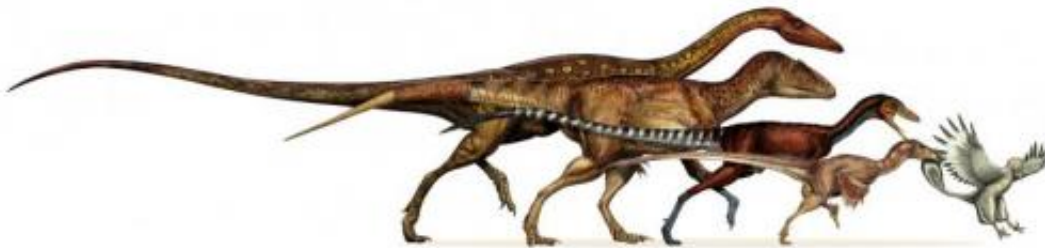


Shrinking dinosaurs evolved into flying birds (w/ Video)

July 31 2014



The dinosaur lineage that evolved into birds shrank in body size continuously for 50 million years. From left to right are: the ancestral neotheropod (~220 Million years old), the ancestral tetanuran (~200 myo), the ancestral coelurosaur (~175 myo), the ancestral paravian (~165 myo), and *Archaeopteryx* (150 myo). Credit: Davide Bonnadonna

A new study involving scientists from the University of Southampton has revealed how massive, meat-eating, ground-dwelling dinosaurs evolved into agile flying birds: they just kept shrinking and shrinking, for over 50 million years.

Today, in the journal *Science*, the researchers present a detailed family tree of [dinosaurs](#) and their bird descendants, which maps out this unlikely transformation.

They showed that the branch of [theropod dinosaurs](#), which gave rise to modern birds, were the only dinosaurs that kept getting inexorably

smaller.

"These bird ancestors also evolved new adaptations, such as feathers, wishbones and wings, four times faster than other dinosaurs," says co-author Darren Naish, Vertebrate Palaeontologist at the University of Southampton.

"Birds evolved through a unique phase of sustained miniaturisation in dinosaurs," says lead author Associate Professor Michael Lee, from the University of Adelaide's School of Earth and Environmental Sciences and the South Australian Museum.

"Being smaller and lighter in the land of giants, with rapidly evolving anatomical adaptations, provided these bird ancestors with new ecological opportunities, such as the ability to climb trees, glide and fly. Ultimately, this evolutionary flexibility helped birds survive the deadly meteorite impact which killed off all their dinosaurian cousins."



Meet the ancestors: The feathered dinosaur *Microraptor* pounces on a nest of primitive birds (*Sinornis*). Both species lived during the Cretaceous Period (~120 million years ago) in what is now northern China. Credit: Brian Choo.

Co-author Gareth Dyke, Senior Lecturer in Vertebrate Palaeontology at the University of Southampton, adds: "The dinosaurs most closely related to birds are all small, and many of them - such as the aptly named *Microraptor* - had some ability to climb and glide."

The study examined over 1,500 anatomical traits of dinosaurs to reconstruct their family tree. The researchers used sophisticated mathematical modelling to trace evolving adaptations and changing body size over time and across dinosaur branches.

The international team also included Andrea Cau, from the University of Bologna and Museo Geologico Giovanni Capellini.

The study concluded that the branch of dinosaurs leading to [birds](#) was more evolutionary innovative than other dinosaur lineages. "Birds outshrank and out-evolved their dinosaurian ancestors, surviving where their larger, less evolvable relatives could not," says Associate Professor Lee.

More information: *Science*, www.sciencemag.org/lookup/doi/10.1126/science.1252243

Provided by University of Southampton

Citation: Shrinking dinosaurs evolved into flying birds (w/ Video) (2014, July 31) retrieved 20 April 2024 from <https://phys.org/news/2014-07-dinosaurs-evolved-birds-video.html>

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