甘肃兰州盆地中新世泉头沟动物群的仓鼠类

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摘要 记述了甘肃兰州永登四兴沟发现的4种仓鼠化石; *Plesiodipus leei* Young, 1927; *Megacricetodon sinensis* Qiu et al., 1981; *Ganocricetodon cheni* gen. et sp. nov. 和 *Pararicetulus schaubi* Young, 1927。仓鼠类的组合和形态特征表明: 仓头沟动物群与近似于早更新世的中古动物群的组合和形态特征基本一致。但它们的时代和生态环境略有差异。不同时代的动物群中, 仓鼠类是重要的组成部分。

关键词 甘肃, 兰州盆地, 中新世, 仓鼠科

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甘肃兰州永登县下街(威武河)四兴沟龙湾是西北地区发现较早的中新世哺乳动物化石地点, 发现的标本一直是我国北方地区中新世化石研究的比较对象。但作为西北地区一个重要的中中新世动物群, 它将包括 *Plesiodipus leei*、*Pararicetulus schaubi*、*Heterosminthus orientalis* 和 *Protalactaga grabauai* 4 种小哺乳动物 (Young, 1927; Schaub, 1930, 1934)。为了增加动物群的种类和加深对已知属、种的认识, 1991 年甘肃省博物馆、省文物考古研究所和中科院古脊椎动物与古人类研究所的科技人员在这一经典地点进行了取土篗洗, 获得 7 科的小哺乳动物化石一批, 其中食虫类、啮齿类、林栖鼠类和兔形类的描述已于此前发表 (邱铸鼎, 2000)。本文记述仓鼠类 (详见本文的英文部分), 其余的啮齿类和蟑螂类将另文发表。

泉头沟的仓鼠类化石比较丰富, 归入 *Plesiodipus leei* Young, 1927; *Megacricetodon sinensis* Qiu et al., 1981; *Ganocricetodon cheni* gen. et sp. nov. 和 *Pararicetulus schaubi* Young, 1927 等 4 属 4 种, 其中包括一新属、新种, *P. leei* 和 *P. schaubi* 标本可认为是属型种的补充材料, 而 *M. sinensis* 的形态和构造特征与产于新近地的正型标本完全一致。新属、新种及其特征如下。

甘古仓鼠属(新属) *Ganocricetodon* gen. nov.
陈古仓鼠属(新种) *Ganocricetodon cheni* gen. et sp. nov.

特征 小体型仓鼠。臼齿低冠, 冠面较宽。上臼齿 3 根, 中臼齿发育程度不一。原尖和

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前尖由单一或双脊连接；M1 前尖边分开，后脊不对称，后外骨不显，ml 下前尖边尖小，脊形，前下脊及与原尖前脊连接的下后脊。

杨钟健（1927）根据来自甘肃永城河（即本文的泉头沟地点）的标本创建了 Paracricetulus schaubi。绍伯（Schaub，1930，1934）对杨的研究作了订正，把其中的一件下颌骨归入林跳鼠科，命名为 Heterosminthus orientalis。另外一件标本仍保留杨的指定，但在属未赋于该属明确的特征，此后也再没有关于该属材料被发现的报道。

Paracricetulus schaubi Young, 1927 的模式标本系一件带有 M1-3 的下颌骨，现作为“拉氏收藏品”保存于瑞典乌普萨拉大学博物馆。虽然正型标本的 M1 破碎，但仍可见其具有以下特征：M1 下尖向后内突出，使牙齿的后内角不呈弧形；M2 的原尖不明显向后内角突出，使牙齿的前内角呈方角状；M2 具有原尖前脊和后脊对称连接的双脊脊；有短的中脊；M1 和 M2 具 4 齿根。泉头沟新材料的 M1 和 M2 具有与 P. schaubi 正型标本一致的特征，而且这些特征的组合在本文记述的 3 种小型仓鼠中是独到的，牙齿的尺寸也很接近，无疑可以归入该种。根据前人的记述，以下可以作为该属、种的增订特征：小个体仓鼠，下颌骨体与齿列斜交达 30°左右；冠面视不见颊孔；侧视 m3 未完全被上升支遮掩。臼齿低冠，齿尖相对齿脊显著；M1 前尖边缘宽，内谷近横向，后外谷甚窄；M2 常具双脊脊，并与原尖的前脊和后脊对称连接；M1 和 M2 的中脊发育程度变异大，前尖多见后刺，4 齿根，下颚齿无下中脊；ml 下前尖边缘宽，外谷宽阔，略前指。

