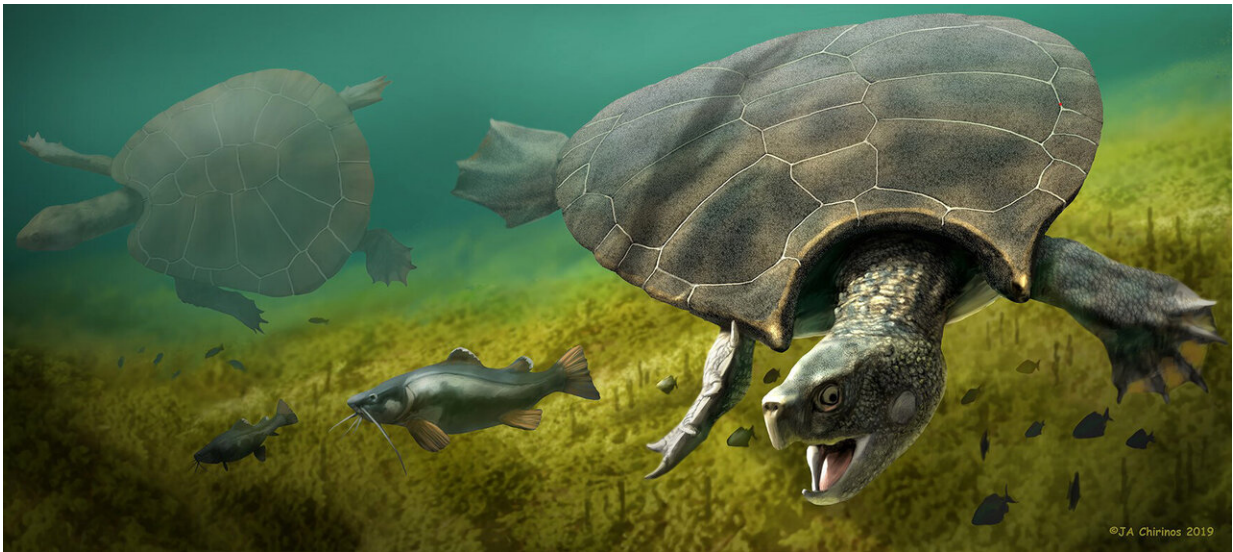


Extinct giant turtle had horned shell of up to three meters

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A graphic reconstruction of the giant turtle *Stupendemys geographicus*: male (front) and female individual (left) swimming in freshwater. Credit: Artwork: Jaime Chirinos

Paleobiologists from the University of Zurich have discovered exceptional specimens in Venezuela and Colombia of an extinct giant freshwater turtle called *Stupendemys*. The carapace of this turtle, which is the largest ever known, measured between 2.4 to almost 3 meters. Moreover, the shell of male *Stupendemys* had horns—a rare feature in turtles.

The tropical region of South America is one of the world's hot spots when it comes to animal diversity. The region's extinct fauna is unique, as documented by fossils of giant rodents and crocodilians, including crocodiles, alligators, caimans and gavials—that inhabited what is today a desert area in Venezuela. Five to ten million years ago, this was a humid swampy region teeming with life. One of its inhabitants was *Stupendemys geographicus*, a turtle species first described in the mid-1970s.

Giant turtle 100 times heavier than its closest relative

Researchers of the University of Zurich (UZH) and fellow researchers from Colombia, Venezuela, and Brazil have now reported exceptional specimens of the extinct turtle recently found in new locations across Venezuela and Colombia.

"The carapace of some *Stupendemys* individuals reached almost three meters, making it one of the largest, if not the largest turtle that ever existed," says Marcelo Sánchez, director of the Paleontological Institute and Museum of UZH and head of the study. The turtle had an estimated body mass of 1,145 kg—almost one hundred times that of its closest living relative, the big-headed Amazon river turtle.

Males carried horns on their carapace

In some individuals, the complete carapace showed a peculiar and unexpected feature: horns. "The two [shell](#) types indicate that two sexes of *Stupendemys* existed—males with horned shells, and females with hornless shells," concludes Sánchez. According to the paleobiologist, this is the first time that [sexual dimorphism](#) in the form of horned shells has been reported for any of the side-necked [turtles](#), one of the two major groups of turtles world-wide.



Venezuelan Palaeontologist Rodolfo Sánchez and a male carapace of the giant

turtle *Stupendemys geographicus*, from Urumaco, Venezuela, found in 8 million years old deposits. Credit: Edwin Cadena

Despite its tremendous size, the turtle had natural enemies. In many areas, the occurrence of *Stupendemys* coincides with *Purussaurus*, the largest caimans. This was most likely a predator of the giant turtle, given not only its size and dietary preferences, but also as inferred by [bite marks](#) and punctured bones in fossil carapaces of *Stupendemys*.

Turtle phylogeny thoroughly revised



Venezuelan Palaeontologist Rodolfo Sánchez and a male carapace of the giant turtle *Stupendemys geographicus*, from Urumaco, Venezuela, found in 8 million years old deposits. Credit: Jorge Carrillo

Since the scientists also discovered jaws and other skeleton parts of *Stupendemys*, they were able to thoroughly revise the evolutionary relationships of this species within the turtle tree of life. "Based on studies of the turtle anatomy, we now know that some living turtles from the Amazon region are the closest living relatives," says Sánchez. Furthermore, the new discoveries and the investigation of existing fossils from Brazil, Colombia and Venezuela indicate a much wider geographic distribution of *Stupendemys* than previously assumed. The animal lived across the whole of the northern part of South America.

More information: E.-A. Cadena at Universidad del Rosario in Bogotá, Colombia et al., "The anatomy, paleobiology, and evolutionary relationships of the largest extinct side-necked turtle," *Science Advances* (2020). DOI: [10.1126/sciadv.aay4593](https://doi.org/10.1126/sciadv.aay4593) , advances.sciencemag.org/content/6/7/eaay4593

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