

## Discovery of early, 'croc-like' reptile sheds new light on evolution of dinosaurs

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A life reconstruction of the new species Teleocrater rhadinus, a close relative of dinosaurs, feasting on an ancient mammal relative, Cynognathus, in the Triassic of Tanzania. The large dicynodont Dolichuranus is seen in the background. Credit: Natural History Museum, London, artwork by Mark Witton.

A new species of ancient reptile has been described by scientists at the University of Birmingham, filling a critical gap in the fossil record of dinosaur cousins and suggesting that some features thought to



characterise dinosaurs evolved much earlier than previously thought.

Described in a paper published today in *Nature*, the carnivorous reptile, Teleocrater rhadinus, was approximately 7- 10 feet in length, had a long neck and tail, and walked on four crocodile-like legs.

It roamed the Earth during the Triassic Period more than 245 million years ago - pre-dating the first true dinosaurs by around ten million years - and appears in the <u>fossil record</u> just after a large group of reptiles, known as archosaurs, split into a bird branch (leading to dinosaurs and eventually birds) and a crocodile branch (eventually leading to today's alligators and crocodiles). Teleocrater and its kin are the earliest known members of the bird branch of the archosaurs.

The discovery overturns widely-held preconceptions by palaeontologists about the morphology of early dinosaur relatives, with many scientists anticipating that such creatures would be smaller, bipedal and more 'dinosaur-like".

"Teleocrater fundamentally challenges our models of what the close relatives of dinosaurs would have looked like," says Dr Richard Butler from the University of Birmingham.





Life reconstruction of the new species *Teleocrater rhadinus*, a close relative of dinosaurs. Credit: Museo Argentino de Ciencias Naturales

"Dinosaurs were amazingly successful animals. It's natural to want to know where they came from, and how they became so dominant. Teleocrater is hugely exciting because it blows holes in many of our classic ideas of dinosaur origins."

All the specimens used to describe Teleocrater were collected from a rock unit called the Manda Beds, in the Ruhuhu Basin of southern Tanzania, Africa. Teleocrater fossils were first discovered in the region in 1933 by palaeontologist F. Rex Parrington, and subsequently studied by Alan J. Charig, former Curator of Fossil Reptiles, Amphibians and Birds at the Natural History Museum, in the 1950s.





Life model of the new species *Teleocrater rhadinus*, a close relative of dinosaurs, preying upona juvenile cynodont, a distant relative of mammals. Credit: Museo Argentino de Ciencias Naturales

However, due to a lack of crucial bones, such as the ankle bones, Charig could not determine whether Teleocrater was more closely related to crocodylians or to <u>dinosaurs</u>. Unfortunately, he died before he was able to complete his studies.

Re-examination of Charig's specimens by Butler and colleagues, combined with the discovery of additional fossils by a US-led team in Tanzania in 2015, has finally allowed the surprising relationship between Teleocrater and its dinosaur cousins to be revealed.





Silhouettes not to scale

A simplified depiction of phylogenetic relationships within Archosauria, including Teleocrater rhadinus. Credit: Credit: Dr Richard Butler, University of Birmingham

"It's astonishing to think that it's taken more than 80 years for the true scientific importance of these fossils to be understood and published," says Dr Butler.

Professor Paul Barrett from the Natural History Museum, one of the other main authors of the work on Teleocrater, said:

"My colleague Alan Charig would have been thrilled to see one of 'his' animals finally being named and occupying such an interesting position



in the Tree of Life.

"Our discovery shows the value of maintaining and re-assessing historical collections: many new discoveries, like this one, can be made by looking through museum collections with fresh eyes."







The new species *Teleocrater rhadinus* hunting a cynodont, a close relative of mammals. Credit: Museo Argentino de Ciencias Naturales

**More information:** Sterling J. Nesbitt et al, The earliest bird-line archosaurs and the assembly of the dinosaur body plan, *Nature* (2017). DOI: 10.1038/nature22037

Provided by University of Birmingham

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