

Meet the 19-meter Cretaceous kraken that swam with mosasaurs

On top of that, when analyzing the beaks, the team noticed a distinct pattern. The wear wasn't uniform. The right edge of the jaw was consistently more worn down, chipped, and scratched than the left. The team concluded this asymmetry wasn't an accident but a proof of lateralized behavior. It's a tendency we observe in modern octopuses, which often favor a specific side of their body or a particular eye when performing complex tasks.

In biology, lateralized behavior is usually linked to a highly sophisticated, specialized nervous system. "Of course, we cannot directly measure intelligence from a fossil," Iba said. "But the asymmetric wear suggests that these animals may also have had advanced and individualized hunting behavior, similar in some ways to modern octopuses."

They were not just huge and powerful. They were probably smart.

The evolutionary arms race

A highly intelligent, 19-meter-long cephalopod actively hunting and crushing prey suggests that the Cretaceous evolutionary arms race wasn't entirely dominated by vertebrates. By shedding heavy shells like those seen in early nautiloids and ammonites, the ancestors of modern octopuses traded passive defense for active offense. They gained explosive swimming speed, vast improvements in eyesight, and

the neurological capacity required for advanced cognition.

“Our study highlights convergent evolution. Vertebrates and cephalopods have very different evolutionary origins, but both evolved toward becoming large, intelligent marine predators with powerful jaws, flexible bodies, high mobility, and advanced behavior,” Iba said. He notes that Cretaceous marine ecosystems were most likely way more complex than we thought.

Iba also hopes the Digital Fossil Mining technique can be used to learn more about this complexity. “One major direction is to apply Digital Fossil Mining to many more fossil-bearing rocks,” he told Ars. “This approach allows us to uncover organisms and structures that were previously almost invisible in the fossil record.” The technique, he thinks, is especially important for animals like octopuses and squids, which rarely fossilize.

The team ultimately wants to reconstruct a more complete history of cephalopods. “More broadly, our goal is to reveal the hidden components of ancient ecosystems and build a much more complete picture of how past ecosystems really worked,” Iba said.

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