

The first dinosaur

Julián Monge Nájera | Ecologist

BLOG 9 de noviembre de 2021

What was the first dinosaur like? How have dinosaurs changed during the enormous time that they have been evolving? Fortunately, we have enough fossils to answer both questions, and here I answer them based on the most recent findings, explaining the five great evolutionary paths that dinosaurs followed.



Note: there are no fossils of the first dinosaur, so I have used as illustration an heterodontosaur, an early species with characteristics believed to be typical of primitive dinosaurs. Art by Tyler Keillor.

It was the 1960s and the children of my school in Costa Rica were fascinated by collecting stamps from an album of prehistoric animals, we bought them in a small store or “pulpería” in surprise envelopes, because we did not know which images were inside. That was the commercial trick, many had images

that we already had, so we had to keep buying; but to the ingenuity of the sellers, we had our own, and exchanged with other children what we needed.

Years passed, I became an adult and later a biologist, but I continued to be fascinated with them. Sadly, I could not study them directly because Costa Rica has no dinosaur fossils, the country is too young. But this did not stop me from asking questions: What was the first dinosaur like? How did they change over time?

Fortunately, we have enough fossils to answer both questions, and here I answer them based on the most recent findings [1,2].

Although we do not have a fossil of the first dinosaur, the fossils of its relatives indicate that it was small (no larger than a person), carnivorous, ran on two legs and manipulated food with the hands of its small front legs [1].

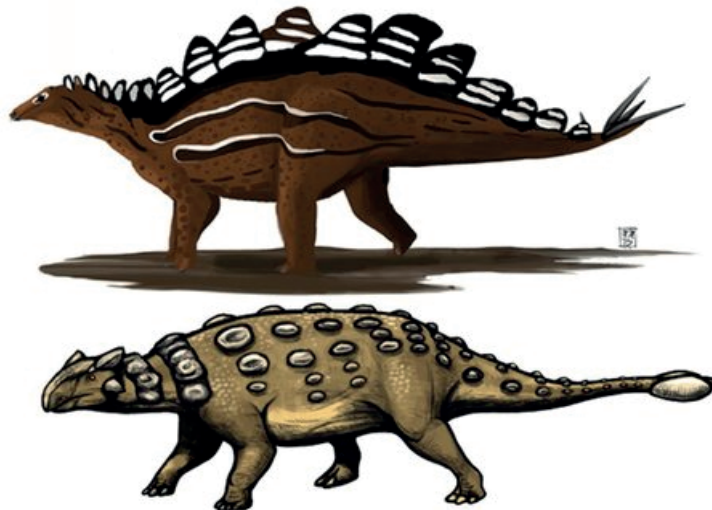
Soon, the first dinosaur gave rise to two large groups, one that combined carnivorous and herbivorous species, which we will see later; and another that produced mostly herbivores and that we call ornithischians.

Among the oldest ornithischians were small, agile, and feathered heterodontosaurs, which became extinct before other groups.



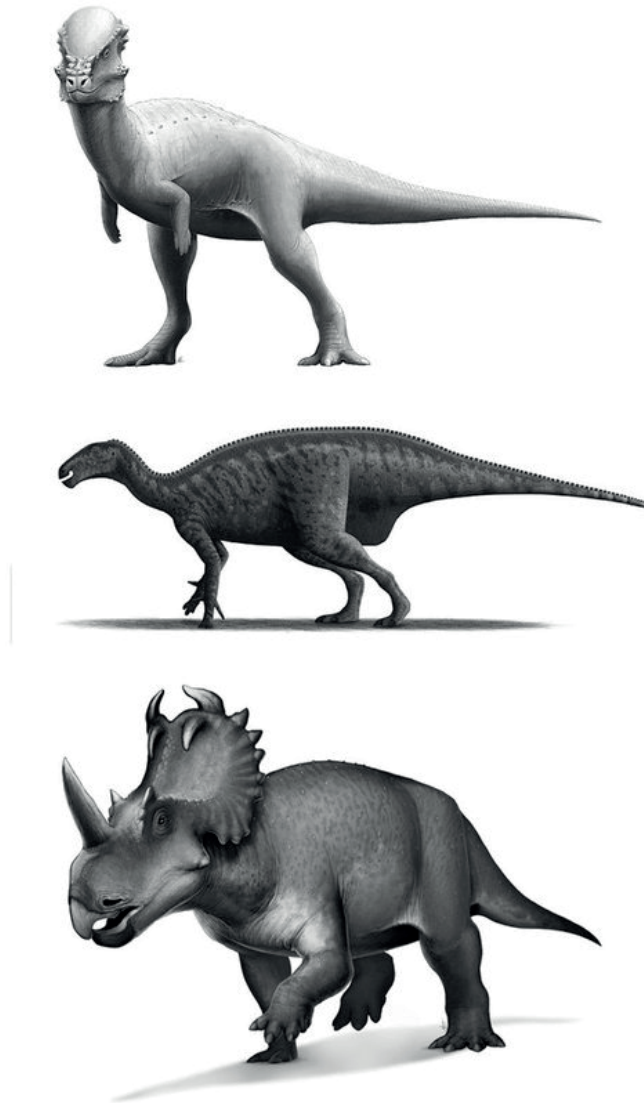
First evolutionary line: small, bipedal and carnivorous dinosaurs. This heterodontosaur was the size of a cat. Source: Wikimedia.

