Boat noise increases predation of isolated invasive fish

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Abstract

In general, humans affect ecosystems in many ways. In underwater context, they contribute to the spread of invasive fish and they generate anthropogenic noise. However, there is a lack of research to study how the two interact. Here, we used the functional response concept to investigate the effects of chronic exposure to boat noise on the predation of invasive freshwater fish. We also measured their mobility to explain why noise affect fish predation. In a first study, we unexpectedly observed an increase in predation rate under noise exposure on the isolated round goby *Neogobius melanostomus*. This result suggests a synergy between anthropogenic disturbances. In a second experiment, we focused on the invasive topmouth gudgeon (*Pseudorasbora parva*), conducted both in isolation and in the presence of a congener. For this species, we showed a reduction in predation by boat noise when the fish was alone whereas. However, this reduction disappeared when two fish were together, suggesting the possibility of non-trophic interactions that could influence per capita predation rates. These experiments have important implications for future research. Firstly, it is clear that different species respond differently to stressors. While fish predation is generally negatively affected by noise, as in the case of the topmouth gudgeon, our study showed an increase in goby predation with both an increase in attack rate and a decrease in handling time. Secondly, it can be difficult to extrapolate findings from studies on isolated fish to real-world scenarios.

Keywords: Functional response, Trophic impact, Biological invasion, Noise pollution, Multiple predator effects, Freshwater fish

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