

COMPOSITION AND CHARACTERISTICS OF THE SUBFAMILY DORUDONTINAE (ARCHAEOCETI, CETACEA)

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The subfamily Dorudontinae currently includes seven valid species in four genera. Dorudontines are known from deposits of late middle (Bartonian) and late Eocene (Priabonian) age in Egypt, southeastern North America, Europe, and New Zealand. Species included in Dorudontinae are: *Dorudon serratus* Gibbes 1845, *D. atrox* (Andrews 1906), *Zygorhiza kochii* (Reichenbach 1847), ?*Z. wanklyni* (Seeley 1876), ?*Z. juddi* (Seeley 1881), *Saghacetus osiris* (Dames 1894), and *Pontogeneus brachyspondylus* (Müller 1851).

Dorudon serratus is known from the type specimen and referred material from the type locality and little else. This includes dP²⁻⁴, some anterior teeth, cranial fragments, and twelve caudal vertebrae (now lost). All material is from deposits now identified as the Priabonian Harleyville Formation of South Carolina. *Dorudon atrox* was originally described as *Prozeuglodon atrox* of Egypt, from the Bartonian/Priabonian Birket Qarun formation. *D. atrox* also includes the previously named species *Dorudon intermedius* (Dart 1923) and *Dorudon stromeri* (Kellogg 1928). Deciduous teeth of *D. atrox* are virtually identical to deciduous teeth of North American *D. serratus*. Numerous specimens of varying completeness represent virtually the entire skeleton of *D. atrox*.

Zygorhiza kochii is known from Bartonian and Priabonian deposits across the southeastern United States. These specimens include most of the adult dentition and skeleton, including an innominate that is currently under study. Most described specimens of *Z. kochii* are adult specimens, which makes it difficult to compare to the type specimen of *Dorudon serratus*. These two taxa may represent the same species, but more juvenile specimens need to be studied to evaluate this possibility. ?*Zygorhiza wanklyni* and ?*Zygorhiza juddi* are both only known from single vertebrae, a fifth cervical and an anterior caudal (8th?) respectively.

Saghacetus osiris includes the previously named species *Dorudon osiris*, *Dorudon zitteli* (Stromer 1903), *Dorudon elliotsmithii* (Dart 1903), and *Dorudon sensitivus* (Dart 1903). Much is known of *S. osiris*, including the skull and lower jaws, vertebrae, ribs, and sternum. No hindlimb material has been recovered of *S. osiris*.

Pontogeneus brachyspondylus is the least well-known of the dorudontine taxa. It is known from cranial fragments and some vertebrae, from both North America and Egypt. It has vertebrae that are similar in width and height to those of *Basilosaurus*, but are not elongated. Cranial fragments known of *P. brachyspondylus* are similar to those of *Basilosaurus*, and some skulls that have been assigned to *Basilosaurus* may be *P. brachyspondylus*. Associated skulls and skeletons need to be studied to clarify the differences between these taxa.

Dorudontines share many features with basilosaurines that are derived relative to protocetids. These include: loss of M³, loss of a sacrum, reduction of the hind limb, rotation of the pelvis, presence of accessory denticles on the cheek teeth, and having all cheek teeth are double-rooted. Dorudontines do not appear to have any synapomorphies that unite them in a strictly monophyletic group. Instead they lack the autapomorphic character of elongated vertebrae that distinguishes Basilosaurinae, and dorudontines also lack the synapomorphies that unite the Odontoceti and Mysticeti. Phylogenetic analysis suggests that the subfamily Dorudontinae is a paraphyletic assemblage that gave rise to both the Basilosaurinae and the modern suborders of Cetacea.