Another of its branches took the path of becoming large and covered with armor, which made them heavy and slow, giving rise to stegosaurians and ankylosaurs, both defended by fearsome tails.



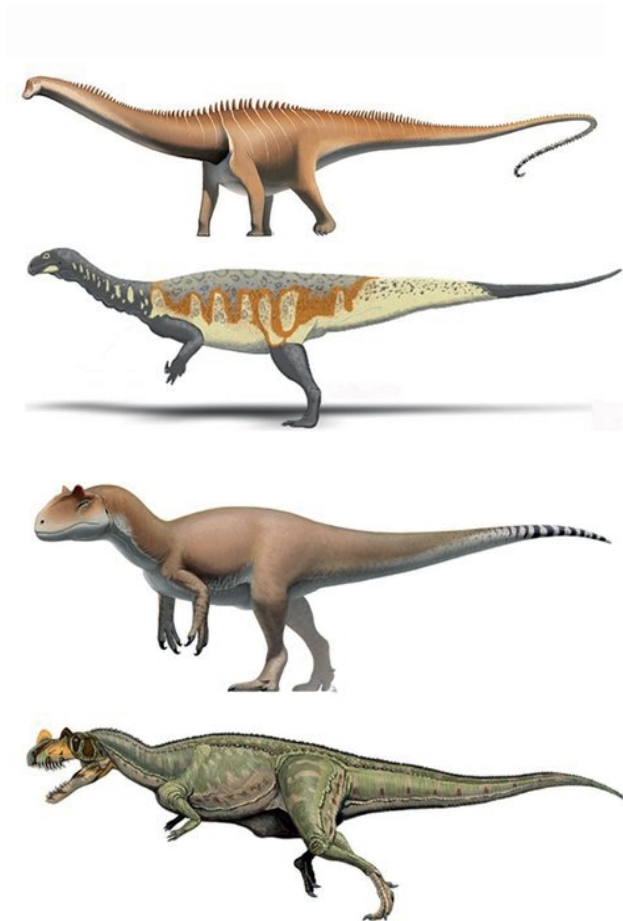
Second evolutionary line: large herbivores protected by armor; here: stegosaurius (above) and ankylosaurus. Source: Wikimedia.

But armor was not the only defense option, others chose to run and live in the protection of herds: pachycephalosaurs and ornithomimids such as the Iguanodon. Their relatives, the triceratops, although not as agile, possibly also lived in packs for protection.



Third evolutionary line: Herbivores protected by their life in herds; here: pachycephalosaur (top), ornithomimid (middle) and ceratopsid (bottom). Source: Wikimedia.

The other large group, that of the saurischian dinosaurs, also started with a small dinosaur, similar to a two-legged lizard, but they followed two evolutionary paths, one of them gigantism, leading to the largest dinosaurs, the long-necked quadruped herbivores (called sauropods), as well as their two-legged predators, such as the tyrannosaurus and the ceratosaurus. Two less successful groups of saurischians were the primitive sauropodomorphs, which were miniature long-necks; and the allosaurs, very similar to the tyrannosaurus.



Fourth evolutionary line: gigantism, dinosaurs protected by their great size and strength; here, from top to bottom: sauropod, sauropodomorph, allosaur and ceratosaur. Source: Wikimedia.

Finally, saurischians also followed a fifth evolutionary path marked by small and agile dinosaurs, in two main groups: deinonicosaur (two-legged bird-like predators) and modern-day birds.



Fifth evolutionary line: small, agile bird-like dinosaurs and real birds.
Birds include carnivorous, herbivorous and omnivorous species.
Source: Wikimedia.

Of all dinosaur groups, saurischians are the only dinosaurs that did not become extinct, today they are an important source of food for humans: chickens, relatives of tyrannosaurs, are the basis of a poultry industry that moves 320 billion dollars a year [3]. Who would have guessed that!

REFERENCES

- [1] Davis, J. (2019). Where did dinosaurs come from? Natural History Museum, United Kingdom. <https://www.nhm.ac.uk/discover/where-did-dinosaurs-come-from.html>
- [2] Nesbitt, S. J., & Sues, H. D. (2021). The osteology of the early-diverging dinosaur *Daemonosaurus chauliodus* (Archosauria: Dinosauria) from the Coelophysis Quarry (Triassic: Rhaetian) of New Mexico and its relationships to other early dinosaurs. *Zoological Journal of the Linnean Society*, 191(1), 150-179.
- [3] Anonymous. (2021, March 11th). Global Poultry Industry and Trends. *Feed and Additive Magazine*. <https://www.feedandadditive.com/global-poultry-industry-and-trends/>



Julián Monge-Nájera

Ecologist and Photographer
Universidad Estatal a Distancia
San José, Costa Rica

Email: julianmonge@gmail.com

Publications: <https://cr.linkedin.com/in/julianmonge-najera-4a60a918/es>

Edited by Katherine Bonilla y Carolina Seas.