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Mammal remains from the Lower Cretaceous Bol'shoi Terekhtyul' locality in West Siberia, Russia

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ABSTRACT

Four mammalian taxa have been identified based on upper molariform tooth and edentulous dentary fragments from the Bol'shoi Terekhtyul' locality of the Lower Cretaceous Ilek Formation (Krasnoyarsk Territory, Russia): Docodonta indet., Amphidontidae indet., Zhangheotheria indet. sp. A and sp. B. The docodontan from Bol'shoi Terekhtyul is smaller than *Sibirotherium rossicum* from the Ilek Formation at Shestakovo 1 locality (Kemerovo Province, Russia) and may belong to a distinct taxon. It is one of the younger docodontans in the fossil record. The mammal assemblage from the Bol'shoi Terekhtyul' locality is drastically different from the mammal assemblage of nearby localities of the Ilek Formation along Bol'shoi Kemchug River, which consists of Gobiconodontidae and Amphilestidae. The reason for this faunal discrepancy is unclear for the moment.

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1. Introduction

The continental Lower Cretaceous Ilek Formation is widely distributed in West Siberia. The sporadic findings of the ceratopsian dinosaur *Psittacosaurus* in this formation have been known since the middle of the last century (Rozhdestvensky, 1955, 1960). However, the study of the vertebrate fauna was really started after discovery of a mammal jaw in a *Psittacosaurus* locality Shestakovo 1 in Kemerovo Province in 1995, which was the first Mesozoic mammal discovered in Russia (Maschenko and Lopatin, 1998). In 2000–2001 a new region with outcrops of the Ilek Formation producing vertebrate remains was discovered in Krasnoyarsk Territory (Leshchinskiy and Fayngertz, 2001). We have reported previously on the mammalian assemblages from the localities of the Ilek Formation along Bol'shoi Kemchug River in Krasnoyarsk Territory (Averianov et al., 2005b); the present report is devoted to description of mammalian remains from the nearby localities along the Bol'shoi Terekhtyul' River, the tributary of the Bol'shoi Kemchug River. The majority of the mammalian specimens have been collected in 2011 by the expedition of Saint Petersburg and Tomsk universities and deposited in the Moscow Paleontological Institute and Tomsk University. The vertebrate fauna of Bol'shoi Terekhtyul' localities includes paleonisciform and amiiform fishes, caudate amphibians, indeterminate turtles, shartegosuchid and possible protosuchian crocodyliforms, choristoderes, pterosaurs, stegosaurs, ceratopsian *Psittacosaurus* sp., sauropods, non-avian theropods, tritylodontids, and mammals. This faunal assemblage is typical for other localities within the Ilek Formation. From the vertebrate sample from the Bol'shoi Terekhtyul' localities only a fragmentary maxilla of Caudata indet. has been described previously (Skutschas, 2013: fig. 4e–f).

Institutional abbreviations. LMCCE – Laboratory of Mesozoic and Cenozoic Continental Ecosystems, Tomsk State University, Tomsk, Russia; PIN – Borissiak Paleontological Institute, Russian Academy of Sciences, Moscow, Russia; PM TGU – Paleontological Museum, Tomsk State University, Tomsk, Russia.

Locality abbreviations. BT-0, BT-2, BT-3 – Bol'shoi Terekhtyul' localities 0, 2, and 3 (see map on Fig. 1).

Measurements. L – length; W – width.

2. Geographic and geological setting

The mammal specimens described herein come from several outcrops of the Ilek Formation along the Bol'shoi Terekhtyul' River (N 56°38′, E91°59′), the east tributary of the Bol'shoi Kemchug River