在泉头沟动物群的仓鼠中，Plesiodipus leei 的尺寸大，属脊形齿，易与其他种类区别。在其余的 3 种小型仓鼠中，大体的差异如下：

Ganocricetodon cheni gen. et sp. nov. 的个体相对较大，上、下臼齿相对短宽，主尖显著，使其易于区别其他 2 种；在 M1 臼齿和齿脊的排列方面，特别是前尖有分开的方向，多少与 Megacricetodon siensis 相似，但以齿冠相对短宽，没有后外谷而有所不同；其下颌骨的高度大，ml 下前尖尖呈较窄脊形，也不难与 M. siensis 区分；以 M1 的前尖分开浅，M1 和 M2 具 3 齿根，ml 下前尖脊状而不同于 M1 前尖尖，M1 和 M2 具 4 齿根，ml 具状下前尖尖的 Paracricetulus schaubi。

结论 泉头沟发现的小哺乳动物化石除仓鼠科外，尚有猬科、睡鼠科、林跳鼠科、跳鼠科、沙鼠科和鼠兔科，计 11 属 12 种，其中猬科、林跳鼠科、跳鼠科和鼠兔科的 4 属 5 种此前已作过报道（郑铁铮，2000）。然而，该动物群名单似乎未必能客观地反映当时动物的组合面貌，因为华北近现代中的一些成员，如食虫目中的鼩鼱科和鼩鼱科、啮齿目中的松鼠科均未在动物群中出现，中生华北和西北广布的鼠兔科只有一个牙齿为代表。这些如果不是由于它在生态上的独特性，就可能是埋藏或采集上的原因。尽管如此，泉头沟动物群的组成显示了它与我国通古尔的小哺乳动物群最为接近。

泉头沟动物群与通古尔动物群有颇多相同的小哺乳动物属种，说明两者的时代接近和所指示的生存环境近似。但它们在仓鼠科的组成上有明显的不同，即泉头沟动物群含有通古尔动物群所没有的 Ganocricetodon cheni 和 Paracricetulus schaubi，而下一动物群中较为常见的 Democricetodon 属却未见在前一动物群中出现，这又可能表明两动物群在时代和生态环境方面存在一些差异。至于时代，从两动物群的 Heterosminthus orientalis 和 Megacricetodon siensis 的比较看来，泉头沟的 Heterosminthus 上臼齿中脊的平均长度较短，下臼齿中脊平均长度较短，这些性
CRICETID RODENTS FROM THE MIDDLE MIocene
QUANTOU GOU FAuna OF LANZhou, GANsU

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Abstract Four species of cricetid rodents are recognized and described from the upper Xianshuie Formation of Tunggur age (middle Miocene) at Quantougou, Gansu. Among the cricetids, Ganocricetodon cheni is new. A comparison of the Quantougou assemblage with that of Tunggur reveals some striking similarities in composition and obvious differences among cricetids, that are temporal, ecological, or both.

Key words Lanzhou Basin of Gansu, Xianshuie Formation, Middle Miocene, Cricetidae

1 Introduction

A new collection of small mammals was made in 1991 by a team made up of the Provincial Museum of Gansu, the Institute of Cultural Relics and Archaeology of Gansu, and the IVPP at Quantougou near Xianshuie, a classic locality in Gansu Province. Seven families of small mammals were screen-washed from about 150 kg of sediments of the upper Xianshuie Formation of Tunggur age (middle Miocene), of which eight taxa were added to the micromammalian fauna previously described as the Hsienshuo assemblage by C.C. Young in 1927 and S. Schaub in 1930 and 1934. As for the geological background of this locality and description of Erinaceidae, Zapodidae, Dipodidae and Ochotonidae of the fauna, the reader is referred to the previous presentation (Qiu et al. 1997; Qiu, 2000). This paper deals with the Cricetidae. The Gliridae and Gerbillidae will be described next.

