A NEW SPECIES OF CHIMAEROID FISH FROM THE
UPPER CRETACEOUS OF THE SARATOV REGION,
RUSSIA

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ABSTRACT. Amylodon karamysh sp. nov. (Chondrichthyes, Holocephali, Chimaeridae) is described from the
Early Campanian (Late Cretaceous) of the Saratov Region, Russia. It is based on a single mandibular plate
with a relatively short outer margin and four small median tritons. The morphology of the mandibular plate
of A. karamysh appears to have evolved from the condition in the chimaerid Ischyodus, which implies that the
shearing-type dentitions of Amylodon and Rhinocirhomaera were probably of independent origin.

Chimaeroid fish are a compact group of holocephalan chondrichthynes which now occur in the
deep waters of all oceans. However, in the Mesozoic and early Cenozoic, they were widespread and
abundant in continental seas and are represented in the fossil record most commonly by their dental
plates. Chimaeroids have three pairs of dental plates: vomerine and palatine plates in the upper
jaws, and mandibular plates in the lower jaws. Each dental plate consists of a mass of acellular bone
in which are set several structures composed of pleromin — the dental tritons. The tritons exposed
along the occlusal margin are usually composed of laminated plates of massive pleromin, while
those on the lingual surface tend to be elongate parallel columns of vascular pleromin. These
vascular tritons occupy most of the lingual surfaces in primitive chimaeroids (Ischyodus, Edaphodon,
Elasmodus) and are adapted for crushing. In more derived forms, however, such as Elasmorhinae, Amylodon and Rhinocirhomaera, the vascular lingual tritons are greatly reduced in size or are absent,
whereas the occlusal tritons may become more prominent. This type of dentition is associated with
a shearing bite. In the following account, the terminology and orientation of chimaeroid dental

Over the last century, our knowledge of Cretaceous chimaeroids from the territory of the former
Russian Empire and USSR has increased greatly. During the nineteenth century, only one genus
(Ischyodus) was reported from the Cretaceous of Russia (Rogovich 1860; Sinov 1872). In the most
recent published review, seven chimaeroid genera were recorded in Cretaceous vertebrate faunas of
the USSR by Glickman et al. (1987). These comprised Ischyodus, Edaphodon, Elasmorhinae, Ganados, Chimaera, a probable callorrhynchoid (Callorrhynchus or a new genus), and a rhinochimaerid
(Rhinocirhomaera, determined from an egg-capsule, plus a dentition from an undescribed, possibly
new, genus). A further chimaeroid genus, Amylodon, is reported here for the first time the
Cretaceous of Russia. This genus was known previously only from the Palaeogene of Belgium and
England.

GEOLOGICAL BACKGROUND

The specimen described here comes from the Campanian (Upper Cretaceous) deposits near the
village of Shyrokyi Karamysh (51° 21' 3" N, 45° 2' 7" E) in the Saratov Region (Text-fig. 1). The
locality is a poor exposure in a ravine. It consists of three beds (Text-fig. 1).

1) A coarse quartz glauconitic sand, about 6 m thick, containing the bivalve Syniciclonema laeve
(Nielsen), a shark coprolite and teeth and bone fragments of pleisosaurs.
TEXT-FIG. 1. Geographical maps and stratigraphical section of the Karamysh locality. A, map of Russia giving general position of the Saratov Region. B-C, progressive enlargements specifying the position of the locality within the Saratov Region. D, section at the locality. E, key to D. 1, productive horizon; 2, sandstone; 3, phosphatic conglomerate; 4, sand.
(2) A phosphatic conglomerate, up to 400 mm thick, with the bivalves Monacola cf. vesicularis (Lamarck), the holotype of Amyloodon karamysh sp. nov., a fragment of a long beak and a mandibular plate of Edaphodon sp., several dental plates of Ichtyodus cf. bifurcatus Case, numerous coprolites and shark teeth including Cretolamia borealis (Priem), Pseudoisurus arcautus (Woodward), Eostriatolamia ex gr. subulata (Agassiz), Pseudorax laevis (Leriche), teeth of the teleost fish family Enchodontidae, and the remains of polycotyloid and elasmosaurid plesiosaurs, and mosasaurs.

(3) A quartz glauconitic sandstone, about 1·5 m thick, with fragments of belemnite rostra. In a neighbouring exposure, also near Shyrokii Karamysh, Bed 3 yields Belemnitella macronata (Schlotheim), the abundant species in the lower part of the Upper Campanian (Bondareva and Morosov 1970). The molluscs from Bed 2 suggest a late Early Campanian age (E. M. Pervushov, pers. comm.). The shark fauna from Bed 2 is also characteristic of the Early Campanian, the same species occurring with Belemnitella macronata in the Early Campanian phosphatic chalks in the Paris Basin (Priem 1897).

