

美国内布拉斯加州中新统的 美獾化石一新种

林钟真 苗德岁

(美国堪萨斯大学自然历史博物馆暨生态与进化生物学系 劳伦斯 66045)

摘要 记述了采自美国内布拉斯加州中新统的一保存较完整的美獾 (*Leptarctus*) 头骨化石。与美獾属的其他已知种相比, 该标本的颊齿粗壮, P4 臼齿化, 近方形, 宽略大于长, 齿尖磨蚀均匀, I3 犬齿化, 且向犬齿方向弯曲; M1 宽略大于长, 且比已知种的 M1 大; 听泡具钩状突, 突起上有一明显的舌骨关节面。依据上述与已知种的差别, 我们将其定为一新种 *Leptarctus martini* sp. nov.。新种的牙齿形态及齿尖磨蚀状况显示其为杂食动物。

关键词 内布拉斯加州, 中新统, 鼬科

中图法分类号 Q915.874

NEW SPECIES OF *LEPTARCTUS* (CARNIVORA, MUSTELIDAE) FROM THE MIOCENE OF NEBRASKA, USA

LIM Jong-Deock MIAO De-Sui

(Natural History Museum and the Department of Ecology and Evolutionary Biology, University of
Kansas Lawrence KS 66045 USA)

Abstract A new species of *Leptarctus* is described on the basis of a well-preserved skull from the North American Miocene. *Leptarctus* is only known from the Miocene of Nei Mongol (Inner Mongolia) and North America. The new specimen differs from other species in having an unusually enlarged upper dentition and a hooked process on the tympanic bullae. The third upper incisors are caniniform and are curved toward the canine. The dental characters of this new species indicate it had omnivorous diet.

Key words Nebraska, Miocene, Mustelidae

1 Introduction

Leidy (1856) described a P4 from a Barstovian deposit, now included in the Fort Randall Formation (Skinner and Taylor, 1967) at Bijoux Hill, Charles Mix County,

South Dakota. He based the taxon *Leptarctus primus* on this tooth and compared it to the coati, *Nasua*. Wortman (1894) described a lower jaw with c1, p3, p4, from Clarendonian deposit of Nebraska. He referred this specimen to *L. primus* and concluded that the affinities of the genus lay between the more typical Procyonidae and the aberrant *Potos*. Matthew (1924) referred *Leptarctus* to the Mustelidae based upon a reduced molar number with only M1 present. Matthew (1924) referred a nearly complete skull and a lower jaw from the early Barstovian lower Snake Creek beds to *L. primus* and erected a new species, *Leptarctus wortmani* Matthew, 1924 for the specimen previously described by Wortman (1894). Simpson (1930) described an upper P4, from the Bone Valley Formation, as *Leptarctus progressus* and concluded that it shows some special resemblance to *Nasua* in its greater width and relatively larger protocone. Stock (1930) described fragments of a skull including portions of the palate with P4 and M1 from the Mascall Miocene fauna of eastern Oregon as *L. oregonensis*. He supported Matthew's assertion of mustelid relationship for *Leptarctus*. Gazin (1936) described a mustelid, *Craterogale simus*, from northwestern Nebraska, noticed its close similarities to *Leptarctus*, and further confirmed mustelid affinities of *Leptarctus*. He therefore erected a separate subfamily, the Leptarctinae, to include both genera. At the Thomas Farm quarry, Florida, White(1941) collected and described a partial upper dentition as representing a new genus, *Mephititaxus*, but Olsen (1957) placed it as a new species in *Leptarctus*, *L. ancipidens*, based on new material including a nearly complete right lower jaw and another isolated unworn m1, from same deposit. In 1959, a group of Chinese paleontologists discovered a skull, mandible, atlas, and axis from the Miocene of the Tung Gur region(13.5~13.8Ma), Nei Mongol, and described it as *Leptarctus neimenguensis* (Zhai, 1964). More recent mammalian classification (McKenna and Bell, 1997) has maintained the validity of the subfamily, Leptarctinae, and its mustelid affinity. However, McKenna and Bell (1997) seemed to concur with Baskin (1998) in synonymizing *Hypsoparia bozemanensis* Dorr, 1954 with *Leptarctus primus*. We are inclined to agree with Qiu and Schmidt-Kittler (1982) in keeping *Hypsoparia* a separate genus and J. Lim will deal with this issue elsewhere.

