

Dromaeosauridae

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The first dromaeosaurids described were *Dromaeosaurus albertensis* (Matthew and Brown, 1922) and *Velociraptor mongoliensis* (Osborn, 1924), both from the Upper Cretaceous strata of the Northern Hemisphere. Because of the rarity of small theropod fossils, however, the significance of these animals was not fully understood until the discovery of *Deinonychus* in 1964. Since that time, dromaeosaurids have been a focal point for research on the interrelationships of theropods, the origin of birds, dinosaur physiology, dinosaur brain size, and dinosaur behavior.

Two subtaxa of dromaeosaurids are currently recognized. Velociraptorine dromaeosaurids include *Deinonychus* (Ostrom, 1969), *Saurornitholestes*, and *Velociraptor*. *Dromaeosaurus* is the only unquestionable dromaeosaurine dromaeosaurid, but the poorly known *Adasaurus* from Mongolia has also been re-

ferred to this genus. Giant dromaeosaurids from the Lower Cretaceous of the United States (*Utahraptor*), Japan, and Mongolia are poorly known and cannot be assigned to either subtaxon with confidence at this time.

Most dromaeosaurids were between 2 and 3 m in length. Their most conspicuous character is found in the second toe of the hindfoot, which bears a large raptorial claw. This claw is strongly recurved and was more than twice as long as the other claws on the foot. Because of its sharp point and knife-like lower edge, it was held off the ground in normal situations. Although dromaeosaurid footprints are unknown at present, the raised position of this claw can be seen in several articulated skeletons.

Many other dromaeosaurid apomorphies make this one of the better diagnosed theropod taxa. These include a pubis that is more bird-like than those of any other known dinosaur. The pubis faces down and backward, parallel to the ischium. The tail is unusual because there are long but delicate rods in the tail that extend anteriorly from the prezygopophyses and the haemal arches. They form a cable-like network that would have stiffened the tail without making it completely rigid. As in other theropods, inter-

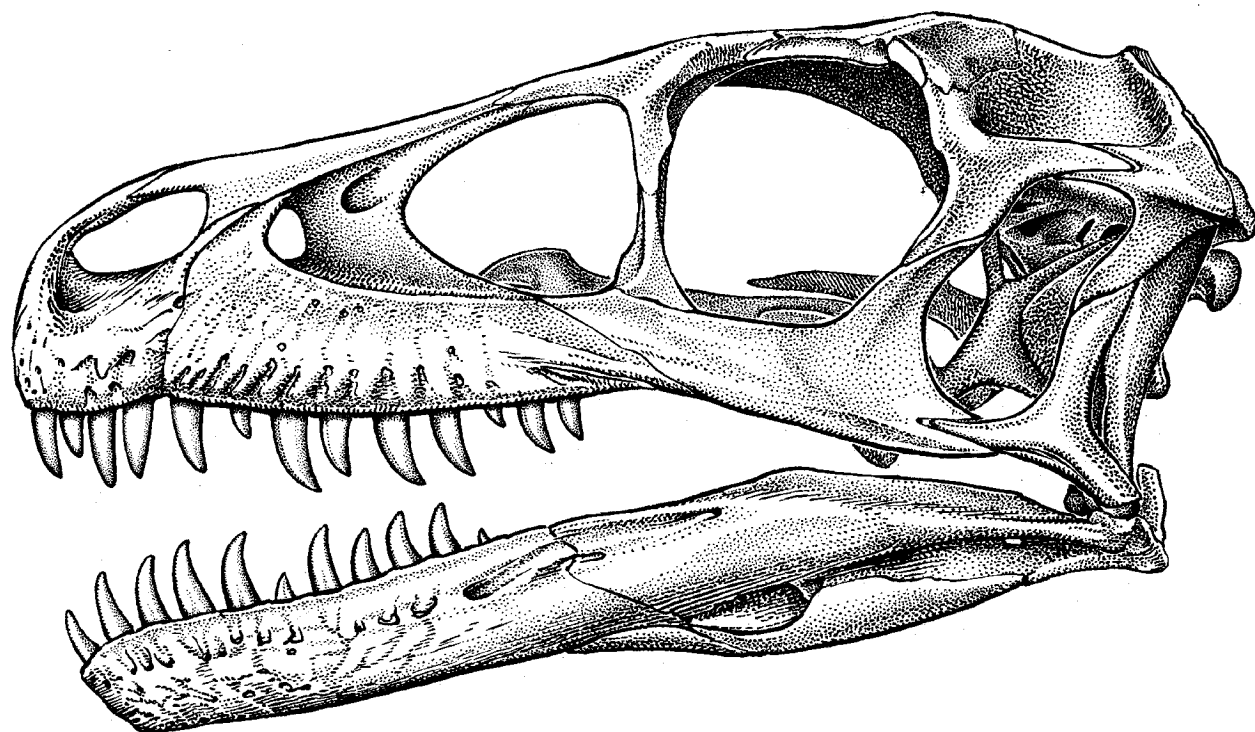


FIGURE 1 Reconstruction of the skull of *Dromaeosaurus albertensis*.

dental plates seem to have been present on the inside of the tooth rows, but they are fused together so that individual plates can no longer be distinguished. The jaw articulation is peculiar in that there is a tall, slender, vertical process behind the joint (Currie, 1995).

