Form and Function

Changing invaders: the evolution of alien rodents on islands

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Introduced species often adapt their behaviour, morphology, and ecological niche in response to variables that differ from those of their native range. We analysed body size and island data for 241 rodent populations belonging to 16 species on 212 islands worldwide to test whether body size of insular populations of introduced rodents is correlated with the geographical and ecological characteristics of the islands as well as time in isolation. Introduced rodents follow the predicted island rule trend, with body size shifts more pronounced for populations with greater residence times on the islands. Body size of insular populations is positively correlated with latitude, consistent with thermoregulatory predictions based on Bergmann's rule. Body size of insular populations is negatively correlated with number of co-occurring mammalian species, especially other aliens, confirming an ecological hypothesis of the island rule. Carnivory in rats and mice in the form of predation on nesting seabird colonies seems to promote 1.4- to 1.9-fold increases in body size: Henderson Island (Pitcairn Islands) and Gough Island (South Atlantic) are home to rats and mice (respectively) almost twice the size of their mainland conspecifics. The island rule is a pervasive pattern in rodents, exhibited across a broad span of geographical regions, time periods and for introduced as well as native populations. Time in isolation impacts body size evolution profoundly. All insular populations of Polynesian rats (*Rattus exulans*) and Asian house rats (*Rattus tanezumi*), both Holocene introductions, evolve larger body sizes, whereas almost all Anthropocene populations of the brown rat (*Rattus norvegicus*) evolved smaller body sizes. Individual populations, however, varied substantially in their rate of body size evolution, with some populations exhibiting significant body size change in less than 400 years, here proposed as likely coinciding with increased levels of carnivory.

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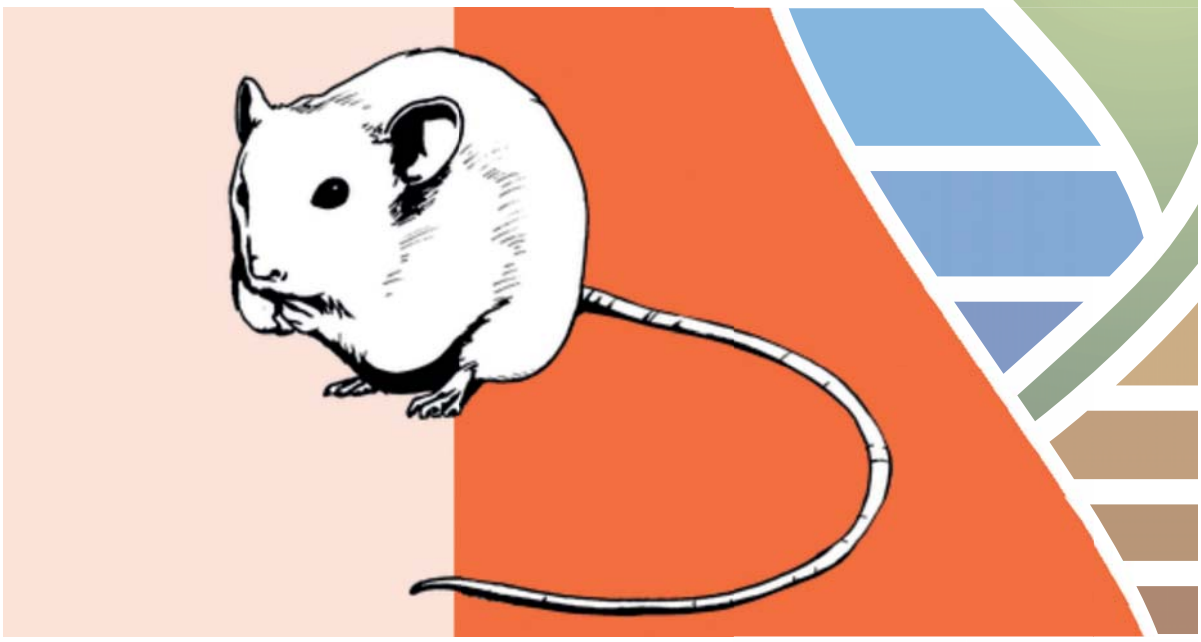

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