

## Fossil Discovery Turns Scientific Theory on Its Head

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Part of the jawbone of the fossilised mouse-like creature believed to have lived at least 16 million years ago. Credit: University of Adelaide

An international team led by University of Adelaide palaeontologist Trevor Worthy has discovered a unique, primitive type of land mammal that lived at least 16 million years ago on New Zealand.

The discovery of tiny fossilised bones of a mouselike creature in the Central Otago region is the first hard evidence that New Zealand once had its own indigenous land mammals. The finding could prompt a major rewrite of prehistory textbooks, say scientists.

Mr Worthy, a University of Adelaide PhD student in the School of Earth



& Environmental Sciences, and fellow team members from New Zealand and the University of NSW, discovered fossilised parts of a jaw and a leg from the mammal, unearthed in sediment from the St Bathans lake bed in the South Island. It represents an evolutionary stage that predates the split between pouched marsupials and placental mammals.

The find adds a whole new insight into the evolution of mammals in New Zealand, putting paid to the theory that the country's diverse prehistoric groundbird fauna evolved there because they had no competition from land mammals.

"Scientists have long held the view that New Zealand has this weird and wonderful avian biota that lived on the ground because there were no mammals to impede or compete with birds. It appears that this little mouselike animal was part of the fauna on the ancient Gondwana supercontinent and it got stuck on New Zealand when the latter separated more than 80 million years ago," Mr Worthy says.

The discovery also challenges geological claims that New Zealand was entirely submerged beneath the sea from 25 to 30 million years ago and re-colonised by plant and animal species from nearby land masses like Australia once it re-emerged.

"While a lot of the land disappeared temporarily, there is evidence that some of it was emergent because there are floral pollen records that indicate there were living plants throughout the period. The Tuatara reptiles, also found in New Zealand, have no living relatives in the fossil record until 65 million years ago – and there is no evidence of them in Australia, so we can only assume they have been in New Zealand all the time."

Mr Worthy and his team expect to unearth more mammal fossils from the St Bathans site, perhaps even other species that pre-date the split



between pouched marsupials and placental mammals, surviving for millions of years in isolation in New Zealand.

"The deposition site was a big lake – 5600km2 – and the three mammal bones from the mouse were discovered in a 36m2 area, so it's reasonable to believe we will find more. We have already found bats of three families at this site, of which two are new in the world. We have also unearthed 24 kinds of extinct birds from this sediment that were previously unknown."

The findings were published in the *Proceedings of the National Academy of Sciences* journal this week.

The Australian Research Council recently awarded the team a \$513,902 grant over three years to further explore the St Bathans site. Mr Worthy is organising the next field trip in early January.

Source: University of Adelaide

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