

Study discovers eating habits of Diplodocus

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Diplodocus carnegiei, the well known sauropod from the Late Jurassic of North America. Image: Nobu Tamura/Wikipedia

A team of researchers from the University of Bristol, Natural History Museum of London, the University of Missouri and Ohio University has discovered the eating habits of *Diplodocus* using a three-dimensional model of the dinosaur's skull. The eating habits of the herbivore have been uncertain since its discovery more than 130 years ago.

Understanding these behaviors could help scientists better understand extinct and modern ecosystems and what it takes to feed these giant herbivores, as well as today's living animals.

Diplodocus was a giant, herbivorous sauropod dinosaur from the [Jurassic period](#), which was around 150 million years ago. The dinosaur, which was more than 170 feet long and weighed more than 12 tons, was the

longest animal ever to walk the planet. Its neck was about 20 feet in length.

"Since Diplodocus was such a huge animal, its [eating habits](#) and behavior have always been a question in the paleontology community," said Casey Holliday, an assistant professor of pathology and anatomical sciences at MU. "With the 3D model of the skull, we were able to simulate three eating scenarios using a computer-based analysis to determine the stresses that the skull would experience in each situation."

Using data from a [CT scan](#), the team of researchers designed a three-dimensional model of the 2.5-foot-long Diplodocus' skull and tested it using [finite element analysis](#) (FEA). FEA, which is commonly used to aid in mechanical engineering and design, revealed the stresses on the dinosaur skull from three different eating behaviors: a normal bite, "branch stripping" and "bark stripping."

"Originally, some scientists in the early 1900s thought that Diplodocus would strip bark off of trees using its jaws to close down on the bark," Holliday said. "However, we found that this process places a lot of stress and strain on the dinosaur's teeth and skull, which could result in [bone damage](#) or breaking of teeth. The model and the scans showed that branch stripping, which is when the dinosaur would place its mouth on a branch and pull all the leaves off the branch, placed little to or no stress on the teeth and skull."

While the feeding habits of the Diplodocus have largely been resolved, the behaviors of other extinct animals also could be tested using FEA.

"Sauropod dinosaurs, like Diplodocus, were so weird and different from living animals that there is no animal we can compare them with," said Mark Young, a doctoral student at the University of Bristol and lead author on the research. "This makes understanding their feeding ecology

very difficult. That's why biomechanically modeling is so important to our understanding of long-extinct animals."

Holliday thinks that findings from the [Diplodocus](#) feeding habits can help determine the ways extinct animals live, but he also said that understanding large, extinct animals will continue to help scientists' understanding of large animals today.

"Sauropods tell us about the evolution of gigantism, or giant body size, because they enable us to understand how much range or space giant animals really need to get around, and how much food they need to survive," Holliday said. "The findings on sauropods also help us understand today's giant [herbivores](#), such as elephants and giraffes, and how they interact with their environments."

The study's authors included Paul Barrett, merit researcher at The [Natural History Museum](#) in London; Emily Rayfield, senior lecturer at University of Bristol; and Lawrence Witmer, professor of anatomy at Ohio University. The study was published in *Naturwissenschaften*, a natural sciences journal.

Provided by University of Missouri-Columbia

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