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Researchers find new characteristics of Pareiasaurs, extinguished reptiles that

Paleontology | Study describes unknown features about the anatomy of the *Provelosaurus americanus*, whose fossils were found in the cities of Acegua and Sao Gabriel

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By [Geovana Benites](#)

Written by UFRGS, FURG (Federal University of Rio Grande) AND UFPI (Federal University of Piauí) researchers, an article published in the magazine *Frontiers in Ecology and Evolution* presents a new report about the only species of *pareiasaurus* (a peculiar and extinct kind of reptile) found in the American continent, the *Provelosaurus americanus*. The study has analyzed fossils collected since the 1970 decade from the only 7 known individuals from the species, being 6 of them found in Acegua and Sao Gabriel (Rio Grande do Sul). One of the spotlights of the study was reconstructing the so far unknown missing parts of the animal's skeleton.

The huge group of *pareiasaurs* lived on planet Earth between 270 and 250 million years ago, with large geographic distribution around the globe, being the *Provelosaurus* one of the oldest *pareiasaurs* from the world.

Analysis results

Titled "The Brazilian Pareiasaur Revisited", the study reanalyzed fossils that were previously described and also described new bones from the species that were still unknown – such as skull parts of the *Provelosaurus* – by using remains collected between 2008 and 2010. "We found new remnants that were already known, some of them much more preserved than the originals, so we managed to refute or corroborate what was originally described," explains Heitor Francischini, professor based at the Vertebræ Paleontology Laboratory of the Geosciences Institute (UFRGS) that integrated the work group.

Besides the skull parts of the animal, jaw and finger bones and neck vertebrae – so far unknown – were described too. The results obtained also suggest that the species might have been a common ancestor of a set of animals found in South Africa, known as dwarf Pareiasauria. "This group gathers smaller pareiasauria, with a more complete armor, so to speak. They form a subgroup inside the large group of pareiasauria and, among them, the older is the Brazilian one. Then, the other more recent dwarf pareiasauria are all from Africa, existing just in that continent, which had happened since 255 million years ago," explains Heitor.

Regarding the period of occurrence of *provelosaurus americanus*, the researchers managed to determine the age of the material analyzed based on volcanic ashes found on the same place. Having dated these ashes – estimated to have originated around 265 million years ago – it is possible to appraise approximately when the animal lived in the region we now know as Rio Grande do Sul (circa 10 million years before the appearance of the other African dwarf pareiasauria).

Work starts in the field

The biggest challenge conducting the research was not analyzing the bone structure of the *provelosaurus americanus*, but collecting the fossils in the field. As reports Heitor, even before the pandemic, the difficulty to access the fossils sites was already present. This because many of these places are inside private properties and, to access them, researchers needed to ask landowners for permission – which was many times denied. Moreover, one of the most important places to this work was studied in 2008 and could no more be accessed since then. "One of the biggest obstacles and challenges now is trying to pick up this conversation with local landowners and show them that actually science does not bring any kind of harm to their properties," explains the professor.

Besides the results shown in the study, the group also identified other aspects of the remains that will be published in future works. All the animal's palate, the posterior skull region and the skull articulation with the jaw are preserved and may be described in the future. To Heitor, the more the material is explored, the more findings are made, and the analysis of such small and delicate fossils need more investigation time. "The cool part, and the one that surprised me the most, is that I had initially imagined I could exhaust the anatomic description of this animal at once, but no, actually there is a lot more to be done with it.

The importance of the study is highlighted with the reach of a very known fossil species that will serve as reference to other anatomic comparisons with other fossils that possibly will be made in the future. "Any new material from this group called pareiasauria, that perhaps may be found in Brazil, in Rio Grande do Sul or any other region of the Americas, will have to be compared, at first, with this material so that it can be determined whether it belongs to this same species or not, or if it is a new species."

Scientific article

CISNEROS, Juan C.; DENTZIEN-DIAS, Paula; FRANCISCHINI, Heitor. [The Brazilian Pareiasaur Revisited](#). *Frontiers in Ecology and Evolution*, 17 nov. 2021.

Translated into English by Ágnis Jamardo, under the supervision and translation revision of Elizamari R. Becker (P.h.D.) – IL/UFRGS.



Photo: artistic representation of *Provelosaurus americanus*, drawn by the project staff. Photo: Juan Cisneros, Paula Dentzien-Dias and Heitor Francischini

