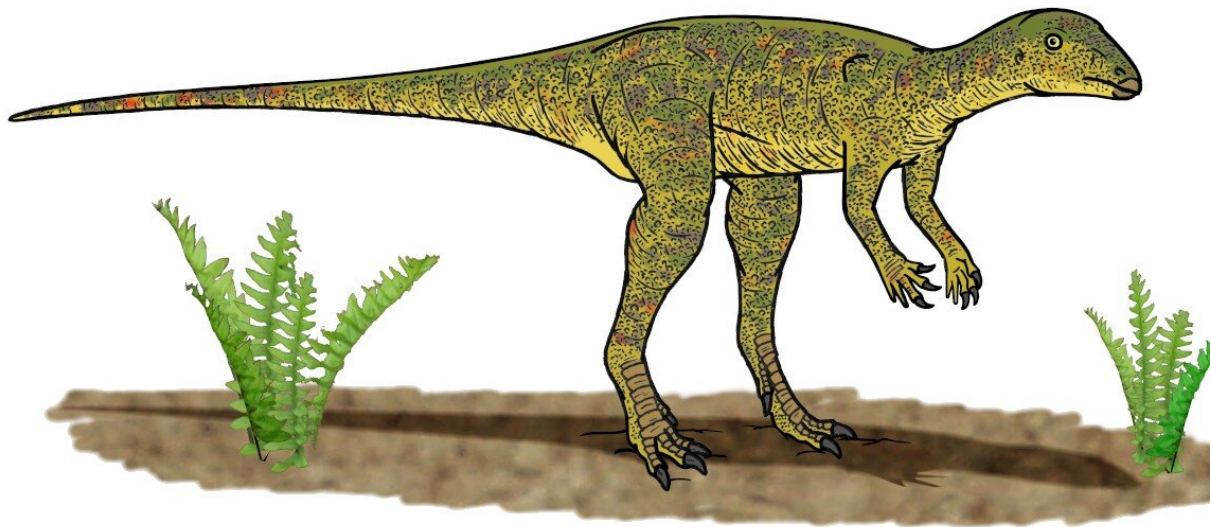


'Bird-hipped' Jurassic dinosaur was one of the first to live in herds

August 25 2022, by James Ashworth



Herds of Lesothosaurus may have formed to protect themselves against predators in the Early Jurassic. Credit: Conty, licensed under [CC BY 3.0](https://creativecommons.org/licenses/by/3.0/) via [Wikimedia Commons](https://commons.wikimedia.org/).

Fossils uncovered in South Africa may reveal some of the earliest evidence of social behavior among ornithischian dinosaurs.

As the world recovered from a volcanic extinction event, Lesothosaurus may have banded together to help ward off predators.

One of the earliest-known members of a major dinosaur group has shown the reptiles may have been social for most of their [evolutionary history](#).

[Lesothosaurus diagnosticus](#) was one of the earliest ornithischian dinosaurs, the group that would later include species like Triceratops horridus and Iguanodon bernissartensis.

Excavations in South Africa, led by paleontologists from the Evolutionary Studies Institute, Johannesburg and the Natural History Museum, unearthed a "bonebed" of Lesothosaurus individuals, with parts of many skeletons jumbled and packed tightly together.

A new study of these fossils suggests that Lesothosaurus lived in herds which roamed the ancient supercontinent of Pangaea, providing some of the earliest evidence of social living in these dinosaurs.

Professor Paul Barrett, a dinosaur expert at the Museum who co-authored the study says, "Until now, we didn't have direct evidence that Lesothosaurus lived together in groups."

"We know that later ornithischians had conspicuous features, such as the horns and frills of Triceratops, which were used for communication and other social behaviors, but Lesothosaurus lacks these obvious bony characteristics. This shows Lesothosaurus were already developing aspects of its social biology before these structures evolved."

"Living in a herd offers these dinosaurs the same benefits we'd expect from herd living today. Herds provide protection against predation by reducing the chance of any individual being attacked, as well as by appearing more intimidating to a predator."

