack of analysis and reflection shown in Nicholas Mandrak's comments. He did not address any of the main points and case studies in my article, such as

the crayfish *Orconectes rusticus*, which is constantly deemed as invasive and subject to control programs despite the fact that it does not appear to pose a risk to human health or the economy and has not caused the extinction of any local species. Instead, he uses the example of the zebra mussel to reiterate the standard invasion biology mantra: invasive species are bad and we should fight against them. Even in this one example, the story is much more complex than he suggests. Zebra mussels have been found to be very useful as biomonitors for aquatic pollution in Ontario and more than a century after being introduced to western Europe are considered an integral part of the local ecosystems there.

My article was not meant to deny that invasive species can cause problems. It was an attempt to broaden the discussion. Some invasion biologists and wildlife managers have a negative attitude towards all non-native species, harmful or not. Often, it is these biologists who are using the media to get their alarmist message across.

Also, despite what the letter writer implies, there is no consensus among biologists about the meaning of terms such as "native," "introduced," and "invasive." I was recently invited to participate in a major scientific survey to examine the goals, methods, and definitions used in the study of invasive species. This survey was considered necessary precisely because we have yet to reach a clear consensus. Rather than simply dismissing criticisms, some invasion biologists could do more to help the maturation of their field by taking a more thoughtful look at their assumptions, definitions, methods, and goals.

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