Diet of introduced black rats (*Rattus rattus*) on Christmas Island: setting the scene with stomach and stable isotope analysis

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The black rat (*Rattus rattus*) is an introduced and invasive rodent, negatively affecting endemic species on many islands worldwide. Black rats have existed on Christmas Island for more than 100 years, and feral cats (*Felis catus*), also on the island, are poised for imminent eradication. The risk of meso-predator release needs to be considered, and a combination of stomach and stable isotope analyses of rats was used to determine potential impacts on native fauna should such a release occur. Samples of rat stomach, muscle and fur, along with baseline and consumer reference groups were collected in plateau forest and coastal terrace for stable isotope analysis during the wet and dry season of 2015/16. Stomach analysis revealed an omnivorous diet, with reproductive parts (flowers, fruits and small seeds) of plants significantly dominating the invertebrate component. One reptile was found in a single gut, the introduced blind snake (*Indothyphlops bramini*) but no birds were detected in stomach contents. Stable isotope analysis showed an omnivorous to predatory role compared with stomach analysis, but no association with nesting seabird sources. The effect of habitat and season did not result in major diet shifts, with rats consuming items that primarily followed the C3 pathway. Omnivory was predominant in plateau forest and carnivory dominated the coastal terraces, while trophic niche width broadened on the coastal terraces. Homogeneity of diet across habitat and season suggests persistent plant and invertebrate resources may satisfy nutritional requirements through opportunity or necessity year-round. Little evidence of significant dietary overlap was shown with feral cats based on stomach data from previous diet studies. Further investigation into the diets and relative abundance of rats over time is required to reliably gauge their impacts on vulnerable species and communities on Christmas Island, to justify future rat control actions in the wake of feral cat eradication.

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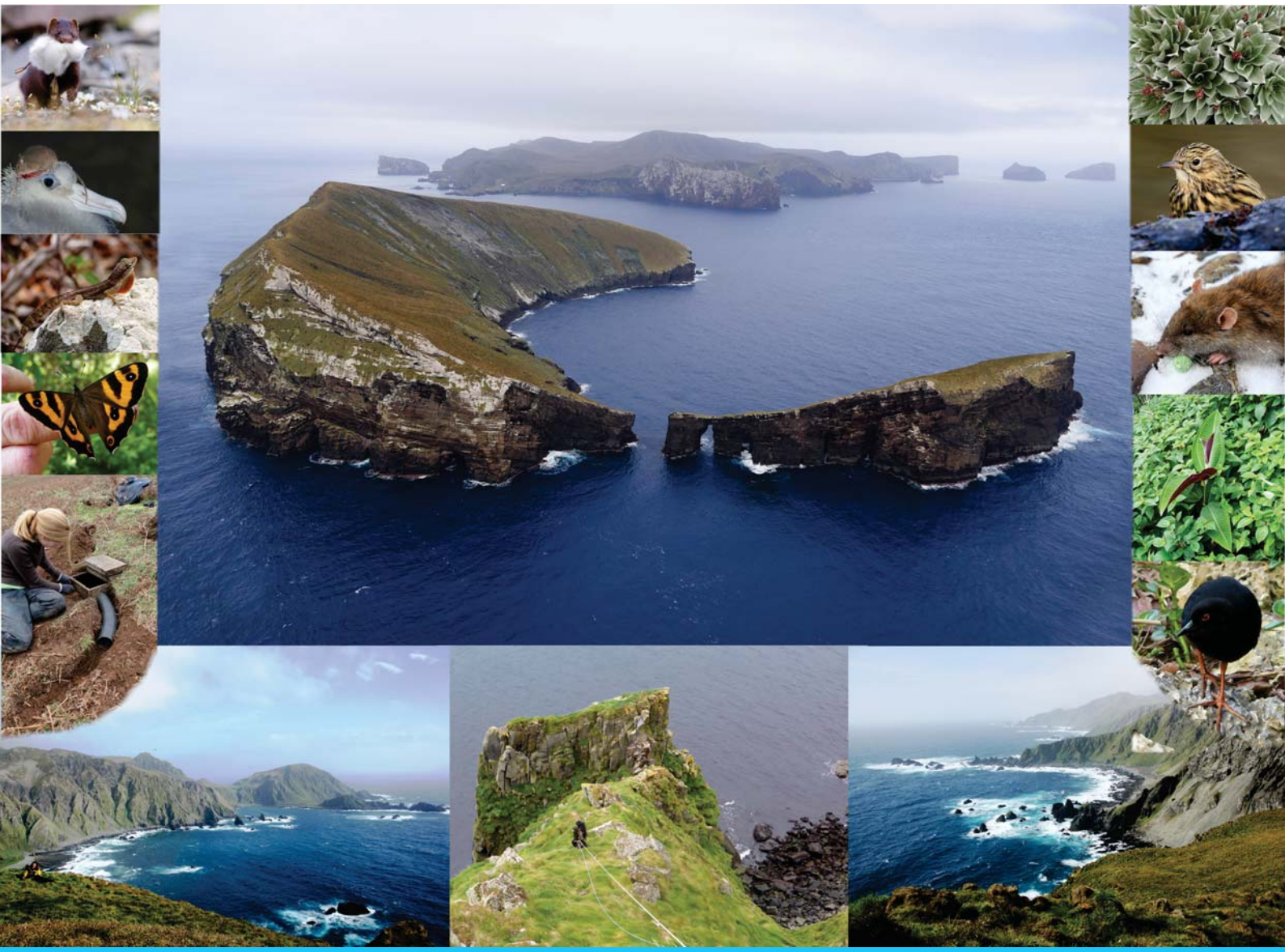

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