

How do Invasive Alien Species impact on biodiversity in the EU?

A BirdLife Europe fact sheet

BACKGROUND

The Convention on Biological Diversity (CBD), among a host of other international studies, assessments and agreements, recognises IAS as a major driver of global biodiversity loss. It therefore urges its Parties (including the EU) to identify and prioritise IAS and their pathways of introduction, to manage these pathways to prevent introduction and establishment, and control or eradicate priority species. The International Union for the Conservation of Nature (IUCN) and the EU-funded DAISIE project have each identified the 100 'worst' invasive species threatening biodiversity and human livelihoods on the global and European scales. The following list provides a few examples of IAS impact on biodiversity in the EU - but the reality in total goes far beyond these few cases.

A NOTE ON TERMINOLOGY AND ECOLOGY

The use of the term 'Invasive Alien Species' is widespread, is the choice of CBD and the EU, and is synonymous with invasive non-native species, or invasive exotic species. It must be emphasised, however, that the IAS problem is entirely one of human making, and no species is intrinsically 'good' or 'bad'. The central issue is that geographical barriers around the world (oceans, mountains, deserts, currents etc) prevent biota from mixing and thus make evolution proceed independently in different regions. This generates and maintains a high proportion of global biodiversity. When people break down these barriers by moving species and letting them escape and establish, we inevitably drive down biodiversity.

BRIEF CASE STUDIES

Aquatic plants

Water hyacinth, water primrose and NZ pigmyweed are three examples of freshwater aquatic plants that have become highly invasive. These species cause fundamental changes to freshwater habitats, covering large areas of wetland, including canals and other waterways. They block waterways and interfere with the oxygenation and movement of the water. They alter the composition of the aquatic community, decreasing its diversity. Often remedial action must be done by hand at a large economic cost.

Aquatic invertebrates

Waterways created or connected by people to aid transport facilitate the rapid spread of aquatic organisms. Signal crayfish, Red swamp crayfish and Spinycheek crayfish were all introduced from N America to be used for food, as bait or kept as pets. Some were released into the environment, where they transmitted the crayfish plague, a parasitic disease, to native European crayfish. The Chinese mitten crab and the Pacific oyster were introduced for human consumption in Europe but, now abundant and still spreading; they modify habitats and alter water quality.

Freshwater fish

In the last two centuries, the freshwater fish communities have regularly been "improved" by introducing more aggressive species, with a view to making angling more challenging or exciting. These new arrivals predated the smaller fish –including the young of valued species– and their food, and simplified the original communities. A very high proportion of introduced fish species become invasive in insular freshwater environments. Mosquito fish were introduced in various wetlands to prey on mosquito larvae (and reduce the risk of malaria) but, instead, they turned to the native fish, themselves consumers of mosquitoes, with severely negative net outcomes.

Rodents on islands

Islands are extremely vulnerable to IAS, particularly where they have breeding seabirds or resident reptiles and amphibians. Historically, rodents (rats, mice) and feral cats have been extremely harmful species, driving hundreds of island endemic species to extinction over recent centuries. There are now few islands in Europe that remain predator-free. The cost of eradicating rodents is high, particularly for larger islands, because the task must be completely successful, which is often a technical challenge. However, following removal of non-native mammals, native vegetation and fauna recover quickly and dramatically - demonstrating that the presence of alien predators was a major driver of poor conservation status.

Marine species in ballast water

Ballast water from cruise ships, large tankers and cargo carriers is often taken in one region and released in another, carrying a huge variety of organisms with it. This has led to the unintentional introduction of, for example, the comb jelly *Mnemiopsis*, which has caused fish stock and ecosystem collapse in the Black Sea. The International Convention for the Control and Management of Ships' Ballast Water and Sediments was adopted in 2004 to tackle this pathway - but it will need more ratifications before it can enter into force.

'Lessepsian' and Ponto-Caspian invaders

The opening of big waterways, such as the Suez Canal (1869), and the connection across watersheds, e.g., through the Rhine-Main-Danube Canal (1992), facilitated the expansion of dominant species into new environments. Much biological diversity evolved in isolation, so breaking geographical barriers causes homogenisation of communities and significant biodiversity loss. Zebra mussels damage artificial waterworks with high economic costs; Killer shrimps are active predators spreading their way across Europe.

Predators

Non-native, medium-sized predators are among the most problematic IAS, particularly opportunistic species that will take the easiest variety of prey, which may include species of conservation concern. The American mink, the Raccoon and the Raccoon dog already have large, well-established populations in mainland Europe, which need to be managed. It is important to limit their further spread, particularly onto islands and vulnerable habitats. The Raccoon is a known vector of several diseases, including the raccoon roundworm, which is potentially lethal for humans.

Terrestrial plants

Invasive terrestrial plants like Pampas grass, *Rhododendron ponticum* hybrids, Japanese knotweed and giant hogweed can extend over huge areas as mono-specific tracts. They dominate the space, preventing other plants from establishing in those areas, and interfering in reproductive processes, out-competing native wildflowers for the attention of pollinators. Himalayan balsam excludes other species from woodlands. Iceplants form extensive carpets on limestone islands; their presence can benefit rats, to the detriment of the vertebrate communities (seabirds, reptiles) that once thrived on invaded islands.

Ants

Ants can be particularly harmful to biodiversity, especially those species that predate on other invertebrates. Polygynous species (= multiple queens in the same colony) are of most concern, especially where the queens are closely related. Because their members are genetically very similar, ants do not fight and colonies do not compete. This leads to mega-colonies of several million members, as in the Argentine ant and Asian garden ant. Fire ants are potential invaders of highly predatory nature.

Harmful insects

The tiger mosquito spread via the international tyre trade (due to the rainwater forming small pools in the tyres when stored outside). It is associated with the transmission of several human diseases, including the viruses: Dengue, West Nile and Japanese Encephalitis. The Asian hornet arrived in France most probably in a container of pottery from China. It predated on social wasps and honeybees, causing important economic losses. Its sting can be particularly painful. The UK has issued a Species Alert for this species.

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