

# Focusing on Tamaulipas's Vertebrate Fossils

Marisol Montellano Ballesteros\*

Fossils are a testimony to life in the past. Their study, together with the study of rocks, permit us to understand how life on Earth has changed. The state of Tamaulipas is rich in biological, climatic and geological formations. It has regions bathed by the waters of the Gulf of Mexico, and others at great altitudes in the Eastern Sierra Madre, thus creating an endless number of ecological niches. Although few paleontological projects have been systematically carried out in the state, the study and analysis of mainly terrestrial vertebrates have contributed important information to the understanding of different aspects of organisms' evolution and diversity. Huizachal Canyon is Mexico's oldest site for land vertebrate fossils, and fauna this ancient is scarce in the world as a whole. The study of fauna from the Pleistocene like that found in the San Lázaro *Ejido* and the El Abra Cave aids in discovering how climatic conditions have changed over the last tens of thousands of years.



Location of some vertebrate fossil remains found in Tamaulipas.  
Map: Marisol Montellano.



View of a new species of turtle, collected in *Ejido San Lázaro*.  
Photo: René Hernández.

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Few systematic paleontological studies have been made of the state of Tamaulipas. Nevertheless, the state's geology is complex and diverse, since it includes rocks from the pre-Cambrian period (more than 600 million years old) to very recent rocks. This geological record is rich and diverse, including invertebrates, microfossils, plants, pollen and vertebrates.

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more systematic studies should be carried out in order to expand knowledge and design policies to preserve this patrimony.

#### THE FAUNA OF THE HUIZACHAL CANYON

In the Huizachal Canyon, located 20 kilometers south of Ciudad Victoria, remains of fauna from the early Jurassic Period (approximately 180 million years ago) have been found; to date, this is the oldest site in Mexico where land vertebrates have been discovered. Its existence was first announced in a publication in which Clark and Hopson described a Trytilodontid (a mammal-like reptile), called *Bocatherium mexicanum*.<sup>1</sup> This sparked the start of a research project that after several years resulted in the gathering of a significant collection of vertebrate remains, some of which are still under study. The fauna includes two types of sphenodontian (a kind of reptile), *Cynosphenodon huizachalensis*,<sup>2</sup> the more common variety, and *Zapatodon ejidoensis*, a dwarf sphenodontian;<sup>3</sup> a burrowing

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\* Researcher at the Geology Institute and professor at the Faculty of Sciences, UNAM.  
marmont@servidor.unam.mx



Carapace of a glyptodont found in the San Lázaro *Ejido*.  
Photo: René Hernández.

reptile, *Tamaulipasaurus morenoi*;<sup>4</sup> crocodiles, some dinosaurs and several types of mammals in different stages of evolution that testify to the diversity of the mammals present at the end of the early Jurassic period.<sup>5</sup> Lastly, there is the so-called *Dimorphodon weintraubi*, a flying reptile or pterosaur,<sup>6</sup> a uniquely well preserved specimen. The preparation of this specimen took six years, after it was found in 1985 and transferred to the lab during the field seasons of 1986-1988, because of the delicacy of its bones and the hardness of the matrix it was encased in. The specimen consists of an articulated partial skeleton that includes the back part of the cranium and the first four cervical vertebrae, part of the right wing, the distal portion of the right back leg and other postcranial elements.

Thanks to the preservation of this specimen, it has been possible to reconsider the hypothesis about the way the basal pterosaurs moved. Previously, it had been supposed that primitive pterosaurs walked on their two hind legs, using their toes, and that they were able to run. After analyzing the hind leg of the Tamaulipas specimen, specialists came to the conclusion that they supported their weight on the entire foot, and that the curved claws suggested that they could climb and hold onto branches, which contradicts the original hypothesis.

