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Brief report

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A new genus of eutherian mammal from the Early Cretaceous of Transbaikalia, Russia

ALEXANDER O. AVERIANOV and PAVEL P. SKUTSCHAS

Eutherian (placental) mammals are the dominant group of modern mammals, with very good Cenozoic and reasonable complete Late Cretaceous fossil record. However, the earliest, Early Cretaceous history of this important group is still inadequately known. Until recently, the only undisputed Early Cretaceous eutherian was *Prokennalestes* Kielan-Jaworowska & Dashzeveg, 1989, represented by two species from the Aptian–Albian of Mongolia (see also Beliajeva *et al.* 1974 and Sigogneau-Russell *et al.* 1992). Recent discoveries both in North America (Cifelli 1999) and Asia (Averianov & Skutschas 1999, 2000a, b) demonstrate greater diversity of earliest eutherians, or their closest relatives, than previously recognized. We describe here a new taxon, *Murtoilestes* gen. n., from the Early Cretaceous of Siberia. *Murtoilestes* gen. n. presents an unusual combination of primitive and derived characters compared with *Prokennalestes* and North American *Montanalestes* Cifelli, 1999, which indicate that the early evolutionary history of eutherian mammals was complex and is poorly understood.

We describe here a new genus of earliest eutherian mammals, based on *Prokennalestes abramovi* Averianov & Skutschas, 2000 from the Early Cretaceous of Russia (Averianov & Skutschas 2000b). The species was originally established on a single upper molar (M2) from the Mogoito locality (site MRT-102; Barremian–Aptian) in Western Transbaikalia (Buryatia), Siberia, eastern Russia. Additional screen-washing at the same site yielded two more molars of this animal (M1 and m3). These specimens show that '*Prokennalestes*' *abramovi* differs more significantly from Mongolian species of *Prokennalestes* than earlier envisaged, thus indicating the need to establish a new generic taxon for the former (Averianov & Skutschas 2000a).

Dental terminology is after Nessov *et al.* (1998: fig. 1) with three additions: an area lingual to the bases of the paracone and metacone is called the protocone shelf (after Butler 1990), an area on the talonid labial to the cristid obliqua is called the hypoflexid (after Bown & Kraus 1979), and an auxiliary cusp on the entocristid is called the entoconulid (after Crompton & Kielan-Jaworowska 1978). Wear facet terminology is after Crompton & Kielan-Jaworowska (1978). The method of tooth measurements is after Butler (1990: fig. 2). All measurements are in mm.

Institute abbreviations. — SMP-SMU, Shuler Museum of Paleontology, Southern Methodist University, Dallas; ZIN, Zoological Institute, Russian Academy of Sciences, Sankt Petersburg; ZPAL, Institute of Paleobiology, Polish Academy of Sciences, Warsaw.

Other abbreviations. — AW, anterior width of the crown; L, crown length; MRT, Murtoi, abbreviation for sites within Murtoi Formation at the Mogoito locality; PW, posterior width of the crown; PRW, protocone width; TAW, width of the talonid; TRW, width of the trigonid.

Infraclass Eutheria Gill, 1872

Eutheria *incertae sedis*

Superfamily Kennalestoidea Kielan-Jaworowska, 1981

Kennalestoidea *incertae sedis*

Genus *Murtoilestes* gen. n.

Kennalestoidea gen. n.: Averianov & Skutschas 2000a: p. 130

Etymology: Murtoi, the railway station on the Moscow–Beijing route, Transbaikalia, near Gusinoe Lake and the Mogoito locality (also the name of the Lower Cretaceous Murtoi Formation); and Greek *lestes* a robber.

Type species by monotypy: *Prokennalestes abramovi* Averianov & Skutschas, 2000. Early Cretaceous (Barremian– Aptian) of Transbaikalia, eastern Russia.