2 Systematics

Cricetidae Rochebrune, 1883

Plesiodipus Young, 1927

Plesiodipus leei Young, 1927

Material Four maxillary fragments including 1 M1, 2 M2, 3 M3; 2 mandible fragments with m2–3; 35 isolated teeth (2 M1, 1 M2, 7 M3, 13 m1, 5 m2, 7 m3); V 12590.1–41.

Measurements (Table 1)
Table 1 Measurements of the teeth of *Plesiodipus leei* (mm)

<table>
<thead>
<tr>
<th>Tooth</th>
<th>N</th>
<th>Length</th>
<th>Width</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>Range</td>
</tr>
<tr>
<td>M1</td>
<td>1</td>
<td>2.93</td>
<td>2.75-3.10</td>
</tr>
<tr>
<td>M2</td>
<td>3</td>
<td>2.63</td>
<td>2.40-2.75</td>
</tr>
<tr>
<td>M3</td>
<td>10</td>
<td>1.80</td>
<td>1.60-2.00</td>
</tr>
<tr>
<td>m1</td>
<td>9</td>
<td>2.60</td>
<td>2.45-2.70</td>
</tr>
<tr>
<td>m2</td>
<td>4</td>
<td>2.45</td>
<td>2.30-2.60</td>
</tr>
<tr>
<td>m3</td>
<td>9</td>
<td>2.28</td>
<td>2.10-2.40</td>
</tr>
</tbody>
</table>

**Description**
A maxillary fragment shows the posterior margin of the anterior zygomatic arch arising anterior to M1. Ascending ramus of dentary arises opposite the posterior border of m2. Masseteric crest pronounced beneath m1 and m2. The horizontal ramus below m2 measures 4.4 mm and 4.8 mm, respectively.

The molars are bunolophodont with prominent cusps and developed crests, four roots in upper molars except the three-rooted M3, and two roots in lower molars.

M1: Anterocone robust, single-cusped, compressed anteroposteriorly, and connected with anterior arm of protocone by a striking anterolophule; protocone larger, located slightly anterior to the paracone with its posterior arm connected to the "middle oblique crest", which consists of the paracone, entoloph and hypocone; hypocone strong, joins metacone by a short metaloph; metacone similar to paracone in size and morphology. M2 wider anteriorly than posteriorly; protocone located distinctly anterior to paracone; weak anterocone close to protocone and joins the anteroloph; antero-entosinus absent. M3 triangular with similar protocone and paracone in shape to those of M2; hypocone rather reduced and the metacone serves as a ridge connecting hypocone and paracone.

m1: Anteroconid prominent, single-cusped with a labial anterolophid in 12 of 13 specimens; two anterolophulids, with the lingual one connecting to the anterior metalophid and the labial one joining the anterior arm of protoconid; with wear a quadrilateral grinding surface appears on protoconid and hypoconid; hypoconid has a distinct anterolabial crest; metaconid and entoconid similar in shape; posterior metalophid present in 6 teeth; hypolophid short and connected to mesoconid; longitudinal crest more robust anteriorly than posteriorly, joining mesoconid, protoconid and entoconid to form a strong "middle oblique crest"; well developed posterolophid bears a pronounced hypoconulid. m2: anteroconid fused with metaconid to form a strong transversely-directed anterolophid; protoconid prominent, with its anterior arm extending to the anterolophid labial to the midline; hypoconid and posterolophid merged as a short crest parallel to and connected with the "middle oblique crest". m3 similar to m2 in dental pattern, but smaller in size and more reduced posteriorly.

**Remarks**
The specimens described are additional materials of *Plesiodipus leei* Young, 1927 from the type locality. *P. leei* is also known from Lierbao, Qinghai (Qiu et al., 1981) and Tunggur, N. Mongol (Qiu, 1996). The specimens from Lierbao are identified with the material of Quantouou, while the teeth from Tunggur are slightly smaller in size than those of Quantouou on an average. *P. leei* is more primitive than *P. progressus* from Moergen V of Tunggur based on lower crown height, bunodont cheek teeth, less undulated enamel crown base and less extend external sinusae of M1 (Qiu, 1996).

