

Preface

Alien, in the context of invasive species, means that the species, subspecies, or group with some specific genetic traits has (recently) been introduced by humans to a region, usually a continent or island, to which it didn't spontaneously spread. Mostly, alien is seen as a prerequisite for invasive.

The term invasive, when it is applied to a species other than human, is used with several different meanings. In the broadest understanding of the term, it means a species that, with the help of humans, establishes itself in an area outside its native range. In a somewhat more narrow understanding, it should not only survive for generations in the new territory but also undergo a drastic population expansion. A further limitation of the term comes when a damage criterion is introduced, mostly expressed in economic terms. Thus, the most widely used, human-centered definition reads "An invasive species is a plant or animal that is not native to a specific location; and has a tendency to spread, which is believed to cause damage to the environment, human economy and/or human health." In practice, as national governments and authorities are key players, the word "native" is understood to mean "from our country." Thus, the house finch, native to California and brought by humans to the US east coast, from where it has spread all over the USA, Mexico, and southern Canada and now numbers over a billion, is not classified as alien or invasive in the USA and Mexico. However, the house sparrow, with much lower numbers, but coming from Europe, is classified as invasive. Whether the house finch shall be seen as an invasive alien in Canada becomes a different administrative and philosophic question, since the original west coast population lately has spread north on its own and entered British Columbia, while the human-moved eastern population has spread to Ontario, Quebec, and the Atlantic provinces. Another example of a species that has been moved by humans within a country and then spread itself from the new location to other countries is the raccoon dog (*Nyctereutes procyonoides*). It was brought by humans from eastern Siberia to European Russia and Ukraine during Soviet times and then spread naturally from there to the Baltic states, Finland, and Sweden. It is regarded as alien and invasive in the latter countries, but not in European Russia.

Sometimes, a moral argument comes up for forgiving the invasiveness of a species when it prospers in an area to which humans brought it—when humans altered its native area to the point where the species can no longer survive there. The snowdrop (*Galanthus nivalis*) is about to become such a species thriving well on the British Isles and in Scandinavia, to where humans brought it, but fighting for survival in its native Continental Europe. Global warming is likely to produce quite a few such species. Are they to be seen as aliens that should be exterminated if possible, or are they refugees from our manipulations of the environment that we are morally obliged to give a new home in the world we altered?

In the definition of invasive cited above, the expression “is believed to” is used instead of the much stricter “has been showed to” or even more so “has been proven to.” This can possibly be seen as an off-shoot of the wordings used in the definition of the precautionary principle from the 1992 Rio Summit, where it is said that “Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason to postponing cost-effective measures to prevent environmental degradation.”

There is, however, a clear further weakening of the requirement to demonstrate damage, if “lack of full scientific certainty” is seen as the mother of “is believed to” and the question of who is authorized to be the believer immediately comes to mind.

Another aspect, if the precautionary principle is invoked, is the wording “cost-effective measures to prevent environmental degradation.” This would seem to imply that measures to reduce or eradicate invasive species should only be undertaken if the cost of those measures is lower than the damage caused by the invader. (The methods used to calculate economic and ecological damage will be commented on in the concluding chapter.)

In this book, the term invasive is used without any damage criteria. I have used the term for species, which conquered new territories after having been introduced by humans, and that increased dramatically in numbers there. There are many of those, so to arrive at the 18 cases presented here, further selection criteria have been applied. First and foremost among those is time since introduction, as the long-term fate is the theme of the book. The order of the chapters with case studies also reflects this as they are presented following the year of introduction with the oldest, the earthworms, first.

The idea has also been to select examples from different groups of animals and plants, and organisms coming from and invading different geographical areas. The result comprises 18 cases: two parasitic fungi, three plants, six invertebrates (out of which three are insects), one amphibian, two birds, and four mammalians. Invaded areas are Africa, Asia, Australia, Europe, North America, Pacific Islands, and South America. The invaders come from Africa, Asia, Europe, North America, and South America. The invaded areas include terrestrial systems, as well as fresh and marine waters, in temperate and tropical areas in the northern and southern hemispheres.

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