

Hunted in New Zealand, conserved in Australia: Brushtail possum genome could help with population management efforts

October 17 2023



Common Brushtail Possum, Austin's Ferry, Tasmania, Australia. Credit: Wikimedia Commons, [CC BY-SA 2.5](#)

Researchers say mapping the genetic code of the brushtail possum will benefit those working to both conserve and control the animal.

In a five-year long study, just published in *Nature Communications*, an international group of researchers led by the University of Otago, has assembled the entire genetic code of the marsupial mammal.

The work also uncovered where and when their genes are expressed, and revealed surprising details about their [population](#) diversity, reproduction, and origins.

Study lead Associate Professor Tim Hore, of Otago's Department of Anatomy, describes possums as "a fascinating animal that is loved in one country and a cause of concern in another."

"They are hunted in Aotearoa New Zealand for their fur, and controlled for conservation, but treasured and protected in Australia. Having their full genetic code is important for both countries as efforts to manage their respective populations are being held back by the lack of this knowledge," he says.

"In New Zealand, where the possum is a harmful introduced species, we can use the information to help guide control and eradication strategies, by tracking and monitoring target populations on the basis of their genes; but in the same way our work will also be useful for its conservation in Australia, where it is a valued native species."

A potential novel way to improve possum population management has also been revealed by the DNA sequencing, based on chemical communication genes the researchers have discovered.

"Possums are nocturnal, so non-visual means of communication are really important. We uncovered possum genes responsible for carrying scent in urine, and found that although they are silenced in newborns, they are switched on in adults, particularly males. Molecules produced from these genes could be used to lure possums towards a trap or keep them away from pest-free areas," he says.

Professor Dan Tompkins, Science Director at the study co-funder Predator Free 2050 Limited, was excited about the results for the research and development pathways they open up.

"Through the Predator Free 2050 mission we are driving to eradicate possums—along with rats and stoats—from the whole of Aotearoa to protect native biodiversity, and we are always on the lookout for more targeted, efficient and humane ways of getting the job done," Professor Tompkins says.

"Deciphering their [genetic code](#) provides us with an invaluable new knowledge base that underpins and enables exploration of a range of better approaches to do just that, from possum-species toxins to fertility control, and the exciting new ideas leveraging scent communication proposed here."

Researchers also uncovered new details regarding the establishment of possums in New Zealand from Australian populations.

Introduced in the late 19th century to establish a fur trade, possums went on to become serious pests, damaging many forest ecosystems and killing native birds and some insects.

As carriers of bovine tuberculosis, they also threaten biosecurity and trade. The New Zealand government alone spends more than \$150 million per year controlling possum numbers.

In comparison, they are a cultural and ecological treasure in their native range, where Southern Aboriginal tribes use their skins for cloaks, depicting images and stories on them throughout life.

Study co-first author Dr. Donna Bond, also of Otago's Department of Anatomy, says possums from the study were collected from Otago Peninsula and other sites near Dunedin, but were genetic hybrids tracing back to discrete populations in Tasmania and the Australian mainland.

"Although the [possums](#) introduced in the 19th century were low in numbers, perhaps a few hundred, because they are mixed up from at least four different Australian populations, the New Zealand animals we tested had more genetic diversity than those from Australia," she says.

More information: The admixed brushtail possum genome reveals invasion history in New Zealand and novel imprinted genes, *Nature Communications* (2023). [DOI: 10.1038/s41467-023-41784-8](https://doi.org/10.1038/s41467-023-41784-8)

Provided by University of Otago

Citation: Hunted in New Zealand, conserved in Australia: Brushtail possum genome could help with population management efforts (2023, October 17) retrieved 2 May 2024 from <https://phys.org/news/2023-10-zealand-australia-brushtail-possum-genome.html>

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