
Climate change threatens the worldwide fish fauna

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Abstract

Anticipating the effects of climate change on biodiversity is crucial for proactive conservation management, but critical knowledge gaps remain in our understanding of species vulnerability, especially in aquatic environments. Here, we used thermal tolerances, together with phylogenetic information and species distributions, to assess global patterns of vulnerability for ~3000 freshwater and marine fish species under future climate change scenarios. We found that fish inhabiting tropical oceans are likely to be highly susceptible to future climate change, whereas the risks may be especially pronounced in Northern fresh waters. Physiological susceptibility was also strongly clustered along the phylogeny, suggesting that climate-related losses will not be randomly distributed across the tree of life. Of most concern is that the spatial congruence of these patterns with contemporary human pressures indicate that the most susceptible fishes to deleterious effects of climate warming might also be the less resilient, thereby being predictably the most severely affected.

Keywords: Climatic vulnerability, Aquatic ecosystems, Ectotherms, Niche conservatism, Thermal safety margins

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