**Megacricetodon Fahlbusch, 1964**

**Megacricetodon sinensis** Qiu et al., 1981

(Pl.I, 7-12)

**Material**
Twelve maxillary fragments including 10 M1, 7 M2, 2 M3; 17 mandible
fragments including 10 ml, 14 m2, 11 m3; 42 isolated teeth (5 M1, 8 M2, 4 M3, 15 m1, 7 m2, 3 m3); V 12591.1～71.

**Measurements** (Table 2)

<table>
<thead>
<tr>
<th>Tooth</th>
<th>N</th>
<th>Mean Length</th>
<th>Range</th>
<th>Mean Width</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>12</td>
<td>1.48</td>
<td>1.35～1.60</td>
<td>1.01</td>
<td>0.90～1.10</td>
</tr>
<tr>
<td>M2</td>
<td>13</td>
<td>1.08</td>
<td>1.00～1.15</td>
<td>0.92</td>
<td>0.85～1.00</td>
</tr>
<tr>
<td>M3</td>
<td>5</td>
<td>0.82</td>
<td>0.80～0.85</td>
<td>0.82</td>
<td>0.80～0.85</td>
</tr>
<tr>
<td>m1</td>
<td>19</td>
<td>1.35</td>
<td>1.25～1.45</td>
<td>0.86</td>
<td>0.80～0.95</td>
</tr>
<tr>
<td>m2</td>
<td>20</td>
<td>1.16</td>
<td>0.95～1.25</td>
<td>0.96</td>
<td>0.85～1.10</td>
</tr>
<tr>
<td>m3</td>
<td>13</td>
<td>0.88</td>
<td>0.80～0.95</td>
<td>0.83</td>
<td>0.75～0.85</td>
</tr>
</tbody>
</table>

**Description**  Masseteric fossa wide and shallow. Masseteric crest terminates anteriorly with a moderate nub beneath m1. Horizontal ramus below m2 measures about 2.3 mm in 5 specimens.

**Molars** are brachydont with three roots in upper molars and two in lower ones.

**M1**  Antercone marked, unequally bilobed with the lobes connected posteriorly in almost all specimens; weak ledge or anterior styal shelf present in 8 specimens; anterolophule straight, joining anterior arm of protocone with anterocone near the midline in 9 specimens and with lingual side of midline in 7; protoloph short, posteriorly-directed to join the longitudinal crest; longitudinal crest curved and thicker posteriorly; mesoloph low, weak, long in 5 of 15 specimens, short in 7, nearly absent in 3; metaloph short, posteriorly-directed, either connected to posteroloph or posterior arm of hypocone; posteroloph well developed, closing a very narrow postero-ectosinus; sinus transverse; lingual cingulum usually present. **M2**  Labial branch of anteroloph striking, but lingual branch relatively weak, nearly absent in 3 cases; protoloph anteriorly-directed, usually connected to the anterior arm of protocone; a posterior protoloph absent; longitudinal crest semicircular, thicker posteriorly; mesoloph low, weak, of 15 teeth extending to the labial margin in 2, long in 3, short in 9 and absent in one; metaloph usually anteriorly-directed or transverse to join hypocone or its anterior arm, posteriorly-directed to join the posterior arm of hypocone in one case; posteroloph developed, closing the postero-ectosinus; sinus transverse, with weak cingulum usually on the edge of the sinus. **M3**  Occlusal outline triangular; lingual branch of anteroloph weak or completely absent; protoloph directed anteriorly, joining the junction of anterior arm of protocone and anteroloph; longitudinal crest short, connecting protocone with the small hypocone; metacone rather reduced, hypocone fused into posteroloph; weak mesoloph present in two specimens.

