

Extinct moa rewrites New Zealand's history

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Moa birds. *Dinornis giganteus*, Height 12 feet. D. (*Pachyornis*) *elephantopus*, a smaller species." *Hunting Moa birds from Extinct Monsters: A popular account of some of the larger forms of ancient animal life* 1892. Image credit: Wikimedia Commons

(PhysOrg.com) -- The evolutionary history of New Zealand's many extinct flightless moa has been re-written in the first comprehensive study of more than 260 sub-fossil specimens to combine all known genetic, anatomical, geological and ecological information about the unique bird lineage.

That lineage ended only about 600 years ago after a journey through time that most likely began about 80 million years earlier on the prehistoric supercontinent of Gondwana, according to the study published in [Proceedings of the National Academy of Sciences](#) by an international team of researchers.

Found on the south and north islands of New Zealand, the evolutionary history and relationships between the moa species has long been subject to scientific debate, with past studies suggesting that up to 64 species existed with as many as 20 generic groups.

The new study found that moas should be grouped into only three families, six genera and it reduced the number of species to nine. The most recent species were relatively modern, evolving in the South Island only after the uplift of the Southern Alps between 5 and 8.5 million years ago.

Periodical land bridges, created by geological events and sea-level changes, allowed some of these species to cross over to the North Island.

The many species of moa are thought to have descended from a [common ancestor](#) of other large living flightless birds that evolved on separate southern landmasses when Gondwana broke up: the ostrich in Africa; the emu and cassowary in Australia; the rhea in South America; and New Zealand's kiwi. Another presumed relative was the extinct giant elephant bird in Madagascar.

New Zealand broke away from Gondwana at least 60 million years ago and a wide variety of moas subsequently evolved there, ranging in size from a large turkey to the three-metre tall *Dinornis*, which weighed up to 300 kg.

Maori people are known to have killed large numbers of birds for their meat, eggs and feathers - moa is a Polynesian word for chicken - after they arrived on the islands about 1,000 years ago. All the nine living species were gone within a few centuries.

The study also presents an important new geological/paleogeographical model, which suggests that land-dwelling animals on the North and

South Island landmasses were isolated for most of the past 20-30 million years.

"The prolonged geographic isolation of New Zealand and the paucity of terrestrial mammals created a unique ecosystem dominated by an estimated 245 species of birds, providing an unparalleled opportunity to observe evolutionary processes," says Dr Trevor Worthy, a palaeontologist from the UNSW School of Biological, Earth and Environmental Sciences, who was one of the 11 members of study team.

"Our study reveals that the patterns of genetic diversity within and between different moa groups reflect a complex history following a major drowning of the New Zealand landmass in the Oligocene [23 to 34 million years ago]. Their history was then affected by a series of marine barriers, tectonic activity and glacial cycles.

"We were surprised to discover just how recently many of the moa species - and probably many of the iconic New Zealand animals and plants - evolved in the South Island after the uplift of the Alps. The Alps brought rain and allowed wet rainforests to develop in the west and generated a drier, warmer climate to the east, creating a mix of upland and lowland environments, wet and dry habitats and a variety of forest, shrubland, and grasslands."

More information: The [evolutionary history](#) of the extinct ratite moa and New Zealand Neogene paleogeography, *PNAS*.

Source: University of New South Wales ([news](#) : [web](#))

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