Differential diagnosis (primitive characters marked by '–', derived by '+', characters of uncertain polarity by '?'). — Differs from majority of 'tribotheres' (*Hypomylos* Sigogneau-Russell, 1992, *Tribotherium* Sigogneau-Russell, 1991, *Aegialodon* Kermack *et al.*, 1965, *Kielantherium* Dashzeveg, 1975, *Kermackia* Slaughter, 1971, *Trinititherium* Butler, 1978, *Slaughteria* Butler, 1978, *Potamotelses* Fox, 1972, *Picopsis* Fox, 1980) and deltatheroidans in having a larger protocone (+), trigonid more acute-angled (+), talonid basin larger and deeper (+). Similar to *Montanalestes* Cifelli, 1999 in trigonid acute-angled (+), but differs in that the precingulid is shorter (?), protocristid less transverse (–), cristid obliqua placed more labially and closer to trigonid midline (+), talonid basin larger (+), talonid cusps of nearly equal size (?). Differs from *Holoclemensia* Slaughter, 1968 in lacking stylar cusp C (–) and anterolingual cuspule (?), cristid obliqua longer (continuing up trigonid wall) and more lingual (–) [lower molar characters are based on SMP-SMU 62131]. Differs from *Kokopellia* Cifelli, 1993 in having stylar shelf narrower (+), preparacrista and postmetacrista cusp-like (–), conular 'wings' less developed (–), trigonid more acute angled (+), paraconid relatively smaller (+), postcingulid lacking (–). Similar to primitive Marsupialia Illiger, 1811 in presence of a distinct crest along anterolingual border of paraconid (?), but differs in lacking stylar cusps posterior to stylocone (?) and postcingulid (–), and in having paracone larger than metacone (–) and hypoconulid equidistant from hypoconid and entoconid (–). Differs from *Pappotherium* Slaughter, 1965 in having stylar shelf narrower (+), stylocone much lower (+), preparacrista weaker (+), protocone larger (+). Most similar to *Prokennalestes* Kielan-Jaworowska & Dashzeveg, 1989 in retention of numerous plesiomorphies: stylar shelf wide (–), ectoflexus deep (–), preparastyle present (–), stylocone present (–), preparacrista and postmetacrista cusp-like (–), protocone short mediodistally (–), lingual cingula absent (–), trigon basin deep (–), conules conical with incipient 'wings' (–), conules close to protocone apex (–), metaconule located more labially than paraconule (–), precingulid short and subvertical (–), talonid long and bearing deep hypoflexid (–); and in several synapomorphies: protocone relatively large (+), preprotocrista and postprotocrista extend labially past bases of paracone and metacone [= double ranked prevallum-postvallid and postvallum-prevallid shearing achieved] (+), lower molars much higher labially than lingually (+). Differs from *Prokennalestes* in having parastylar lobe and cusps reduced (+), cristid obliqua placed more labially (+), and entoconulid present (?). Similarly, *Prokennalestes* possess some dental apomorphies not found in *Murtoilestes* gen. n.: paracone and metacone lingual walls longer and gradually sloping into trigon basin (+), paraconid greatly reduced (+), talonid cusps relatively smaller (+). Similar to *Bobolestes* Nessov, 1985 in having conules incipiently 'winged' (+), but differs in having stylar shelf wider (–), preparacrista and postmetacrista cusp-like (–), stylocone less reduced (–), and protocone shelf wider (+). Similar to *Otlestes* Nessov, 1985 in having parastylar lobe reduced (+), ectoflexus deep (–), postmetacrista cusp-like (–), conules incipiently 'winged' (+), lower molars much higher labially than lingually (+), m3 paraconid relatively high and projecting (–), entoconulid on m3 present (?), talonid cusps big and spine-like (–), cristid obliqua placed close to protocristid notch (+); differs in having wider stylar shelf (–), preparacrista cusp-like (–),

