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The first finding of a fossil crocodile skull in Siberia*

Archaic crocodiles of the Order Protosuchia, and their derivates close to Notosuchia, widely occupied Asia from the Early Jurassic to the middle of the Late Cretaceous (4, 5, 10). They reached maximum diversification at the Jurassic-Cretaceous boundary and, possibly, occupied the ecological niches of lizards and small mammals. Generally, they were not large animals, with body lengths of about 50-70 cm. Using long and thin legs with wide autopodia, they were able to run quickly along sand and boggy waterlines in search of small prey. Prerequisites for good hunting were very good vision (large orbits), hearing (highly pneumatic bones in the periotic region), sharp teeth, and claws. In arid and semi-arid conditions, many of them were most active during twilight.

Crocodiles occupied near-shore habitats. In shallow water, they hunted small animals, very likely even young fishes. Some of the archaic crocodiles were apparently swimmers, and this is clearly seen in the morphology of the palate and other structures. However, the process of evolution of the secondary palate, which provided functionality to snatch prey in the water, occurred very unevenly and often in bursts. In some forms from Inner Asia, the medial connection of the palate and pterygoids, which formed the floor of the nasal passage, already developed at a high rate in late ontogenesis. Among representatives of the Shartegosuchidae, in the area of the reduced interpterygoid vacuity, a fossa appeared very early that has a connection to the nasal passage and that should be considered as a true functional choana. The “ancient” choanae are placed in the area of palatines and maxillae, and were likely covered by membranes. Forms with such a type of palate construction we consider close to descendants of Protosuchia, which were more developed; i.e. Mesosuchia and among them, representatives of the Infraorder Notosuchia are closest, and also possibly Atoposauridae (4, 10).

In 1996, S.V. Leschinskii found the skull of a small crocodile in the locality Shestakovo -3 (Kemerovsky region, Russia), in deposits of the Ilekskaya Svita, Lower Cretaceous [Aptian-Albian]. This locality was discovered in 1995 and become widely known from articulated fragments of dinosaur skeletons (8). This finding is the first such discovery in Siberia, even though an account of a later discovery (in 1997) from the same locality has been

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published (1). It is worth mentioning that in the description of the 1997 discovery, deposits of the locality were referred by mistake to the Shestakovskaya Svita, which was defined in 1940 by A. R. Ananyev(2). The Shestakovskaya Svita was abolished in the 1940s after its attribution to the Ilekskaya Svita desribed by L. A. Ragozin in 1936 from the outrop Bolshoy Ilek (2,3,7,9).

The skull desribed below was found before employees of Tomsk University (6) started their major excavation at site A-17 (Fig.1).

Order Crocodylia Gmelin, 1788

Suborder Mesosuchia Huxley, 1875

Infraorder cf. Notosuchia Gasparini, 1971

Family Shartegosuchidae Efimov, 1988

Genus *Kyasuchus* Efimov et Leschinskii, gen. nov.

Genus named after the river Kya

Type species - *Kyasuchus saevi* sp. nov.

Diagnosis. Small short-snouted crocodile with skull length of about 4 cm. Palatines fused medially and form longitudinally extended palate, flooring the nasal passage between the openings for the anterior and posterior choanae.

Species. Only the type species.

Comparison. The species differs from *Shartegosuchus* (locality Shar-Teg (4), Upper Jurassic, southwestern Mongolia) by unpaired palatal bones, contact with posterior choana, and larger size.

Kyasuchus saevi Efimov et Leschinskii, sp. nov.

Species named after Vladimir Ivanovich Sayev - Associate Professor of Faculty of Paleontology and Historical Geology of Tomsk State University, discoverer of locality Shestakovo-3.

Holotype – PM TGU 16/I-184; incomplete skull with lower jaw; Lower Cretaceous, Ilekskaya Svita; Russia, Kemerovsky region, Chebulinsky District, Locality Shestakovo-3.

Description (Fig. 2). The skull is wide, moderately high. Bones of skull roof well sculptured. External naris, possibly paired, and oriented obliquely anteriorly as in *Shartegosuchus*. Sclerotic represented by two elements. Antorbital fenestrae are

somewhat reduced and appear as depressions which connected to nasal passages and lacrimal channel. Lateral edge of squamosals bears smooth areas for attachment of skin flaps isolating ears during diving.

Palatine is medially elevated in shape of shallow sculptured swelling. Generally unsculptured region of posterior choana cavity bounded laterally by minor ridges that run together posteriorly. Verticalization of basisphenoid is poorly defined. The basisphenoid and bones of temporal and periotic region are highly pneumatic.

Lower temporal fenestra is lentil-like. Middle-ear opening is oval and placed almost in the quadrate bone, as in recent crocodiles.

Lower jaw is massive with turned inside posterior rami. Maxillary(?) (external) fenestra is reduced and slit-like. Splenials reach posterior edge of symphysis.

Premaxilla has four teeth (the third is largest) with crowns of puncture-shearing type. The second tooth on the premaxilla is significantly larger then the first. Five small cheek teeth have laterally flattened shearing crown with serrated distal edge.

The notch between premaxilla and maxilla incorporated the enlarged mandibular tooth during jaw occlusion. Anterior teeth on the lower jaw were reduced, which possibly reflects agility of the tip of the tongue, or presence of a cartilagenous beak.

Material. Holotype.

Distribution. Early Cretaceous seashore and deltaic plains in southeastern and southern parts of Western Siberia.

Fig.1. The skull of *Kyasuchus saevi* in siltstone of the Ilekskaya Svita of the Shestakovo 3 locality.

Fig. 2. *Kyasuchus saevi* Efimov et Leschinskii, sp. nov. Skull with lower jaw, Holotype – PM TGU 16/I-184. A – dorsal view, B – ventral view, C – lateral view. 1 – photograph, 2 – drawing from photograph, 3 – reconstruction.

Abbreviations: Pmx- premaxilla, Mx – maxilla, PO – antorbital fenestra, PB - sclerotic, Sq – squamosal, CH-I – anterior choana, CH-II – posterior choana, Pal-palatine, Pt – pterygoid, Bs – basisphenoid, Q – quadrate, IM- mandibular fenestra, IT- lower temporal fenestra, Qj – quadratojugal, E- tympanicum.