The findings of the study were published in the journal *Palaeontology*.



Seventeen Lesothosaurus were found buried together in South Africa. Credit: The Trustees of the Natural History Museum, London

What is Lesothosaurus?

Living more than 190 million years ago in the Early Jurassic, Lesothosaurus lived in what is now South Africa and Lesotho. It was a relatively small bipedal dinosaur, compared with some of its descendants, and was around two meters long.

It first appeared shortly after the beginning of the Jurassic Period, when the world was recovering from a time of intense volcanic activity which is believed to have been responsible for the end-Triassic mass extinction. This event paved the way for dinosaurs to become dominant for the next 135 million years.

In the Early Jurassic, however, many dinosaur groups had yet to reach enormous sizes, or develop a range of body shapes and structures. Lesothosaurus is often considered as a reference species by scientists to infer what the first ornithischian dinosaurs would have looked like.

"At the moment, we do not have evidence for any Triassic ornithischians," Paul explains. "Coming from the Early Jurassic, this makes Lesothosaurus one of the earliest members of the group that we know about."

"Other early ornithischians are quite specialized, or known from limited amounts of fossil material, so Lesothosaurus is currently the best model for understanding what the earliest members of this group would have looked like."

Paul has [previously published a paper](#), based on the remains of three Lesothosaurus specimens, which suggested that the dinosaur was a social animal. However, it could not be ruled out if the individuals were all buried at the same time, or if the remains had accumulated in the same place separately over time.

Excavations carried out by Paul and other scientists between 2009 and 2015 at Bramleys Hoek Farm in South Africa revealed a bed of at least 17 Lesothosaurus specimens clustered together, which all appear to have been buried at the same time.

"Until fairly recently, these dinosaurs were regarded as quite rare animals in these ecosystems, and the idea that they lived in groups, although it wasn't impossible, hadn't really been shown," Paul says. "We're gradually building a picture that these animals were actually abundant and quite sociable."



Credit: Marcus Lange from Pexels

How did Lesothosaurus grow?

These fossils are also helping to reveal other information about how Lesothosaurus lived. The researchers analyzed the Bramleys Hoek Farm remains alongside other specimens to try and assess how these dinosaurs grew up.

Lead author Dr. Jennifer Botha, from South Africa's National Museum, Bloemfontein, investigated the bone microstructure preserved in the fossils.

"When an animal is fully grown, their bone microstructure changes as growth slows down," Jennifer explains. "There are certain features that characterize this, such as an absence of, or very few, [blood vessels](#), as

well as closely spaced lines of arrested growth similar to the annual rings found in a tree."

"While it may continue to grow slightly every year, by a millimeter or so, it will never grow significantly larger."

Collectively, this feature is known as an external fundamental system (EFS). A 2010 study suggested that such a structure was found in *Lesothosaurus*, indicating its maximum size. However, there was some evidence of growth after the formation of this structure, which may have meant it wasn't an EFS after all.

By looking at a group of 27 *Lesothosaurus* specimens, the researchers searched for further signs of an EFS to infer how large the dinosaur could grow.

"We didn't find evidence of an EFS in any of the fossils," Jennifer says. "The previous researchers may have found the beginnings of an EFS, but it could have represented a temporary, rather than permanent, halt in the animal's growth."

"Instead, we found that *Lesothosaurus* grew rapidly until it reached reproductive maturity, where it then invested more energy in reproduction over growth, between the ages of two and four. It is likely it reached its full size at around six years old, but as we didn't find an EFS it may have grown slightly larger."

The researchers are continuing fieldwork in South Africa in an attempt to uncover further *Lesothosaurus* specimens to try and address some of the ongoing puzzles over its biology.

More information: Jennifer Botha et al, Osteohistology and taphonomy support social aggregation in the early ornithischian dinosaur

Lesothosaurus diagnosticus, *Palaeontology* (2022). [DOI: 10.1111/pala.12619](https://doi.org/10.1111/pala.12619)

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