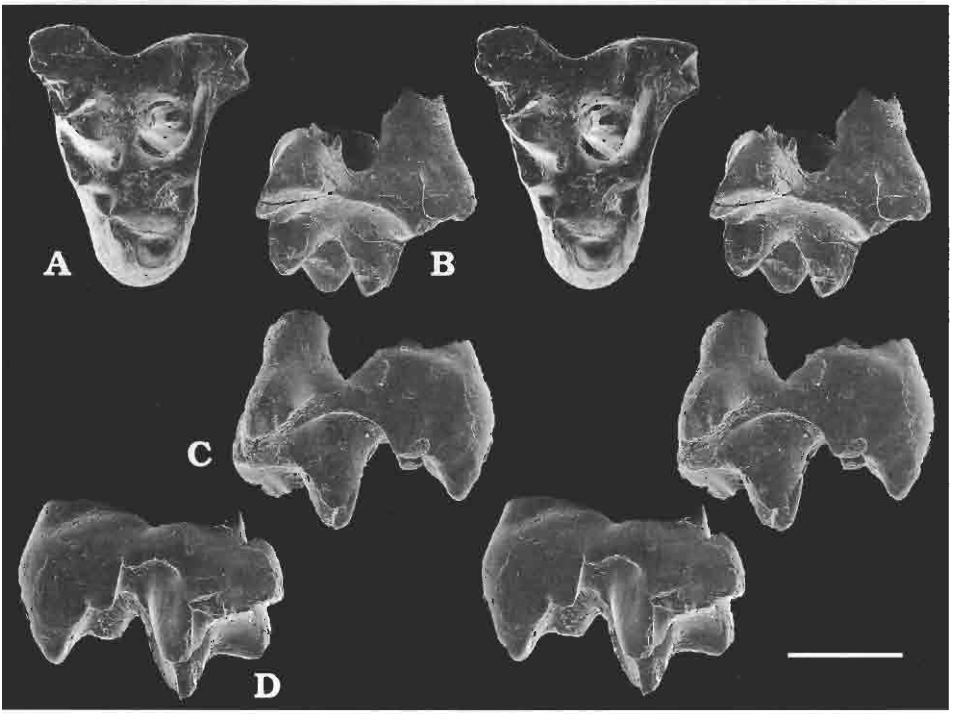

Fig. 1. *Murtoilestes abramovi*, ZIN 34993, right M1. Locality MRT-102, Murtoi Formation (Barremian–Aptian), Mogoito, Buryatia, Russia. **A**. Occlusal view. **B**. Labial view. **C**. Anterior view. **D**. Posterior view. All SEM stereo-micrographs. Scale bar 1 mm.

stylocone less reduced (–). Differs from *Kennalestes* Kielan-Jaworowska, 1969, *Sailestes* Nessov, 1982, 'Zhelestidae' Nessov, 1985, Ungulata Linnaeus, 1766, some species of *Cimolestes* Marsh, 1889, *Batodon* Marsh, 1892, *Gypsonictops* Simpson, 1927, *Paranyctoides* Fox, 1979, in lacking lingual cingula (–). Differs from Asioryctitheria Novacek *et al.*, 1997 (*Daulestes* Trofimov & Nessov, 1979, *Asioryctes* Kielan-Jaworowska, 1975, *Ukhaatherium* Novacek *et al.*, 1997) in having unreduced metastylar region on M1-2 (–), but similar at least with some unworn specimens of *Asioryctes* (ZPAL MgM-I/134) in having cusp-shaped preparacrista and postmetacrista (–). Differs from Zalambdalestidae Gregory & Simpson, 1926 in having wider stylar shelf (–) and trigonid not compressed mesiodistally (–). Very similar to *Cimolestes* in sharing mostly primitive characters: stylar shelf wide (–), parastylar lobe reduced (+), ectoflexus deep (–), stylar cusps posterior to stylocone absent (?), preparacrista and postmetacrista cusp-like (–), additional small cusp posterior to postmetacrista cusp (?), lingual walls of paracone and metacone nearly vertical (–), conules cone-like (–), conules incipiently 'winged' (+), paraconule closer than the metaconule to protocone apex (–), protocone trenchant (–), precingulid short and subvertical (–), cristid obliqua closer to protocristid notch (+), deep depression in talonid basin along entocristid (?), entoconulid present (?); differs in lesser reduction of stylocone (–), presence of preparastyle (–), paraconid higher (–).

Murtoilestes abramovi (Averianov & Skutschas, 2000)

Figs. 1–3.

Prokennalestes sp. n.; Averianov & Skutschas 1999a: p. 6

Kennalestoidea gen. et sp. n.; Averianov & Skutschas 2000a: p. 130, fig. 1.

Prokennalestes abramovi sp. n.; Averianov & Skutschas 2000b: p. 332, fig. 3.

