

SAUROPODOMORPHA: THE PROSAUROPODS AND SAUROPODS

Sauropodomorpha is a clade of dinosaurs that includes the prosauropods and the sauropods. The name “Sauropodomorpha” means

The group ranges from the Upper Triassic to the Late Cretaceous but was most abundant during the Jurassic/Cretaceous transition. They persisted for about 160 Ma.

The name Prosauropoda means

The most primitive known sauropodomorph is

Basal Sauropodomorphs are recognized by a number of characteristics, including:

1. relatively small skull
2. deflected front end of the lower jaw
3. teeth with coarsely serrated crowns
4. a very long neck
5. dorsal and caudal vertebrae added to the front and the hind end of the sacrum
6. an enormous thumb equipped with an enlarged claw
7. a very large foramen in the pubis called the

Prosauropoda

The prosauropods dominated the Late Triassic and appear to have been herbivores. The group disappeared in the Early Jurassic. What did they look like and what was their evolutionary novelty?

The oldest specimens come from the African portion of Gondwana and the fossil record of the group is relatively sparse. The prosauropods went extinct at the end of the Early Jurassic, the first such extinction of any dinosaur group. At the same time, there was the introduction of stegosaurs, ankylosaurs and large sauropods. The prosauropods were among the first dinosaurs to be described, notably *Thecodontosaurus* (1836), and *Plateosaurus* (1837).

Prosauropod dinosaurs include *Plateosaurus*, *Massospondylus*, *Coloradisaurus*, *Riojasaurus*, and at least 8 other genera. The group had a worldwide distribution.

Prosauropods teeth are rather flat (spatulate) and lack grinding surfaces although they had 20 serrations per tooth (similar to the teeth of a living

What did they eat?

Prosauropods were functionally bipedal and may have walked on their hind limbs when they wanted to reach up to get food from high trees.

Sauropoda

Adult sauropods ranged from 7 m - 50 m in length and weighed 15 to 55 tons.

Some characteristics that distinguish Sauropoda are:

1. shortening of the rear portion of the skull with the lower temporal opening situated partly beneath the eye socket
2. reduced postorbital bone
3. neck vertebrae -
4. 4 or more sacral vertebrae
5. massive and vertical limbs with solid long bones

Many sauropods are classified on the morphological characteristics of their vertebrae. Air pockets in vertebrae maximized lightness and strength. The air pockets were called

Why were neural arches at the top of the vertebrae bifid or split in some dinosaurs?

Antetonitrus means

Shunosaurus and *Mamenchisaurus* were common in the Middle to Late Jurassic of China. These dinosaurs ranged from 18-24 meters in length and are a good example of early sauropods with

Why was gigantism an advantage?

The Late Jurassic *Mamenchisaurus* had the longest neck of all known sauropods, reaching at least 11 m, possibly slightly more than half the entire length of the animal. What is special about their neck construction?

Neosauropoda

Neosauropods are the main sauropods of the Late Jurassic and the Cretaceous and are characterized by

- 1)
- 2)
- 3)

Neosauropods are put into different clades on the basis of differing skull shapes, tooth forms, neck lengths and limb proportions that suggest differing approaches to feeding.

The two main clades of neosauropods are:

Diplodocoidea

Diplodocids have been found in North America, South America, Europe, and Africa. They are best known from the Late Jurassic of western North America. This group includes *Diplodocus*, *Apatosaurus*, *Barosaurus*, *Amphicoelias*, *Supersaurus*, *Dystrophaeus*, *Seismosaurus*, *Dicraeosaurus*, *Rebbachisaurus*, and *Amargasaurus*.

What did they look like?

What incorrect name is this group often given?

Diplodocids had long necks with increased numbers of cervical vertebrae at the expense of dorsal vertebrae. Some of the African and South American forms had tall neural spines on their cervical and sacral vertebrae that may have given them a sail on their backs.

They had long, slender skulls with elongate muzzles. The jaws had slender pencil-like teeth confined to the front of the mouth. The nostrils were located on the top of the skull in front of and above the orbits (eye openings).

Their limbs were relatively slender with deep and narrow rib cages. The forelimbs were relatively short with a humerus to femur ratio of 0.66. They had front legs that were much shorter than the back legs. What does this suggest?

The number of wrist bones and ankle bones were reduced in the group.

The tails were very long, with up to 80 caudal vertebrae. Chevrons of caudal vertebrae had fore and aft extensions of the last 30 - 40 caudal vertebrae making them little more than elongate rods.

The dicraeosaurids from the Late Jurassic to Early Cretaceous of South America and Africa had relatively short necks and very tall neural spines. They were relatively small, as were rebbachisaurids.

What are some of the special characteristics of diplodocids?

Macronarians

Macronarians ("big noses") are characterized by:

- Nares as large or larger than orbits
- Stout spoon-shaped teeth
- Elongated metacarpals

Macronarians include the camarasaurids, brachiosaurids, and titanosaurids. *Jobaria* of the Early Cretaceous of Africa is a typical primitive macronarian, as is *Camarasaurus* of the Late Jurassic of western North America, Europe, and Africa.

Macronarians are the most common of the Cretaceous sauropods, and had relatively short necks.

What did camarasaurids look like?

The two definite Camarasaurids are *Camarasaurus* and *Aragosaurus*.

The more advanced macronarians are characterized by

Although a few members made it into the Early Cretaceous, they reached their peak in the Late Jurassic.

This group is also well known as the

Brachiosauridae had 13 elongate cervical vertebrae and large, tall skulls. The very large nares were close to the top of their heads and they had spoon-shaped teeth. Their leg bones were massive to carry the upper body weight. They had 11 to 12 dorsal vertebrae, with neural spines that are low and undivided. They also had 50 relatively short caudal vertebrae resulting in comparatively short tail.

They are known from Europe, Africa, South America, and North America. *Brachiosaurus* and *Ultrasaurus* are members of this group.

Titanosaurids

The Titanosaurids (Late Jurassic to the Late Cretaceous) were the last sauropod group to develop. They have a fairly poor fossil record. This group has been found in Africa, Australia, North and South America, and Europe, Asia.

They have relatively primitive characteristics such as

Alamosaurus is a Titanosaurid that migrated to North America from South America in the Late Cretaceous.

Argentinosaurus (Early Cretaceous) from Argentina may have reached 51 meters (167 ft.) in length. Estimates of its weight reach 100 tonnes. The genus is based on two 1.2 m long cervical vertebrae, one 2 m long femur, and other “indicative” bones.

Saltosaurus was protected by

SAUROPODOMORPHA



