= Othnielosaurus =

Othnielosaurus is a genus of ornithischian dinosaur that lived about 155 to 148 million years ago , during the Late Jurassic @-@ age Morrison Formation of the western United States . It is named in honor of famed paleontologist Othniel Charles Marsh , and was formerly assigned to the genus Laosaurus . This genus was coined to hold fossils formerly included in Othnielia , which is based on remains that may be too sparse to hold a name ; as such , it is part of decades of research to untangle the taxonomy left behind by Marsh and his rival Edward Drinker Cope from the Bone Wars . Othnielosaurus has usually been classified as a hypsilophodont , a type of generalized small bipedal herbivore or omnivore , although recent research has called this and the existence of a distinct group of hypsilophodonts into question .

= = Description = =

Othnielosaurus is known from material from all parts of the body , including two good skeletons , although the skull is still poorly known (note that earlier references use a multitude of names for this material , with most of them since 1977 using Othnielia rex) . Othnielosaurus was a small animal , 2 meters (6 @.@ 6 ft) or less in length and 10 kilograms (22 lb) or less in weight . It was a bipedal dinosaur with short forelimbs and long hindlimbs with large processes for muscle attachments . The hands were short and broad with short fingers . From the partial type skull and the skull on the possible specimen " Barbara " , the head was small . It had small leaf @-@ shaped cheek teeth (triangular and with small ridges and denticles lining the front and back edges) , and premaxillary teeth with less ornamentation . Like several hypsilophodont or iguanodont @-@ grade ornithopods such as Hypsilophodon , Thescelosaurus , and Talenkauen , Othnielosaurus had thin plates lying along the ribs . Called intercostal plates , these structures were cartilaginous in origin .

= = Classification = =

Othnielosaurus (previously under the names Laosaurus , Nanosaurus , and Othnielia) has typically been regarded as a hypsilophodont ornithopod , a member of a nebulous and poorly defined group of small , running herbivorous dinosaurs . This was challenged by Robert Bakker et al. in 1990 . In their description of the new taxon Drinker nisti , they split Othnielia into two species (O. rex and O. consors) and placed " othnieliids " as more basal than hypsilophodontids . With recent analyses suggesting a paraphyletic Hypsilophodontidae , the general idea of " othnielids " as basal to other hypsilophodonts has been supported , although Drinker has been controversial because virtually nothing new has been published on it since its description . Other basal ornithopods have sometimes been linked to Othnielosaurus , particularly Hexinlusaurus , considered by at least one author to be a species of " Othnielia " , O. multidens . New studies concur with the hypothesis that Othnielosaurus is more basal than other traditional hypsilophodonts , but go even farther and remove the genus from Ornithopoda and the larger group Cerapoda , which also includes horned dinosaurs and domeheaded dinosaurs .

= = History and taxonomy = =

O.C. Marsh named several species and genera in the late 19th century that have come to be recognized as hypsilophodonts or hypsilophodont @-@ like animals , including Nanosaurus agilis (possibly) , " N. " rex , Laosaurus celer , L. consors , and L. gracilis . This taxonomy has become very complicated , with numerous attempts at revision in the years since .

In 1877 , Marsh named two species of Nanosaurus in separate publications , based on partial remains from the Morrison Formation of Garden Park , Colorado . One paper described N. agilis , based on YPM 1913 , with remains including impressions of a dentary , and postcranial bits including an ilium , thigh bones , shin bones , and a fibula . The other paper named N. rex , a second species which Marsh based on YPM 1915 (also called 1925 in Galton , 2007) , a complete

thigh bone . He regarded both species as small (" fox @-@ sized ") animals . He assigned this genus to the now @-@ abandoned family Nanosauridae .