In 1964, the University of Nebraska State Museum field party collected a nearly complete skull of *Leptarctus* (Eisele, 1965). The skull is unusual in having a quadrate P4 that is molariform. The P4 is wider than long, a reversed condition to other *Leptarctus* species. Based on the shape of cusps and size of teeth, this new species of *Leptarctus* combined a carnivorous and vegetarian diet. This study reports a new taxon with the best preserved skull known for the Leptarctinae.

Institutional abbreviations are follows: UNSM—University of Nebraska State Museum; KUVp—Division of Vertebrate Paleontology, University of Kansas; AMNH—American Museum of Natural History; UF—Vertebrate Paleontology Colleciton, Florida

Museum of Natural History; IVPP— Institute of Vertebrate Paleontology and Paleoanthropology, China.

2 Systematic paleontology

Order Carnivora Bowdich, 1821

Family Mustelidae Swainson, 1835

Subfamily Leptarctinae Gazin, 1936

Genus *Leptarctus* Leidy, 1856

***Leptarctus martini* sp. nov.**

(fig. 1; pl. I)

Etymology Named for Professor Larry D. Martin, who collected the holotype.

Holotype UNSM 20843, a complete skull with right I2~M1 and with left I1~3, P3~M1.

Type locality and horizon Webster County, Nebraska. Devil's Gulch Member of Valentine Formation; late Barstovian of Miocene (12~12.5Ma).

Diagnosis It differs from *L. primus* in being larger and in having caniniform I3. The upper premolars are conical and robust. The P4 has almost lost the parastyle, and is wider than long.

3 Description

The holotype is a nearly complete skull. Its dentition only lacks right I1, left canine, and left P2. The palate and left tympanic process were damaged. The posterior region of the palate is missing.

The skull of *L. martini* is 1.125 times of that of *L. primus*. The double sagittal crests run in parallel and the minimum width across the sagittal crests is less than that in *L. primus* (9.1mm in *L. martini* and 12.6mm in *L. primus*). The postorbital processes are smaller than those in *L. primus*. The tympanic process is extended anteriorly from the ventral surface of the tympanic bulla. The shape of this tympanic process is different from other *Leptarctus* species in having a hooked bony projection. Like other species of *Leptarctus*, *L. martini* has relatively heavy zygomatic arches. The maximum width is at the middle of the zygomatic arch. The maximum length of the upper row of teeth (from anterior of canine to posterior of M1) is longer than that in *L. primus* and the individual teeth are larger except incisors. The lengths of the diastema separating the canine from P2, and P2 from P3 are much longer than those in *L. primus* (1.8mm in *L. martini* and 0.9mm in *L. primus*).

The incisors are slender and more reduced than in *L. primus*. The most distinctive feature of the dentition is the shape of I3. The I3 is caniniform and curved toward the canine. The canine is proportionately smaller than in *L. primus*. The P2 is

expanded at the base of crown and is positioned inside in the maxilla. The P2 is double-rooted with a single cusp angled lingually. The P3 is cone-shaped and blunt with a single cusp centered on the crown and a lingual cingulum.

The P4 is quadrate with four distinctive cusps and molariform (fig. 1). it is wider than long, the reverse of the condition in *L. primus*. The only other P4 of *Leptarctus* wider than long is *L. progressus* (fig. 1). The cusps of *L. martini* are evenly worn and the parastyle is reduced.

The M1 is also wider than long and larger than M1 of *L. primus*.

4 Comparison and discussion

The P4 of *L. martini* is relatively larger than in any other *Leptarctus* (fig. 1 and table 1). The hypocone is expanded posteriorly, making the surface of occlusion larger. The cusps of the P4 (paracone, metacone, protocone, and hypocone) are worn evenly. This indicates an omnivorous diet like *Procyon lotor*. *Procyon lotor* also has similar cusps evenly worn down. However, *Taxidea taxus* and *Mephitis mephitis* have different cusps unevenly worn. The height of the paracone in P4 of *Mephitis mephitis* is at least two times higher than the protocone, indicating a carnivorous diet. The enlarged molariform surface of P4 also suggests a vegetarian diet.

