

Marine Vertebrate Fossils of the Priabonian (Upper Eocene) Rashrashiyah Formation, Al Jawf Province, Northern Saudi Arabia

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Abstract

The Rashrashiyah Formation is a late Eocene (Priabonian) marine carbonate sequence exposed near and around Al Qurayyat area, Al Jawf Province, in northern Saudi Arabia. It includes massive pale white chalk, chalky-marly limestone, clayey limestone, sandy limestone, and silicified limestone. The Rashrashiyah Formation is 80(+) meters thick, with 50-60 meters exposed at the surface. This is part of an open marine carbonate platform megasequence that is tectonically and sedimentologically related to the development and modification of the Wadi as Sirhan Basin during the Late Cretaceous and early Paleogene. The basin developed from Syrian Arc structural compression. The best exposures of Rashrashiyah Formation are in the cliffs of Qa' Al Rashrashiyah (the type locality). Here the middle part of the formation is characterized by the presence of a few meters of marly shale sandwiched between a thick chalky limestone unit with abundant barite concretions below, and a thick limestone bed that is partly silicified above. The marly shale unit has produced new vertebrate remains of with a strong Tethyan affinity. Selachians (mainly sharks) and Archaeoceti (archaic whales) are the most common Priabonian fossils found within the Rashrashiyah Formation. Marine invertebrates (nautiloids and bivalves) and plant remains (*Nypa* sp. fruit pods and petrified wood) are common as well. The selachian fauna of the Rashrashiyah Formation includes shark teeth and a partial skeleton with 85 sequential vertebrae. Shark teeth belong to two taxonomic orders, Lamniformes with *Carcharias* sp., *Carcharocles sokolowi*, *Macrorhizodus praecursor*, *Xiphodolamia serrata*, and *Alopias* sp.; and Carchariniiformes with *Abdounia* sp. and *Physogaleus* sp. Marine mammals in the Rashrashiyah Formation include two species of archaeocetes belonging to the family Basilosauridae, an extinct group of fully aquatic Eocene whales that once had a remarkable diversity in the middle and late Eocene. The first species, *Basilosaurus* cf. *B. cetoides*, may have reached 16 meters in total length. It is represented by a series of massive cylindrical lumbar vertebrae that are each about 48 cm in total length and 17 cm in diameter. The second species is a smaller whale represented by an articulated vertebral column preserving thoracic, lumbar, and caudal vertebrae, with ribs and some cranial and limb elements. Comparison with contemporaneous archaeocetes elsewhere in the Middle East shows that the smaller Saudi vertebrae are similar in form to vertebrae of *Dorudon atrox* but similar in size to those of *Stromerius nidensis*.