Velociraptorines and dromaeosaurines are easily distinguished from each other on the basis of differences in their teeth. The serrations on the front of a dromaeosaurine tooth are about the same size as the serrations on the back of the same tooth. In velociraptorines, the posterior denticles are much larger than the anterior ones. The teeth in the premaxilla of *Dromaeosaurus* are all about the same size, whereas the second tooth of this bone is the largest in velociraptorines. Dromaeosaurine skulls seem to have been more heavily constructed (Fig. 1).

Dromaeosaurids are often considered to be the most bird-like of the small theropods. The brain is relatively large, the lightly built skulls are often pneumatic, they have clavicles and ossified sternals (breastbones), their arms are relatively long, and the pubis is retroverted. Unlike most other Cretaceous theropods, the metatarsal bones (found in the flat of the foot of humans) are relatively short and unspecialized and are more similar to the metatarsals of early birds. Even the specialized raptorial claw has now been found in Cretaceous birds from Madagascar and Argentina. There are so many similarities between dromaeosaurids and birds that some have even speculated that dromaeosaurids were birds that lost their ability to fly. However, in some characters, such as the stiffened tail, dromaeosaurids are too specialized to have been good ancestors for birds. All known dromaeosaurids are Cretaceous in age, although they no doubt originated sometime in the Jurassic, and other maniraptoran taxa are known from the Late Jurassic (see BIRD ORIGINS).

The dromaeosaurid *Velociraptor* has become a well-known dinosaur thanks to its role in the book and movie called *Jurassic Park*. Depicted as relatively intelligent, vicious, warm-blooded, pack-hunting animals, dromaeosaurids have done much to change the public perception of dinosaurs as slow-witted, solitary, cold-blooded creatures. Like troodontids, dromaeosaurids had relatively large brains. Although this does not indicate that they were as intelligent as living birds and mammals, it does suggest that they had the same capabilities as some birds and mammals. The light, agile bodies, long fingers, and raptorial

claws show that they were probably effective predators. This view is supported by a remarkable pair of skeletons from Mongolia. A *Velociraptor* and a *Protoceratops* were discovered together in Upper Cretaceous sediments, apparently locked in mortal combat. It appears that the predator attacked the herbivore and killed it. However, before the protoceratopsian died, it locked its jaws on the arm of the dromaeosaurid. It might have escaped if a sandstorm had not been in progress, and both animals were completely sealed in sand for 75 million years. Determining conclusively whether or not dinosaurs such as *Velociraptor* were warm-blooded has been elusive (see PHYSIOLOGY). However, the warm-blooded proponents gained some support in 1996 by the discovery in China of a pair of small 'feathered' theropods.

See also the following related entries:

COELUROSAURIA • MANIRAPTORA

References

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of the name *Velociraptor* (Fig. 1), but has been applied to other, related forms of the Dromaeosauridae, or even to any of the small maniraptoran THEROPODS. The word "raptor" is derived from a Latin word that means thief, robber, or predator and has been incorporated into the names of other theropods (i.e., *Oviraptor*, *Sinraptor*) that would not normally be referred to as raptors.

See also the following related entry:

DROMAEOSAURIDAE

In "Encyclopedia of Dinosaurs"
P.J. Currie and K. Padian (eds.)
Academic Press, San Diego
p. 626 (1997)

Raptors

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The term "raptor" is correctly applied to various types of birds of prey, including hawks, eagles, owls, and vultures. However, since the release of the movie *Jurassic Park* in 1993, it has become increasingly common for people to refer informally to small predatory dinosaurs as raptors. This started as an abbreviation

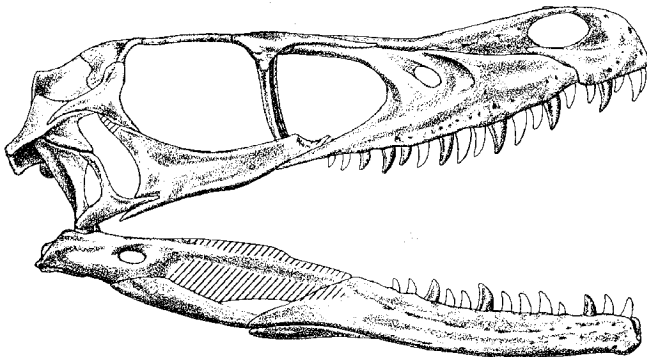


FIGURE 1 *Velociraptor mongoliensis* is one of the "raptors" made famous by *Jurassic Park*. Illustration by Gregory Paul.