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Original article

# Two new mammal localities within the Lower Cretaceous Ilek Formation of West Siberia, Russia☆

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ABSTRACT

Two new mammal localities have been discovered in the Lower Cretaceous Ilek Formation of West Siberia, Russia. The Smolenskii Yar locality in the Chebula District of Kemerovo Province produced an upper molariform tooth (M2) of a Gobiconodontidae indet. The Ust'-Kolba locality in the Tisul' District of Kemerovo Province yielded a lower molar (m2) of the zhangheotherian *Kiyatherium* sp. These are the ninth and tenth Mesozoic mammal localities for Russia. The *Kiyatherium*-bearing vertebrate assemblage from the Shestakovo 3 and Ust'-Kolba localities is likely to be the youngest within the Ilek Formation, reflecting the time after the extinction of the Tritylodontidae.



## 1. Introduction

A rich vertebrate fauna, including various dinosaurs and mammals, have been recovered during the last two decades at Shestakovo 1 and 3 localities from the Lower Cretaceous Ilek Formation in West Siberia (Maschenko and Lopatin, 1998; Alifanov et al., 1999; Tatarinov and Maschenko, 1999; Efimov and Leshchinskiy, 2000; Averianov and Fayngertz, 2001; Averianov and Voronkevich, 2002; Averianov et al., 2002, 2003a,b, 2006; Maschenko et al., 2003; Lopatin et al., 2005, 2009, 2010a,b; Averianov and Lopatin, 2008; Kurochkin et al., 2011; O'Connor et al., 2014; Skutschas, 2014). The Ilek Formation is widely distributed in West Siberia. Extensive exploration of various outcrops of this formation by the field parties of the Tomsk State University and affiliated colleagues led to the discovery of some other vertebrate localities, but so far, only new localities within the Bol'shoi Kemchug River basin, Krasnoyarsk Territory, produced fossil mammals (Leshchinskiy and Fayngertz, 2001; Averianov et al., 2005).

Here, we report on the discovery of two new mammal localities from the Ilek Formation in the Kiya River basin, Kemerovo Province, close to the Shestakovo localities (Fig. 1; Table 1). Both vertebrate localities, namely Ust'-Kolba and Smolenskii Yar, have been found during prospections in 2000 and 2001 (Leshchinskiy and Fayngertz, 2001). Some additional screen-washing was made at these localities in 2002 and 2005. The first mammal specimens have been found in 2010 after the screen-washing of ~ 230 kg of matrix from Ust'-Kolba locality and ~ 380 kg from Smolenskii Yar locality. These mammal specimens are described herein. The specimens are housed in the collection of the Laboratory of Mesozoic and Cenozoic Continental Ecosystems, Tomsk State University (LMCCE).

## 2. Geographic and geological setting

The Ust'-Kolba locality (GPS coordinates: N 55°52′36.2″, E 88°19′07.6″) is a small quarry on the left bank of the Serta River near the Ust'-Kolba settlement, ~ 2 km upstream from the mouth of the river (Tisul' District, Kemerovo Province). The visible section (Fig. 1(c)) starts at the altitude of ~ 187 m and encompass approximately 20 m of fluvial facies of the Ilek Formation. It is dominated by yellowish-green assorted sands with an admixture of pebble and gravel, confined mainly to the