L. martini has a longer skull with bigger premolars and molars but a relatively smaller canine than in *L. primus* and *L. neimenguensis* (table 1). The third incisor is curved toward the canine and much larger than other two incisors. Only *L. neimenguensis* (IVPP V 2880) has a similarly shaped I3.

L. martini is unique in having a hooked process on the auditory bulla. A bony projection on the tympanic bulla is one of the most distinctive characteristics of *Leptarctus*. Based on a comparative study of bony projections in other *Leptarctus* specimens, the hooked process of *L. martini* is different in being more slender than in

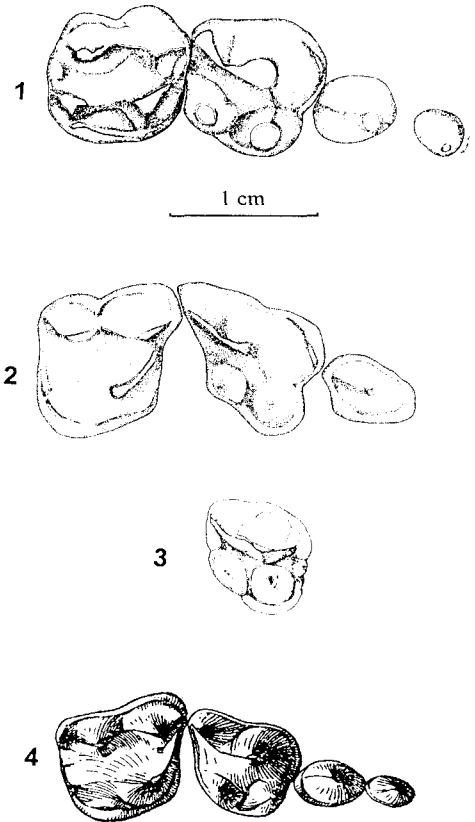


Fig. 1 Occlusal views of leptarctine teeth

1. *L. martini* (UNSM 20843);
2. *L. ancipidens* (UF 5706);
3. *L. progressus* (UF 4255);
4. *L. neimenguensis* (IVPP V 2880), *from Zhai (1964)

Table 1 Comparative measurements of the skull and upper teeth of *Leptarctus martini* and other *Leptarctus* specimens(* from Zhai, 1964) (mm)

Measurements	<i>Leptarctus martini</i> (UNSM 20843)	<i>Leptarctus primus</i> (KUPV 9153)	<i>Leptarctus neimenguensis</i> (IVPP V 2880)*
Greatest length of skull	98.8	87.8	90.5
Breadth of rostrum (Muzzle width at P2)	24.9	24.1	24.1
Zygomatic breadth	70.2		65
Height of zygomatic arch(just posterior to postorbital process of jugal)	11.6	13.1	13.1
Maxillary toothrow (anterior of canine to posterior of M1)	33.5	28.4	27.5
C: Transverse width	4.3	4.2	3.7
Length	5.9	5.4	4.9
P2: Transverse width	2.9	2.6	2.0
Length	3.9	3.4	3.1
P3: Transverse width	4.8	3.8	3.0
Length	5.4	4.1	4.3
P4: Transverse width	9.5	7.7	6.2
Length	8.8	7.9	7.9
M1: Transverse width	10.2	8.3	7.5
Length	8.9	7.7	8.5

L. primus and *L. ancipidens*. The bony projection in *L. primus* and *L. ancipidens* has a foramen and is longer (Olsen, 1958). It also has a clear facet for the hyoid bone.

The suite of distinctive cranial and dental characters of *L. martini* clearly separates it from any other known species within the genus. The dental features of *L. martini* are unique among *Leptarctus* and suggest an omnivorous diet.

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Explanations of Plate I

Leptarctus martini sp.nov.

Holotype specimen, UNSM 20843, Scale bar equals 3 cm

1. dorsal view; 2. lateral view; 3. ventral view

