Non-Native Gobies in the Lower Rhine

Can two different environments cause changes in species characteristics of the Round and Bighead goby?

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The fact that global travel and trade increased dramatically in the past decades created many new pathways for species to establish themselves in new environments. These species are called invasive species and according to the International Union for Conservation of Nature (IUCN), invasive species are "animals, plants or other organisms introduced by man into places out of their natural range of distribution, where they become established and disperse, generating a negative impact on the local ecosystem and species".

Invasive species can destabilize native ecosystems by changing the food web and energy flow through the system, reduce the existing food and space resources that can as a final consequence lead to the extinction of native species and probably an overall decline in the biodiversity of the system.

It has been shown that the Ponto-Caspian gobies, Round goby (*Neogobius melanostomus)* and Bighead goby (*Ponticola kessleri)*, are very successful invasive species that became a threat to most environments that they invaded. Native to the Black Sea these two bottom-dwelling fishes are characterized as successful invaders due to a broad diet spectrum, territorial aggressiveness, multiple spawning events throughout the season, a wide tolerance range for environmental factors, and a lack of natural predators.

The circumstances that both species are very successful invaders result in the fact that nowadays the abundance of those that have established themselves in many of Europe's rivers regularly exceed 80% or more of the local fish community in these rivers. One of these rivers is the River Rhine which became of particular interest in this study. Since researches in other rivers have shown that different environmental conditions within the same water body can significantly influence its inhabitants the goal of this research was to find out if different habitats (sand and gravel; riprap structures) within the Lower Rhine can cause changes in species characteristics of *Neogobius melanostomus* and *Ponticola kessleri* when compared between the different habitats.

In order to detect differences between the two habitats, analyses of the species food uptake, diet composition, parasite infection, and gonad development (to measure sexual maturity) were performed. Finally the morphology of *Neogobius melanostomus* was analyzed and compared.

The results of this study however did not show any significant differences between the two sites. This could probably be related to a high similarity of the environmental conditions in both habitats due to only a small distance between the two habitats. The morphology analysis indicated that *Neogobius melanostomus* regularly moves within them. The study also showed a high competition between *Neogobius melanostomus* and *Ponticola kessleri* for the same prey.

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