

Using ancient dung to reconstruct the transformation of prehistoric island ecosystems by invasive rats

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Rats have been dispersed with prehistoric humans to thousands of islands around the world, where they have had devastating effects on indigenous biotas and ecosystems. However, a complete understanding of the ecological consequences of rat invasions has remained elusive. This is because contemporary studies on rat impacts are based on ecosystems heavily modified during prehistoric times, and prehistoric evidence for direct rat predation is mostly circumstantial e.g., a short temporal overlap of bones of rats with extinct birds. In this talk I will show how ancient DNA and microfossil analyses of dated ancient rat dung found in rock crevices can directly reveal the impacts of the Pacific rat (*Rattus exulans*) on intact New Zealand ecosystems, from the start of their invasion when they were introduced with the first human settlers in the 13th century. Reconstructing past ecological interactions between an invasive rat and island biota helps to resolve questions about how invasive rats transform vulnerable island ecosystems, and to advance our thinking about the legacy of rat impacts on current ecosystem processes and function.