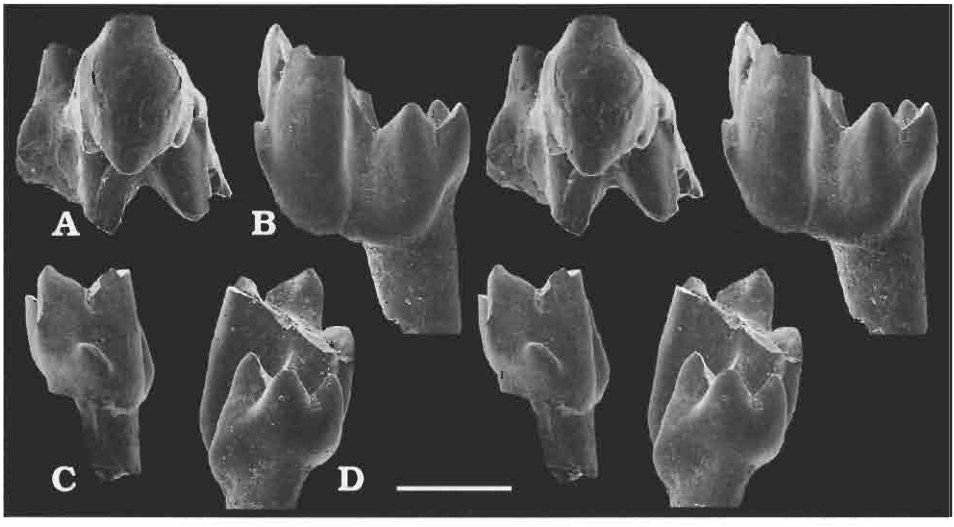

Fig. 2. *Murtoilestes abramovi*, locality MRT-102, Murtoi Formation (Barremian–Aptian), Mogoito, Buryatia, Russia. **A**. ZIN 34993, right M1, lingual view. **B–D**. ZIN 34994, left m3, in labial (**B**), anterior (**C**), and posterior (**D**) views. All SEM stereo-micrographs. Scale bar 1 mm.

Holotype: ZIN 34834, left M2. Found 31st August, 1998.

Type horizon and locality: Mogoito Member of the Murtoi Formation, Lower Cretaceous (upper Barremian–middle Aptian). Microvertebrate site MRT-102, within the Mogoito locality; western coast of Gusinoe Lake, approximately 100 km southwest of Ulan-Ude, Buryatian Republic, western Transbaikalia, eastern Russia (N 51°12'03'', E 106°17'06'').

Referred material. — ZIN 34993, right M1 and ZIN 34994, left m3. The horizon and locality are the same as for holotype.

Diagnosis. — Same as for the genus.

Description. — **M1**: The crown is asymmetrical labially: the parastylar lobe is developed mesiodistally, while the metastylar lobe projects posterolabially. There are two approximately equal cusps, parastyle and preparastyle, on the parastylar lobe. Both are relatively smaller than in *Prokennalestes*. The protoconid notch is shallow. The stylocone is larger than the preparastyle and parastyle, but is weakly defined. There are no cuspules (styles) on the labial cingulum posterior to the stylocone. The stylar shelf is wide, approximately one third of the crown width. The ectoflexus is relatively deep, but more shallow than on M2. The preparacrista is very low and cusp-shaped, with worn apex. The postmetacrista is longer, cusp shaped, and evidently was much higher than the preparacrista (the postmetacrista cusp is broken off). There is a small additional cusp on the postmetacrista, labial to the main postmetacrista cusp. The paracone is higher than the metacone, the base of paracone also being somewhat larger. There are prominent wear facets 3 and 4 on the postparacrista and premetacrista, respectively; this heavy wear and deep embrasure between the paracone and metacone indicate a high and strong hypoconid on the occluding tooth. The lingual walls of paracone and metacone are steep, nearly subvertical, abruptly sloping into the trigon basin. The trigon basin is restricted by the development of conule 'wings', but is relatively deep in the central part. The protocone is lower than the labial cusps, relatively short mesiodistally, and trenchant. The paraconule and metaconule are relatively large and cone shaped, with incipient 'wings', approximately equidistant from the protocone apex. The apices of paraconule and metaconule are worn (wear facet 3a and 4a). The