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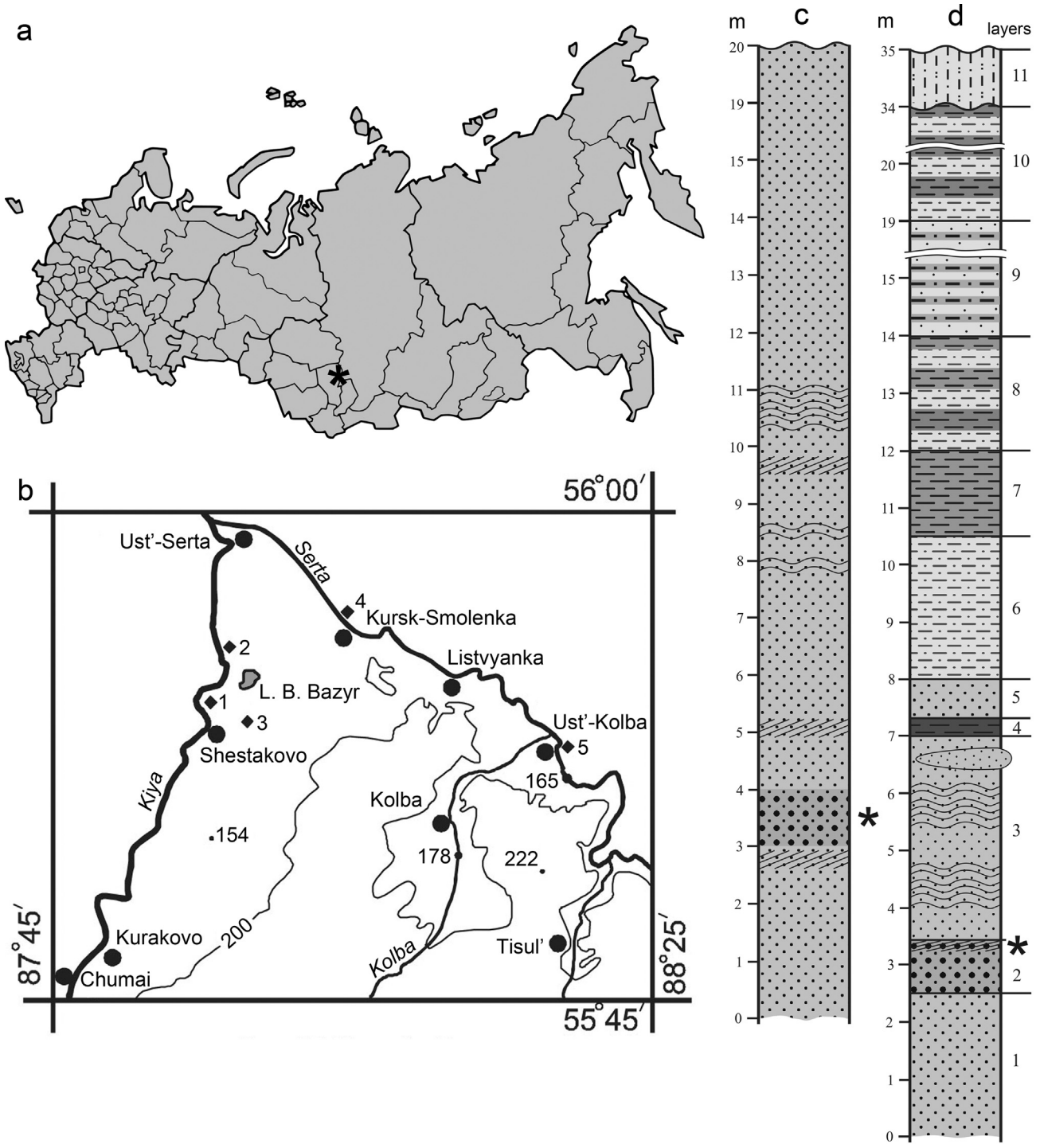


**Fig. 1.** Geographic and geological setting for the Ust'-Kolba and Smolenskii Yar localities: **a**: map of Russia with the studied area shown by an asterisk; **b**: detailed map showing position of the vertebrate localities: 1–3, Shestakovo 1 to 3; 4, Smolenskii Yar; 5, Ust'-Kolba (modified from Leshchinskiy and Fayngertz, 2001: fig. 15); **c**: section at the Ust'-Kolba locality; **d**: section at the Smolenskii Yar locality. Position of the vertebrate bearing level in each section is marked by an asterisk.

bottom of cross-bedded layers and lenses. Pebbles and gravel are presented by pellets (up to 0.1 m) of thick clays, silts, and carbonate nodules. Vertebrate fossils (scales, bone fragments, and teeth) are confined mainly to the gravel lenses at the bottom of the visible part of the section. These sediments represented a relatively high-energy condition, but the preservation of the fossils, although fragmentary, indicates that they were not reworked.

The Smolenskii Yar locality (GPS coordinates: N 55°58′23.9″, E 88°05′35.9″) is confined to a natural outcrop on the right bank of Serta River, 1 km downstream from the Kursk-Smolenka settlement (Chebula District, Kemerovo Province). The section is similar to that of the Shestakovo 1 locality (Leshchinskiy et al., 1997). Eleven layers can be recognized in the section at the southwest part of the escarpment from the water level (Fig. 1(d); from bottom to top):

- yellowish to green, assorted dense sand (> 2.5 m);
- green coarse-grained sand with dense pellets of clay, silt and carbonate nodules. The vertebrate fossils (mainly scales, bone fragments, and teeth) are confined to the roof of this layer which has a cross-bedded texture;