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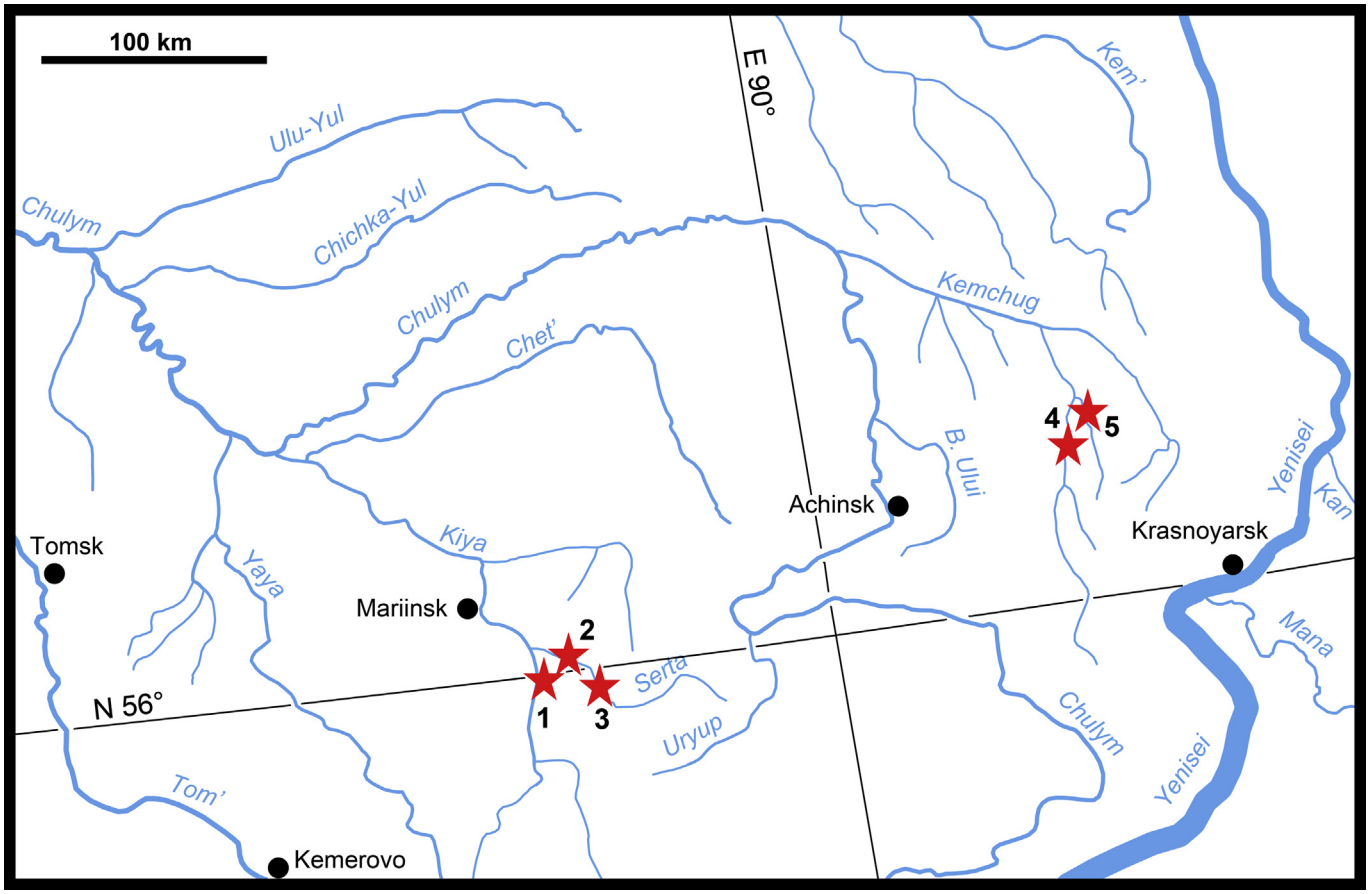

Fig. 1. Map of Chulym River Basin in West Siberia, Russia, showing mammalian localities (stars) within the Lower Cretaceous Ilek Formation. 1, Shestakovo 1 and 3; 2, Smolenskii Yar; 3, Ust'-Kolba; 4, Bol'shoi Kemchug; 5, Bol'shoi Terekhtyul. Modified from Leshchinskiy and Fayngertz (2001: Fig. 19).

of the Chulym River Basin in West Siberia, Russia (Fig. 1). First vertebrate fossils have been discovered there in 2001 by the expedition of the Tomsk University (Leshchinskiy and Fayngertz, 2001; Leshchinskiy et al., 2010). Additional collecting have been made in 2005, 2009 (Leshchinskiy et al., 2010), and 2011 by the expeditions of Tomsk and Saint Petersburg universities. In 2011 approximately 500 kg of matrix were screen-washed and several hundreds of vertebrate fossils, including mammals, were found. The vertebrate fossils come from the layer 2 of the section described by Leshchinskiy et al. (2010). This layer is composed of light greyish-brown varigrained sands with clay pellets and plant debris. The pollen and spores from the fossiliferous level are typical for the other outcrops of the Ilek Formation and cannot be dated more precisely than the Early Cretaceous (Leshchinskiy et al., 2010).

3. Description and discussion

3.1. Upper molariform tooth PIN 5532/1

3.1.1. Description

The tooth has a completely preserved crown (L = 1.8, W = 1.2) and two roots (Fig. 2). The crown is cordiform and nearly symmetrical, with a distinct ectoflexus dividing the crown in a larger mesial and a smaller distal part. The crown is dominated by three main cusps, central A, mesial B, and distal C, forming a trigon angle of about 143°. These cusps are located close to the lingual border of the crown. Their lingual slopes are almost vertical while the labial slopes are more sloping and concave. Cusp A is about twice the height of cusps B and C and cusp B is a little higher than cusp C, however the latter is more worn, and likely of similar height when freshly erupted. Cusp B is positioned closer to cusp A and less separated from the latter compared with cusp C. The crest connecting cusp B and the ectocingulum is little more transverse compared with the crest connecting cusp C and ectocingulum. There are two cingular cusps of similar height at the junction of these crests with the ectocingulum, stylocone mesially and cusp D distally. The ectocingulum is prominent and has no cingular cusps between the stylocone and cusp D. The labial shelf, a flat area between the labial slopes of the main cusps and the ectocingulum, is a narrow stripe similar in width with the ectocingulum. The lingual cingulum is as prominent as the ectocingulum. Undoubtedly, the cingulum was all around the crown but the mesial and distal cingula have been obliterated by wear. In spite of wear, there are two distinct cusps on the mesial cingulum, E and F, with a deep groove between them for the interlocking with the preceding tooth. There are wear facets on the tips of the main cusps A, B, and C. There is an intensive wear in the parastylar area, which extends on the mesial slope of the stylocone and eliminated all the mesial cingulum and most of the cusps E and F. There is also a large wear facet on the distal cingulum, which extends on the distal slope of the cusp D and along the C–D crest. The tooth has two mesiodistally compressed roots, which are set obliquely so their labial sides are more separated compared with the lingual sides. The roots are about twice the height of the crown.

3.1.2. Discussion

PIN 5532/1 is an upper molariform because of a complete cingulum around the crown. Its morphological design, with three

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