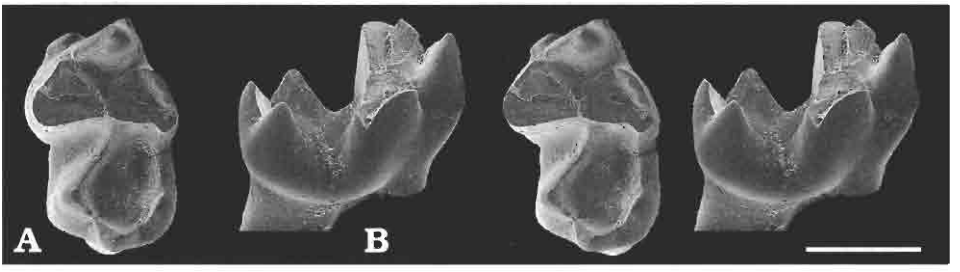

Fig. 3. *Murtoilestes abramovi*, ZIN 34994, left m3. Locality MRT-102, Murtoi Formation (Barremian–Aptian), Mogoito, Buryatia, Russia. **A**. Occlusal view. **B**. Lingual view. All SEM stereo-micrographs. Scale bar 1 mm.

preparaconule crista is long and extends anterolabially to the preparastyle, forming a relatively wide paracingulum. The premetaconule crista is sharp and is higher and better developed than the postparaconule crista; it is best seen in the posteroocclusal view (Fig. 1D). On the postmetaconule crista there is a small auxiliary cuspule just posterior to the metaconule. The postmetaconule crista terminates between the metacone and postmetacrista cusp.

M2: See description in Averianov & Skutschas (2000b: p. 333). To that description should be added that the conules are incipiently 'winged': weak postparaconule and premetaconule cristae border the deeper central depression of the trigon basin. These cristae are developed to the same extent as the postparaconule crista on M1 (ZIN 34993), and are noticeably weaker that the premetaconule crista on that tooth.

m3: The crown is higher labially than lingually. The apices of protoconid and metaconid are broken off. The trigonid cusps were not connate at the base. There is a small, triangular trigonid basin between the trigonid cusps. From the remaining bases of the protoconid and metaconid it is clear that the latter was approximately of the same size at the base as the former; possibly both cusps were not much different in height. If so, this would be a contrasting difference with *Prokennalestes*, which has the metaconid noticeably smaller and lower than the protoconid. The supposition of a relatively tall metaconid is in agreement with the fact that the paraconid preserved on ZIN 34994 is relatively tall: the tooth would have had a high metaconid and a smaller paraconid, a condition typical for placental mammals. The paraconid and metaconid bases are closely approximated, so that the trigonid triangle is acute-angled. The paraconid is compressed mediodistally and bears a very distinct and sharp vertical crest, extending along its anterolingual edge. The precingulid is short and strongly oblique, approaching a subvertical orientation. The anterolingual cuspule is lacking. The talonid is relatively long mesiodistally, exceeding the trigonid in length, but is buccolingually narrower than the trigonid. It is somewhat twisted lingually relative to the trigonid. There is a very deep hypoflexid, constricting the talonid at its junction with the trigonid. The cristid obliqua reaches the talonid somewhat lingual to the protocristid notch. The talonid basin is relatively large and deep. It is especially deep in its central part, along the entocristid. This depression is connected with a deeply excavated vertical groove along the lingual margin of the posterior trigonid wall. Apparently, both these structures represent a prominent wear facet 5, made by the anterior face of protocone during the final phase of occlusion. There are four talonid cusps: hypoconid, hypoconulid, entoconid, and entoconulid. The main talonid cusps are relatively large, spine-like, approximately equal in size; the hypoconid being somewhat the tallest (Fig. 2D). The entoconulid is a small cusp at the base of the entoconid. The hypoconulid is approximately equidistant from the hypoconid and entoconid.

Measurements. — M1: L – 1.90, AW – 2.33, PW – 2.39, PRW – 1.16; M2: L – 2.09, AW – 2.44, PW – 2.61, PRW – 1.12; m3: L – 2.08, TRW – 1.17, TAW – 1.04.

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Alexander O. Averianov [sasha@AA1923.spb.edu] and Pavel P. Skutschas [skutchas@mail.ru], Zoological Institute, Russian Academy of Sciences, Universitetskaya nab. 1, 199034 Saint Petersburg, Russia.