**m1**  Anterconid high, narrow, single-cusped; lingual branch of anterolophid short, extending to the base of metaconid in a few specimens, bearing a tiny cusp in 3 cases; labial branch of anterolophid joins protoconid, bearing a tiny cusp in 2 teeth; anterolophulid straight, weak, absent in one case, usually joining anteroconid on labial side of midline; metalophid usually directed anteriorly to join anterolophulid, slightly transverse to connect anterior arm of protocone in two teeth; longitudinal crest semicircular; short and weak mesolophid present in 10 of 19 specimens; hypolophid short, anteriorly-directed or nearly transverse to join longitudinal crest, absent in one tooth; posterolophid well developed, closing the postero-ectosinusid; sinusid anteriorly-directed, usually with narrow cingulum on the edge of the sinus. **m2**  Labial branch of anterolophid pronounced, lingual branch weakly developed; metalophid short, anteriorly-directed, joining the midline of anterolophid with anterior arm of protoconid; longitudinal crest complete, semicircular, thick anteriorly; mesolophid long in 4 and short in 16 specimens; hypolophid short,
slightly anteriorly-directed to join the longitudinal crest; posterolophid strong, bearing a hypoconulid in some specimens. m3: Subtriangular; metalophid very short, anteriorly-directed, connected either to anterolophid or to the anterior arm of protoconid; longitudinal crest curved and thick anteriorly; entoconid reduced and melded with hypolophid and posterolophid to form a posterolinguinal crest and enclose the postero-entosinusid.

Remarks Dental characters of the hamster described fit the diagnosis of Megacricetodon widely known in the Old World. These characters are: low crowned, with bilobed anterocone on M1; M1 and M2 with mesoloph, postero-ectosinus and connection between protocone and paracone; m1 being the longest lower molar, with single-cusped anteroconid; m1 and m2 usually having mesolophid.

Materials from the type locality of Megacricetodon sinensis are limited, but they fall, together with a M1 described as M. cf. sinensis from Qijiagoukou, Minhe (Qiu et al. 1981), within the range exhibited by the specimens of Quantougou both as to size and dental morphology. M. sinensis also occurs at Tunggur, Nei Mongol, but specimens differ from those of Quantougou only in having longer mesoloph(id)s on average.

Wessels (1996) critiqued the occurrence of Megacricetodon in Pakistan and reallocated all material from the Indian subcontinent previously assigned to Megacricetodon to the myocricetodontine genus Sindems. It seems to me, however, that the differential diagnosis emphasized by Wessels, i.e. frequent occurrence of an entostyle and/or a lingualcingulum in M1 and M2, large variation in shape of longitudinal crest, weak connection between protocone and longitudinal crest, more developed posterior part of longitudinal crest of m1, without a bean-shaped anteroconid on m1, is at the specific, and by no means generic level. Compared with European Megacricetodon and African Myocricetodon, the Siwalik hamsters are more similar to the former than to the latter in morphology.

Ganocricetodon gen. nov.

Etymology Gan, a prefix, the Chinese abridged version for Gansu Province, China.

Diagnosis Small cricetid with low and relatively wide crown. Upper molars with three roots, variably developed mesolophs, single or double connections between protocone and paracone; M1 with weakly bilobed anterocone, poorly developed posteroloph and posteroectosinus; m1 with simple, lophate and single-cusped anteroconid, mesolophid present, and a metalophid connecting to anterior arm of protoconid.

Differential diagnosis Characters of the new genus confine its comparisons to the small bunolophodont cricetids of the middle Miocene of the Old World. Ganocricetodon differs from Megacricetodon in having a deeper horizontal ramus, in molars being relatively short and wide without a clear postero-ectosinus in M1, but with a simple and lophate anteroconid in m1. It is distinct from Democricetodon in having a bilobed anterocone and an undeveloped postero-ectosinus in M1; from Spanocricetodon in having a bilobed anterocone, undeveloped postero-ectosinus in M1, and a mesolophid in m1 (Li, 1977; de Bruijn, 1981); from Paracricetulus in wider occlusal surface of molars and three-rooted upper molars, in having bilobed anterocone and undeveloped postero-ectosinus in M1, the presence of lophate anteroconid and mesolophid in m1; from Shamalina in having relatively heavily built main cusps, without postero-ectosinus in M1, with double protolophs in M2 and a mesolophid in m1.

Ganocricetodon cheni gen. et sp. nov.

