

Rediscovering the dragon's paradise lost

September 30 2009



Komodo dragon. Image: Wikimedia Commons

The world's largest living lizard species, the Komodo dragon (*Varanus komodoensis*), is vulnerable to extinction and yet little is known about its natural history. New research by a team of palaeontologists and archaeologists from Australia, Malaysia and Indonesia, who studied fossil evidence from Australia, Timor, Flores, Java and India, shows that Komodo Dragons most likely evolved in Australia and dispersed westward to Indonesia.

The research, which also details new [fossil](#) specimens indicating the presence of a new species of giant varanid found on the island of Timor, is published September 30 in the open-access, peer-reviewed journal [PLoS ONE](#).

Author Scott Hocknull, Senior Curator of Geosciences at the Queensland Museum, said Australia is a hub for lizard evolution.

"The fossil record shows that over the last four million years Australia has been home to the world's largest lizards, including a five metre giant called *Megalania (Varanus prisca)*," Mr Hocknull said.

"Now we can say Australia was also the birthplace of the three-metre [Komodo dragon](#) (*Varanus komodoensis*), dispelling the long-held scientific hypothesis that it evolved from a smaller ancestor in isolation on the Indonesian islands.

"Over the past three years, we've unearthed numerous fossils from eastern Australia dated from 300,000 years ago to approximately four million years ago that we now know to be the Komodo dragon.

"When we compared these fossils to the bones of present-day Komodo dragons, they were identical," he said.

The varanids are a group of giant monitor lizards, which are the world's largest terrestrial lizards and which were ubiquitous in Australasia for over 3.8 million years, having evolved alongside large-bodied, mammalian carnivores, such as *Thylacoleo*, the 'marsupial lion'. Growing to 2-3 metres in length and weighing around 70 kilos, the Komodo dragon is the last of the truly giant monitor lizards. New fossil discoveries show that the ancestor of the Komodo dragon evolved on mainland Australia, around 3-4 million years ago and then dispersed west to Indonesia. Historically, Australia was home to many other giant monitor lizards, including *Megalania (Varanus prisca)*—once the world's largest terrestrial lizard but which died out around 40,000 years ago.

"This research also confirms that both giant lizards, *Megalania (Varanus prisca)* and the Komodo dragon (*Varanus komodoensis*) existed in Australia at the same time," Mr Hocknull said.

Scott Hocknull and his international team have compared [fossil evidence](#)

of Komodo dragons and other giant varanids in order to reconstruct the palaeobiogeography of the world's largest land-based lizards. The researchers hope this will have implications for the conservation of the Komodo dragon, which is now found on just a few isolated islands in eastern Indonesia, between Java and Australia, and vulnerable to extinction, probably due to habitat loss and persecution by modern humans over the last few millennia.

It was previously thought that the Komodo Dragon evolved its large size as a response to insular island processes, lack of carnivore competition, or as a specialist hunter of pygmy elephants called *Stegodon*. However, Hocknull and colleagues report that the ancestor of the Komodo dragon most likely evolved in Australia and spread westward, reaching the Indonesian island of Flores by 900,000 years ago. Comparisons between fossils and living Komodo dragons on Flores show that the lizard's body size has remained relatively stable since then—a period marked by the extinction of the island's megafauna, the arrival of early hominids by 880,000 years ago, and the arrival of modern humans by 10,000 years ago. Within the last 2,000 years, however, their populations have contracted severely.

Further support for the theory that the giant varanids dispersed to Indonesia from Australia comes from the island of Timor, located between Australia and Flores. Three fossil specimens from Timor represent a new (unnamed) species of giant monitor lizard, which was larger than the Komodo dragon (although smaller than *Megalania*). More specimens of this new Timor-Australian giant lizard are needed before the species can be formally described.

More information: Hocknull SA, Piper PJ, van den Bergh GD, Due RA, Morwood MJ, et al. (2009) Dragon's Paradise Lost: Palaeobiogeography, Evolution and Extinction of the Largest-Ever Terrestrial [Lizards](#) (Varanidae). *PLoS ONE* 4(9): e7241. [doi:10.1371/journal.pone.0007241](https://doi.org/10.1371/journal.pone.0007241)

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Citation: Rediscovering the dragon's paradise lost (2009, September 30) retrieved 26 April 2024 from <https://phys.org/news/2009-09-rediscovering-dragon-paradise-lost.html>

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