The next year , he named the new genus Laosaurus on material collected by Samuel Wendell Williston from Como Bluff , Wyoming . Two species were named : the type species L. celer , based on parts of eleven vertebrae (YPM 1875) ; and the " smaller " L. gracilis , originally based on a back vertebra 's centrum , a caudal centrum , and part of an ulna (review by Peter Galton in 1983 finds the specimen to now consist of thirteen back and eight caudal centra , and portions of both hindlimbs) .

A third species , L. consors , was established by Marsh in 1894 for YPM 1882 , which consists of most of one articulated skeleton and part of at least one other individual . The skull was only partially preserved , and the fact that the vertebrae were represented only by centra suggests a partially grown individual . Galton (1983) notes that much of the current mounted skeleton was restored in plaster , or had paint applied .

These animals attracted little professional attention until the 1970s and 1980s , when Peter Galton reviewed many the " hypsilophodonts " in a series of papers . In 1973 , he and Jim Jensen described a partial skeleton (BYU ESM 163 as of Galton , 2007) missing the head , hands , and tail as Nanosaurus (?) rex , which had been damaged by other collectors prior to description . By 1977 , he had determined that Nanosaurus agilis was quite different from N. rex and the new skeleton , and coined Othnielia for N. rex . The 1977 reference , somewhat buried in a paper concerning the transcontinental species of Dryosaurus , did not elaborate , but did assign Laosaurus consors and L. gracilis to the new genus , and considered L. celer a nomen nudum . The publication of Drinker further complicated matters .

Most recently , in 2007 Galton reevaluated Morrison Formation ornithischians and concluded that the femur on which " Nanosaurus " rex (and by extension Othnielia) is based is not diagnostic , and reassigned the BYU skeleton to Laosaurus consors , which is based on more diagnostic material . As the genus Laosaurus is also based on nondiagnostic material , he gave the species L. consors its own genus , Othnielosaurus . As a result , in practical terms , what had been thought of as Othnielia is now known as Othnielosaurus consors . Othnielia is not a synonym of Othnielosaurus , because they are based on different specimens ; however , the skeletons that had been used to describe and depict Othnielia were reassigned to Othnielosaurus , leaving the older name with only the original femur . The current status for the various species is as follows : Nanosaurus agilis is a possible basal ornithopod , " N. " rex (Othnielia) is a dubious basal ornithopod , Drinker nisti is its own tentatively valid taxon , L. consors is the type species for Othnielosaurus , and L. celer and L. gracilis are still considered dubious .

= = Paleobiology and paleoecology = =

Othnielosaurus was one of the smaller members of the diverse Morrison Formation dinosaur fauna , diminutive in comparison to the giant sauropods . The Morrison Formation is interpreted as a semiarid environment with distinct wet and dry seasons , and flat floodplains . Vegetation varied from river @-@ lining gallery forests of conifers , tree ferns , and ferns , to fern savannas with rare trees . It has been a rich fossil hunting ground , holding fossils of green algae , fungi , mosses , horsetails , ferns , cycads , ginkgoes , and several families of conifers . Other fossils discovered include bivalves , snails , ray @-@ finned fishes , frogs , salamanders , turtles , sphenodonts , lizards , terrestrial and aquatic crocodylomorphans , several species of pterosaur , numerous dinosaur species , and early mammals such as docodonts , multituberculates , symmetrodonts , and triconodonts . Such dinosaurs as the theropods Ceratosaurus , Allosaurus , Ornitholestes , and Torvosaurus , the sauropods Apatosaurus , Brachiosaurus , Camarasaurus , and Diplodocus , and the ornithischians Camptosaurus , Dryosaurus , and Stegosaurus are known from the Morrison . Othnielosaurus is present in stratigraphic zones 2 @-@ 5 .

Typically , Othnielosaurus has been interpreted like other hypsilophodonts as a small , swift herbivore , although Bakker (1986) interpreted the possibly related Nanosaurus as an omnivore . This idea has had some unofficial support , but little in the formal literature ; description of more

complete skull remains will be needed to test this hypothesis .