(pl.I, 13~18)

Etymology Named in honor of the capable technician Chen Shanxin who made great
contributions in collecting Neogene small mammals.

**Holotype** Left maxillary fragment with M1; V 12592.

**Paratypes** Four maxillary fragments including 3 M1, 1 M2; 2 mandible fragments with m2~3 and m2, respectively; 7 isolated teeth (1 M1, 1 M3, 2 m1, 1 m2, 2 m3); V 12593.1~13.

**Diagnosis** As for the genus.

**Measurements** (Length × width) M1: 1.70~1.80 × 1.20~1.30 mm (4); M2: 1.25 × 1.15 mm; M3: 0.85 × 0.95 mm; m1: 1.45~1.50 × 0.95~1.00 mm (2); m2: 1.20~1.25 × 1.05~1.10 mm (3); m3: 0.90~0.95 × 0.85 mm (2).

**Description** Masseteric fossa wide and deep. Masseteric crest developed and terminates with a marked nub beneath m1. Horizontal ramus below m2 measures 3.3 mm.

M1: Occlusal outline short and wide; anterocone relatively narrow, clearly divided by a furrow on the anterior face in the type specimen, weakly divided in others; ledge or anterior stylar shelf present in 3 of 5 specimens; anterolophule complete, joining anterocone with the anterior arm of protocone; protoloph short, transverse or slightly posteriorly-directed to join the posterior arm of protocone; longitudinal crest short and straight; mesoloph short and weak, but reaching the margin and terminating with a cusplet in one specimen; metaloph very short, posteriorly-directed to join the posterior arm of hypocone; postero-ectosinus absent; sinus transverse, with developed lingual cingulum; three-rooted. M2: Narrower posteriorly than anteriorly; anteroloph pronounced; protoloph double, connected symmetrically with the anterior arm of protocone and longitudinal crest; longitudinal crest curved or angular; mesoloph long, nearly extending to the labial margin; metaloph anteriorly-directed, joining the anterior arm of hypocone; posteroconule developed, closing the postero-ectosinus; sinus narrow, posteriorly-directed, with lingual cingulum; three-rooted. M3: Occlusal outline triangular with normally developed protocone, reduced metacone and lophate hypocone; anteroloph complete; protoloph directed anteriorly, joining anteroloph with the anterior arm of protocone; longitudinal crest discontinuous; mesoloph extends to labial edge of the tooth; three-rooted.

m1: anterocnoid single-cusped, relatively narrow; the lingual branch of anterolophid shorter than labial one, and they extend to the base of metaconid and protoconid respectively; anterolophulid low and weak; metalophid directed anteriorly to join anterolophulid or anteroconid, a posterior metalophid connected with the protoconid present in one specimen; longitudinal crest curved; mesolophid reaches lingual edge of the tooth in one specimen, the other lacks a mesolophid but has a low connection between the metaconid and entoconid; hypolophid anteriorly-directed to join longitudinal crest; posteroconule well developed, extending to base of entoconid; sinusid anteriorly-directed; two-rooted. m2: anterolophid moderately developed with the labial branch joining the base of protoconid, lingual branch very narrow; metalophid short, anteriorly-directed, joining the anterolophid; longitudinal crest complete, semicircular; mesolophid unclear; hypolophid short, transverse or slightly anteriorly-directed to join longitudinal crest; posteroconule strong, extending to the lingual margin; sinusid anteriorly-directed. m3: anterolophid weakly developed; metalophid very short, metaconid close to anterolophid; longitudinal crest angular; entoconid merged into a connection of metaconid and hypoconid, enclosing the postero-entosinusid with the hypolophid and posteroconule; sinusid anteriorly-directed.

**Paracricetulus Young, 1927**

**Diagnosis** (improved) Small cricetid. Row of cheek teeth intersecting mandibular body at about 30°; mental foramen not visible in occlusal view; m3 unhidden by the ascending ramus in external view. Brachydont cheek teeth with more striking cusps than
lophs; M1 with simple anterocone, nearly transverse sinus and narrow postero-ectosinus; M2 with double protolophs connected symmetrically to protocone; M1, M2 with variably developed mesoloph, usually paracone-spur and four roots; m1 with single-cusped anteroconid, transverse and slightly anteriorly-directed sinusid; mesolophid absent in lower cheek teeth.

