

Fisheries-induced selection on fish personality traits – encountering the gear is a necessary, yet insufficient, condition for determining vulnerability to angling in three freshwater fish species in the wild

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Abstract

In fisheries operating with passive gears, such as hook-and-line angling, the capture process is ultimately dependent on fish behaviour. Accordingly, evolutionary responses in fish behaviour may be induced via behaviourally selective fishing. Some fish personality traits, such as activity, foster the encounter probability with passively operated gear and are thus candidate behaviours under selection by fishing. We tracked the positions of common carp (*Cyprinus carpio*), tench (*Tinca tinca*) and perch (*Perca fluviatilis*), in a 25-ha lake equipped with a high resolution acoustic telemetry system to examine how encounter-based behaviours and angling vulnerability are related. We experimentally angled the common carp, and tench at baited feeding sites at fixed locations, and let experimental anglers fish for perch with boats and standardized gear. Several encounter-related behavioural traits (e.g., distance moved, activity space) were found to be highly repeatable, indicating consistent among-individual differences or personality. However, encounter-based behaviours were not related to the probability of being angled in any of the species, despite immense variation among individuals in both behavioural traits and angling vulnerability. Hence, angling seems not to induce selection on activity or home range in the wild in a natural lake. However, in perch habitat use variables (mean latitude and longitude of the activity space) were strongly predictive of perch vulnerability, which either suggests habitat specific behavioural patterns or more skilled anglers choosing particular habitats. We find encounters with baits are a necessary, but insufficient condition for driving variation in vulnerability in the three species examined.

Keywords: behavioural selection, telemetry, perch, common carp, tench, fish personality.

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