

## Asian gudgeon bring new terror to rivers

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*Pseudorasbora parva*. Credit: IRD / R. Gozlan

Small in size but significant in terms of the ecological and economic damage they cause, Asian gudgeon are invading a great number of water courses across the world, particularly in Europe. These fish carry a half-animal/half-fungal parasite, which has very likely been present in China for millions of years and which is fatal to most other fish species. Having discovered this pathogen 10 years ago, IRD researchers and their

partners have recently demonstrated how quickly it can spread in a Turkish catchment area. Three years after the arrival of the gudgeon, between 80 and 90% of fish were contaminated, including farmed bass, a species of great economic importance in the Mediterranean.

Arriving from China 50 years ago, a small fresh water fish from the carp family, known as the 'Asian gudgeon', has since caused devastation in the rivers of Europe and North Africa. This creature has successfully colonised various aquatic environments due to its highly efficient strategy for reproduction. But most importantly, as demonstrated in a study by the IRD and its partners, published in *Emerging Microbes and Infections (Nature)*, it is propagating a devastating mycosis, a cousin of the well-known chytrid fungus, which has decimated frogs and toads throughout the world over the last few decades.

## **A parasite from another age**

This small invasive fish is the healthy carrier of a parasite named *Sphaerothecum destruens*, bordering between the animal and fungal kingdoms. This organism, the type of which was only discovered recently, emerged several million years ago when animals and fungi became differentiated. The research team discovered this parasite in the Asian gudgeon in 2005 and subsequently observed its damaging effects on other [fish species](#) under laboratory conditions.

## **A mortality rate of up to 90%**

To confirm these initial experimental findings and validate their epidemiological models, scientists monitored the wild populations of fresh water fish over a four-year period, from 2009 to 2013, in a catchment area in South-East Turkey. Only three years after the introduction of the Asian gudgeon and its deathly parasite in 2006, all

were infected. Between 2009 and 2013, the number of fish fell by 80 to 90%.

## **A long-standing conspiracy**

Scientists subsequently conducted a phylogenetic analysis of different strains of the pathogen *Sphaerothecum destruens*, taking samples from the tissue of various family lines of Asian gudgeon in Europe, as well as from infected salmon in the United States. Their findings suggest that the pathogen and its Asian host have been evolving jointly and concurrently for thousands of years. This confirms the origin of the parasite and explains why the Asian gudgeon, which has evolved with it, is not affected.

## **Contaminated sea fish**

In addition to the serious ecological problem it causes, the Asian gudgeon has an even more worrying potential economic impact: researchers have discovered its parasite in bass cultured in the brackish water of a Turkish aquaculture farm, having previously believed that it could only affect [fresh water](#) species. This [fish](#) is hugely important in economic [terms](#), with an industry representing 400 million euros per year in the Mediterranean.

The research team is sounding the alarm bell. The risk of this disease emerging on a worldwide scale is very real. Animal health organisations and environmental protection agencies will now need to take urgent action to contain the rapid spread of this pathogen across Europe and the rest of the world.

**More information:** Didem Ercan et al. Evidence of threat to European economy and biodiversity following the introduction of an alien

pathogen on the fungal–animal boundary, *Emerging Microbes & Infections* (2015). [DOI: 10.1038/emi.2015.52](https://doi.org/10.1038/emi.2015.52)

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