Remarks Paracricetulus was first named by C. C. Young (1927) based on two specimens from Hsienshuio (Xianshuie, the same locality as Quantouguo). The type specimen of Paracricetulus schaubi is an upper dentary with M1−3, kept in the Paleontology Museum of Uppsala University “Lagrelius Collection”. Although the M1 is damaged, the type specimen shows clearly the following characters: the hypocone of M1 is protruding postero lingually; the protocone of M2 is moderately prominent antero lingually; M2 has double protolophs joining symmetrically the protocone, and a short mesoloph; four roots are present in M1 and M2. The following described materials are referred to the type species because of the identity of M1 and M2 with the type specimen in size and morphology, and the uniqueness of the combined diagnostic characters in the cricetid collection from this site.

Differential diagnosis Paracricetulus can be easily distinguished from almost all the small-sized cricetids from the middle Miocene of the Old World by its deep horizontal ramus and four-rooted M1 and M2, and absence of mesolophid in lower molars. It differs from Mega cricetodon in its simple anterocone in M1, presence of double protolophs in M2, frequent presence of paracone-spur in M1 and M2, and double metalophid in m1; from Democricetodon in having longer and narrower M1 and m1 with smaller anterocone (id), and protoloph of M1 and metalophid of m1 always posteriorly-directed to join the posterior arm of protocone and protoconid respectively; from Spanocricetodon in having larger intersecting angle of the dentary row and mandibular body, relatively more striking cusp(id)s than loph(id)s, narrower anterocone(id), wider and oblique sinusid. By its simple anterocone in M1 and in lower molars, Paracricetulus can be easily distinguished from Shamalina.

Paracricetulus schaubi Young, 1927
(pl. I, 19−24)

Material Thirty-six maxillary fragments including 26 M1, 14 M2, 4 M3; 18 mandible fragments including 11 m1, 11 m2, 4 m3; 109 isolated teeth (20 M1, 21 M2, 2 M3, 25 m1, 29 m2, 12 m3); V 12594.1−163.

Measurements (Table 3)

<table>
<thead>
<tr>
<th>Tooth</th>
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<th>Mean</th>
<th>Range</th>
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</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>37</td>
<td>1.54</td>
<td>1.40−1.70</td>
<td>1.03</td>
<td>0.95−1.10</td>
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<td>M2</td>
<td>32</td>
<td>1.19</td>
<td>1.10−1.30</td>
<td>1.04</td>
<td>1.00−1.10</td>
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<td>M3</td>
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<td>0.81</td>
<td>0.75−0.85</td>
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<tr>
<td>m1</td>
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<td>1.37</td>
<td>1.25−1.45</td>
<td>0.92</td>
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<td>m2</td>
<td>38</td>
<td>1.21</td>
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<td>m3</td>
<td>17</td>
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Description The dental row intersects the mandibular body at about 30°; the mental foramen low and not sighted in occlusal view; m3 hidden by the ascending ramus in external view; mammal fossa wide and shallow; mammal crest clear and terminates with a nub beneath m1; diastema 3.7−4.2 mm and horizontal ramus below m2 measure 5.4−6.0 mm.
Molars brachyodont with more pronounced cusp(s) relative to loph(id)s; anterior arms of protocone and hypocone more developed than their posterior arms, anterior arms of protoconid and hypoconid less developed than their posterior arms; M1 and M2 four-rooted, M3 three-rooted and lower molars with two roots.

