

Bringing up baby: A crocodile's changing niche

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Credit: University of Tennessee at Knoxville

Relatives of the giant crocodile might have been kings of the waterways during the Cretaceous period, eating anything—including dinosaurs—that got a little too close to the water's edge, but the largest

of these apex predators still started off small. Figuring out how these little crocs grew up in a world surrounded by giants is no small task. Now crocs fossils from Texas are shedding light on how these animals changed their diets as they grew, helping them find a place of their own in environments alongside their bigger, badder relatives.

According to the study, published by Cambridge University Press, the crocodiles in question are members of the *Deltasuchus motherali* and lived along the coastline of Texas 96 million years ago. Previously known from a single adult skull, this 20-foot-long crocodile left behind bite marks on turtles and, yes, dinosaurs. The [new discoveries](#) include at least 14 more members of *Deltasuchus*, ranging from sizes as large as the original specimen down to a paltry (if still snappy) four feet in length.

Having so many crocs from the same fossil population is not common, and the smaller, more delicate bones of juveniles often did not survive the fossilization process.

"So many fossil groups are only known from one or a handful of specimens," said paleontologist Stephanie Drumheller, lead author of the study and a lecturer of earth and planetary sciences at the University of Tennessee, Knoxville. "It can be easy to fall into the trap of only thinking about the adults." The researchers ran into challenges piecing together this ancient ecosystem, however. *Deltasuchus* wasn't alone in its coastal swamps.

Living alongside *Deltasuchus* were other large crocs, like *Terminonaris* and *Woodbinesuchus*.

"These two large croc species were comparable in size to an adult *Deltasuchus*, but because they had long, narrow snouts with slender interlocking teeth, they were targeting smaller prey in the environment," said Thomas Adams, co-author of the new study and curator of

paleontology and geology at the Witte Museum in San Antonio.

A smaller crocodile, *Scolomastax*, lived in the area as well, but its unusual jaw and chunky dentition hint that it preferred hard food and maybe even plants.

"These results confirm previous work that shows fossil crocs were much more diverse and creative when it came to coexisting in the same environments," said Chris Noto, co-author and associate professor at the University of Wisconsin-Parkside. "The very warm conditions of the Cretaceous supported a greater number of reptiles and allowed them to explore new niches not possible in the present day."

When these crocodiles died, their skeletons fell apart as they fossilized, getting jumbled together and complicating efforts to tell which bones went with which animal. To help solve this puzzle, the team turned to 3-D scanning technology to help reconstruct the skulls. UT undergraduate student Hannah Maddox meticulously scanned each piece and stitched them together into 3-D models of complete skulls.

"It was like solving a great puzzle," said Maddox. "Every piece brought you closer to seeing a toothy grin that hadn't been seen in millions of years."

As the models came together, a more complete picture of how *Deltasuchus* lived started to take shape.

The juveniles had lighter, skinnier snouts and teeth than their older relatives—faces better suited to snap up quicker, softer prey than the heavier, powerful jaws of their parents. This might have helped make sure that little *Deltasuchus* were not in direct competition with the similarly sized hard-prey specialists in their environments, but as they grew they had other neighbors to consider. The large-bodied, slender-

snouted role was already filled by other species. So *Deltasuchus* shifted in another direction as it grew, bulking up and taking on the heavy jaws and sturdy teeth of an ambush predator.

"This is an amazing fossil discovery where we not only have a population of a single species, but in an ecosystem that has multiple predators coexisting by filling separate niches," said Adams.

Similar results were found in recent analyses of young tyrannosaurs, which spent their teenaged years outcompeting other medium-sized predators in their ecosystems.

Provided by University of Tennessee at Knoxville

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