SYSTEMATIC PALAEONTOLOGY

Class HOLOCEPHALI Bonaparte, 1832
Order CHIMAERIFORMES Buen, 1926
Suborder CHIMAEROIDEI Patterson, 1965
Family CHIMAERIDAE Rafinesque, 1815
Genus AMYLOODON Storms, 1895

Type species. Amyloodon delheidii Storms, 1895, from the Rupelian of Belgium.

Diagnosis. Dentition of shearing type. Tritors on the dental plates are very reduced in number and size. On the mandibular dental plate, the median tritor is represented by a few short stripes of vascular pleromax or is absent. The outer margin of the mandibular dental plate is straight.

Amyloodon karamysh sp. nov.

Text-figure 2

Derivation of name. The species is named after the River Karamysh, close to the type locality.

Holotype. N 154/109, a left mandibular dental plate, in the collections of the Department of Palaeontology, Saratov State University.

Locality and horizon. Shyrokii Karamysh village, Lysogorsk District, Saratov Region, Russia; latest Early Campanian, Upper Cretaceous.

Diagnosis. Large Amyloodon with mandibular dental plate having a relatively short outer margin (63 per cent. of the total oblique length) and four minute longitudinal median tritons.

Description. The mandibular plate (Text-fig. 2) has a distinct beak and wide symphysis. As well as the four median tritons, there is one short stick-like anterior inner tritor on the tip of the beak and another similar tritor on the posterior margin of the plate near the end of the outer margin. The outer margin is somewhat damaged and, consequently, the structure of the outer tritons is unknown. Below the outer margin, the mandibular plate shows a slight thickening which forms a band along the margin. The oblique length of the mandibular plate (from beak tip to caudal extremity) is 104 mm. The angle between posterior and symphysial margins of the mandibular plate is approximately 28°. The thickness of the dental plate is consistently 7–8 mm throughout its length.
Systematic position. The mandibular dental plate is assigned to the genus Amylodon because it has extremely reduced triters (contra Ischyodus, Edaphodon, Elasmodus, Pachymylus, Brachymylus, Callorhynchus, Chimaera and Harriota), a straight outer margin (contra Elasmodectes), and an upwardly elevated beak (contra Rhinoclimaera).

A. karamysh differs from the type species, A. delheidi Storms, 1895 from the Oligocene (Rupelian) of Belgium, in that the former possesses four small median triters on the mandibular plate, together with a short outer margin. Mandibular dental plates have not been described for A. eocenica Woodward and White, 1930, and A. venablesae Casier, 1966, from the Eocene (Ypresian) of England (Woodward and White 1930; Ward 1973). However, they resemble those of A. delheidi in being mesiodistally narrower; larger specimens have a rounded post-occlusal/basal margin similar to that of A. karamysh; and there is no median tritor (David Ward, pers. comm.). A Bartonian mandibular plate assigned to Amylodon eocenica by Woodward and White (1930), but removed from that species by Ward (1973) and referred to as 'Amylodon sp.', differs from the above in possessing a large undivided median tritor and in the shape and position of the anterior inner tritor.
**DISCUSSION**

*Amylodon delheidi* was established on the basis of a single mandibular plate of shearing type without triturors on the occlusal surface (Storms 1895, pl. 4, figs 11–12). Woodward and White (1930) considered their Early Tertiary ‘*Chimaera* eocenica’ to be an intermediate form between Mesozoic chimaeroids with crushing dentitions and the derived Oligocene *Amylodon* and Recent *Rhinochimaera* with purely shearing dentition. The two genera have been assumed to be closely related and both Ob ru chev (1964) and Ward (1973) have classified *Amylodon* as a rhinochimaeroid. However, the dentition of the Recent *Rhinochimaera pacifica* Mitsukuri (Garman 1904, pl. 8, figs 1–2; Tadashi and Garrick 1979, fig. 1b) differs from that of *Amylodon*. In particular, the beak of the mandibular plate of *Rhinochimaera* is curved downwards and inwards below the vomerine plates, or is straight (Garman 1904, p. 225), whereas it is elevated upwards in *Amylodon*. This suggests that the shearing dentition was derived independently in *Amylodon* and *Rhinochimaera*. *Amylodon* has the same distribution of triturors on the dental plates as the Cretaceous *Ischyodus* and may have evolved from that genus.

There is a trend of increase in the relative length of the outer margin of the mandibular dental plate in *Amylodon* species from the Cretaceous to the Oligocene. In *A. karamysh* (Campanian), the outer margin is 63 per cent. of the oblique length of the mandibular plate; in Ward’s *Amylodon* sp. (Bartonian) it is 74 per cent., and in *A. delheidi* (Rupelian) it is 77 per cent. This trend presumably reflects increasing shearing capability in the dentition of this phylogenetic lineage.

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