M1: Anterocone unilobed with long, descending lingual branch of anteroloph and a short labial one that ends in a weakly developed cusp in 8 specimens; anterolophule short, joining anterior arm of protocone with lingual side of anterocone; protoloph short, transverse or slightly posteriorly-directed to join the longitudinal crest, a low anterior protoloph present in 8 teeth; weak paracone-spur present in half the specimens; longitudinal crest short, straight or slightly curved; mesoloph present in all specimens, reaches the margin in 5, long in 8, short in 28 (in 25 it is close to or connected to the paracone-spur); metaloph short, posteriorly-directed, either connected to posteroloph or the posterior arm of hypocone; posteroloph and postero-ectosinus narrow; sinus transverse; weak lingual cingulum present in some specimens. M2: Double protolophs present in all but 5 specimens, of which 4 own only posterior protoloph and one lacks any protoloph; weak paracone-spur present in 15 specimens; longitudinal crest short, straight or semicircular; mesoloph present in all specimens, reaching the margin in 7, long in 10, short in 15, of which in 8 the mesolophid is connected to the paracone-spur; metaloph either anteriorly-directed to join the longitudinal crest or posteriorly-directed to join posteroloph; posteroloph developed, close to the narrow postero-ectosinus; sinus narrow, usually transverse; usually with weak lingual cingulum. M3: Protoloph directed anteriorly, joining anteroloph; longitudinal crest poorly developed, discontinuous in two specimens; weak mesoloph present; hypocone crest-like; with a small postero-ectosinus.

m1: Anteroconid small, single-cusped; anterolophid weakly developed, the labial branch distinctly longer than the lingual one, which is missing in about half the specimens; anterolophid low and weak, joining anteroconid with metaconid in most and with protoconid in a few, lacking in 5 teeth; variably developed double metaconids present in almost all specimens, but 3 teeth have only a posterior metalophid; longitudinal crest long but low, varying from straight to curved; mesolophid absent; hypolophid very short, anteriorly-directed or nearly transverse, joining longitudinal crest; posterolophid well developed, bearing a hypoconulid in a few specimens; sinusid wide and anteriorly-directed, sometimes with narrow labial cingulum, cuspate cingulum in 3 teeth. m2: Labial branch of anterolophid pronounced, while lingual branch weakly developed; the single metalophid short, joining the anterior arm of protoconid to anterolophid; longitudinal crest complete, thick, varying from straight to semicircular; mesolophid absent; hypolophid short and thick, usually joining the longitudinal crest; posterolophid strong, bearing a hypoconulid in some specimens; sinusid anteriorly-directed in all but one specimen, usually with a weak labial cingulum. m3: Metalophid very short, anteriorly-directed; longitudinal crest curved, discontinuous in one tooth; hypolophid present, connecting entoconid with longitudinal crest; entoconid reduced and melded with hypolophid and posterolophid to close the postero-ectosinus.

3 Conclusions

The Quantougu cricetid fauna is comprised of 4 genera and 4 species, of which one genus and 1 species are new. Cricetid rodents are an important component of the Quantougu fauna, because they were quite diverse. Nevertheless, they are endemic to the northeastern Asia except Megacricetodon. In addition to Cricetidae mentioned, Erinaceidae, Gliridae, Zapodidae, Dipodidae, Gerbillidae and Ochotonidae, including altogether 11 genera and 12 species, are now recognized from the Quantougu fauna, of which
lophs; M1 with simple anterocone, nearly transverse sinus and narrow postero-ectosinus; M2 with double protolophs connected symmetrically to protocone; M1, M2 with variably developed mesoloph, usually paracone-spur and four roots; m1 with single-cusped anteroconid, transverse and slightly anteriorly-directed sinusid; mesolophid absent in lower cheek teeth.

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contributions in collecting Neogene small mammals.

**Holotype** Left maxillary fragment with M1; V 12592.

**Paratypes** Four maxillary fragments including 3 M1, 1 M2; 2 mandible fragments with m2~3 and m2, respectively; 7 isolated teeth (1 M1, 1 M3, 2 m1, 1 m2, 2 m3); V 12593.1~13.

**Diagnosis** As for the genus.

**Measurements** (Length \( \times \) width) M1: 1.70~1.80 \( \times \) 1.20~1.30 mm (4); M2: 1.25 \( \times \) 1.15 mm; M3: 0.85 \( \times \) 0.95 mm; m1: 1.45~1.50 \( \times \) 0.95~1.00 mm (2); m2: 1.20~1.25 \( \times \) 1.05~1.10 mm (3); m3: 0.90~0.95 \( \times \) 0.85 mm (2).

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