

Human land-use changes the diets of sympatric native and invasive mammal species

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May 9, 2023

Abstract

The consequences of biological invasions and habitat degradation for native biodiversity depend on how species cope with the individual and synergetic challenges these processes present. To assess the impact of anthropogenic land-use on the food web architecture of an invaded community, we examine the diets of nine native and two highly invasive mammal species at different trophic levels, inhabiting different land-uses across six biogeographic regions in Tasmania, Australia. We use two complementary methods, environmental DNA metabarcoding analysis (eDNA) of faeces and stable isotope analysis (SIA) of nitrogen (N) and carbon (C) in whole blood, to account for the high inter-individual and temporal variability in animal diets. eDNA showed regionalisation in the diet of smaller species, with land-use further defining dietary taxa within each region. SIA revealed that bioregion and land-use influence the $\delta^{13}\text{C}$ values of all carnivore species and omnivores, whereas the $\delta^{15}\text{N}$ values of these species are influenced only by land-use and not bioregion. Including multiple species showed that native rats are changing their diet in response to the presence of invasive rats, an impact that would have been otherwise attributed to land-use. Our findings demonstrate that human activities and invasive species are molding the diets of invaded communities raising questions about the potential impacts that dietary modifications will have on the life-history traits and the evolutionary consequences these modifications might have on the survival of native species. This highlights the urgency to include human activities in ecological studies and the importance of targeting multispecies assemblages to gain a better understanding of synergetic impacts on native biodiversity.

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