Small Asian dinosaur actually a juvenile tyrannosaur, not separate species, researchers say

June 30 2011

"Big Mike" at MSU's Museum of the Rockies. (MSU photo by Kelly Gorham).

New research from Montana State University's Museum of the Rockies is helping unravel the evolutionary history of the iconic tyrannosaurid dinosaurs, according to MSU scientists who reviewed past findings about a small dinosaur from Asia.

The small-bodied tyrannosaur named Raptorex kriegsteini - about 10 feet long -- was named in 2009 by University of Chicago professor Paul Sereno and colleagues, and was described as having originated during the Lower Cretaceous of China, around 130 million years ago. The Raptorex was important because it seemed to show that characteristic features of tyrannosaurids, such as the short two-fingered arms, were acquired some

50 million years before previously thought. As a result, Tyrannosaurus was relegated to being just a particularly large, brutish version of a much older body plan.

However, Museum of the Rockies researcher Denver Fowler and colleagues showed in a paper published June 29 in the journal PLoS One that key supporting evidence was misinterpreted by the original Raptorex authors, and that the old ideas might not have been so wrong after all.

"No one knows precisely where the Raptorex skeleton was dug up, because it was collected illegally and smuggled out of Asia" Fowler said. "The age and location stated had to be inferred from fossils found with the skeleton.

"Basically, the entire age assessment boils down to a single fish vertebra, which was misidentified as belonging to Lycoptera: a species from 130 million years ago. However, the morphology is actually very different," Fowler said.

The MSU scientists said other essential details of the original description were also misinterpreted.

"Raptorex was justified as a new small-bodied species because thin sections of the limb bones were supposed to show that it was a small-bodied adult or subadult," Fowler continued, "But we looked at the images published by Sereno et al., and the story just didn't fit."

The researchers found that the Raptorex specimen was a juvenile, and still growing rapidly when it died, Fowler said.

"All these clues pointed to the fact that 'Raptorex' was actually a juvenile of a large-bodied Late Cretaceous species rather than an adult from the

Early Cretaceous. It looks almost identical to a juvenile Tarbosaurus bataar recently described from the Late Cretaceous of Mongolia, suggesting that it is either also a Tarbosaurus bataar, or another closely related species," Fowler said.

He added that a more serious side to the research is that the type specimen was due to be repatriated to China, from which it was assumed to have been stolen, but actually it is more likely the specimen was illegally removed from neighboring Mongolia.

"One of my coauthors spoke to the original seller of the specimen and he told us it was sold as a juvenile Tarbosaurus from Mongolia," Fowler said. "I do not know where the idea came from that it was Chinese."

"This highlights the problems of dealing with stolen specimens that have none of the essential data," Fowler said.

The MSU research used new "Unified Frames of Reference" analytical methods devised by Jack Horner, Regents Professor of Paleontology at the Museum of the Rockies and co-author on the paper. Fowler said this holistic approach is facilitating great leaps in paleontologists' ability to classify dinosaurs, and reveal evolution patterns.

"We're really only beginning to understand the severe changes that dinosaurs went through as they grew up, and this means that many skeletons of young or especially old animals are being described as new species, when they are actually just growth stages of already recognized species," Fowler said.

"It is important that we get the taxonomy of dinosaurs correct because all subsequent research is dependent on this," he continued. "What our research shows is that the old hypothesis about tyrannosaurs gradually acquiring their unique characteristics is correct or is yet to be falsified."

More information: Research paper online: www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0021376

Provided by Montana State University