Newly discovered dinosaur likely father of Triceratops

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This is an illustration of the *Titanoceratops*, thought to be the ancestor of the more well-known *Triceratops*. Credit: Nicholas Longrich/Yale University

Triceratops and *Torosaurus* have long been considered the kings of the horned dinosaurs. But a new discovery traces the giants' family tree further back in time, when a newly discovered species appears to have reigned long before its more well-known descendants, making it the earliest known member of its family.

The new species, called *Titanoceratops* after the Greek myth of the Titans, rivaled *Triceratops* in size, with an estimated weight of nearly 15,000 pounds and a massive eight-foot-long skull.

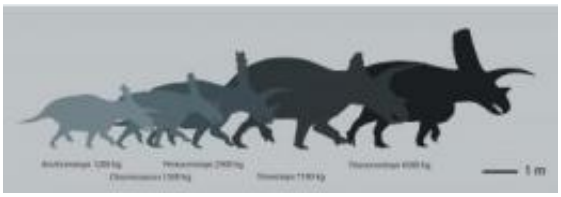
Titanoceratops, which lived in the American southwest during the late Cretaceous period around 74 million years ago, is the earliest known triceratopsin, suggesting the group evolved its large size more than five million years earlier than previously thought, according to Nicholas Longrich, the paleontologist at Yale University who made the discovery. The finding, which will appear in an upcoming issue of the journal Cretaceous Research, helps shed light on the poorly understood origins of these giant horned dinosaurs.

The missing portions of the *Titanoceratops* frill, shown in the shaded areas in the illustration on the right, were reconstructed to look like a *Pentaceratops* skull (left). Credit: Nicholas Longrich/Yale University

Longrich was searching through scientific papers when he came across a description of a partial skeleton of a dinosaur discovered in New Mexico in 1941. The skeleton went untouched until 1995, when it was finally prepared and identified incorrectly as *Pentaceratops*, a species common to the area. When the missing part of its frill – the signature feature of the horned dinosaurs – was reconstructed for display in the Oklahoma Museum of Natural History, it was modeled after *Pentaceratops*.

"When I looked at the skeleton more closely, I realized it was just too different from the other known *Pentaceratops* to be a member of the species," Longrich said, adding that the specimen's size indicated that it likely weighed about twice as much as adult *Pentaceratops*. The new species is very similar to *Triceratops*, but with a thinner frill, longer nose and slightly bigger horns, Longrich said.

Instead, Longrich believes that *Titanoceratops* is the ancestor of both *Triceratops* and *Torosaurus*, and that the latter two split several millions years after *Titanoceratops* evolved. "This skeleton is exactly what you would expect their ancestor to look like," he said.



The *Titanoceratops* rivaled the *Triceratops* in size, with an estimated weight of nearly 15,000 pounds and a massive eight-foot-long skull. Credit: Nicholas Longrich/Yale University

Titanoceratops was probably only around for about a million years, according to Longrich, while the triceratopsian family existed for a total of about 10 million years and roamed beyond the American southwest into other parts of the country and as far north as Canada.

In order to confirm the discovery beyond any trace of a doubt, Longrich hopes paleontologists will find other fossil skeletons that include intact frills, which would help confirm the differences between *Titanoceratops* and *Pentaceratops*.

"There have got to be more of them out there," Longrich said.

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