#### THE SAN LÁZARO *Ejido*

In 1994, the discovery of elephant remains in one of the streams at the San Lázaro *Ejido* Collective Farm in Villagrán municipality was announced. Among the vertebrate fossil remains found in the area were the carapace of a glyptodont and turtles from the end of the Pleistocene epoch.<sup>7</sup>

The remains of the glyptodont include an almost intact carapace and postcranial elements like the ulna, shoulder-blades and humerus, among others. The glyptodonts were a group that originated in South America and arrived in North America after the Panamanian bridge was established almost 3.5 million years ago. Their bodies were covered with bony, circular plates that formed a carapace; on their heads they had a shield, and their tails were covered with rings of bony plates and spikes, giving them the appearance of a tank. In Mexico, most of the extant glyptodont remains are isolated plates, and very few carapaces have been recovered and described.

However, one noteworthy fact is the number of turtle remains found in this area. Three almost complete carapaces of different ages have been recovered, one of which preserves the cranium and the forelegs. The study of this material concludes that it was a new species of giant land turtle belong-



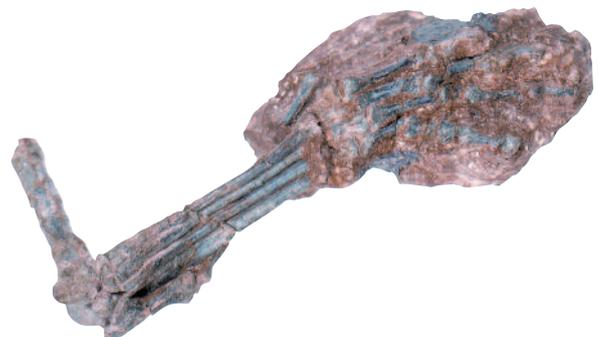
Cranium of the *Tamaulipasaurus morenoi* found in Huizachal Canyon.  
Photo: James M. Clark.

ing to the *Gopherus* genus.<sup>8</sup> The discovery of the presence of this new species of turtle in the area helped explain the far-flung distribution of land turtles in northern Mexico.

#### THE EL ABRA CAVE

The El Abra Cave was frequently visited by scientists studying bats in the 1940s. But, toward the late 1960s, it began to be explored for vertebrate

fossil remains, thanks to which fragments of travertine were discovered containing animal remains. The fauna recovered was made up of small, night-prowling mammals, reptiles and birds like mice, bats, *tlacuache* marsupials, frogs and lizards. The explanation of this very one-sided group of fauna is that the remains come from the regurgitations of the owls that lived in the cave, that is, the species found there had been captured outside the cave itself. Some of these species still live in the area; others are extinct; and yet others are found hun-



Left: Cranium of a tryliodontid found in the fields of Huizachal Canyon. Photo: James M. Clark. Right: Forelegs of the pterosaur *Dimorphodon weintraubi* found in Huizachal Canyon. Photo: Michael Ellison.



Wing and foreleg of the flying reptile *Dimorphodon weintraubi* collected in Huizachal Canyon. Photo: James M. Clark.

dreds of kilometers away. The study of this fauna revealed that during the late Pleistocene, the area must have been much more humid than it is today.

#### OTHER SITES AND FAUNA

Research has shown that the Los Matutes Valley, located in the municipality of Xicoténcatl, was very rich in mega-fauna from the Pleistocene: mammoths, bears, camels, bison and horses, among others. The first reports of this region's wealth date from the late 1950s. Unfortunately, however, the site has been plundered.

Another interesting fossil find is a mosasaur (a marine reptile) found in the town of Rayón in González municipality during exploration for oil in the 1920s. Aligned vertebrae were found, in addition to pieces of cranium, ribs, parts of the extremities, teeth and a section of mandible. The mosasaur lived mainly in the sea during the Cretaceous Period. These animals had long, thin bodies with a wide, flat tail that they used to swim. Their feet were fin-like and their powerful mandibles had wide, sharp teeth. In Mexico, marine reptiles are practically unknown and therein lies the importance of this find, despite the fact that today, the whereabouts of this specimen is unknown.

All these specimens and finds give an idea of the paleontological wealth of the state of Tamau-

lipas. Their scientific value is unquestionable, which is why it is important to contribute to their conservation and systematic study. **MM**

#### NOTES

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