

Camelidae (Artiodactyla)

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Camelidae originated during the Eocene in North America. They began to diversify during the latter part of the Tertiary and continued to do so until the Pleistocene, when their diversity waned. The Camelidae reached South America during the Pliocene (Menégaz and Ortiz Jaureguizar 1995). The living forms are native to South America, Africa, and Asia and include *Lama guanicoe* (guanaco), the domestic llama and alpaca (both derived from the wild guanaco), and *Lama vicugna* (vicuña). The Camelidae reached the Old World during the Late Miocene. The earliest Old World camels, believed to be descendants of *Procamelus* or *Megacamelus* (Pickford et al. 1995), are placed in various species of the genus *Paracamelus*. Later forms are assigned to the genus *Camelus* and include *Camelus bactrianus* (bactrian camel) and *Camelus dromedarius* (dromedary, known only as a domesticated form).

Camels tend to be rare in fossil collections, and therefore the date of their arrival in the Old World was initially underestimated: the date moved back as collections grew. At present, the earliest record is from MN 13 (Morales et al. 1980; MN = Neogene Mammal Units—Mein 1977; de Bruijn et al. 1995). However, the number of localities of this age that have good biostratigraphical or geochronological control is still small. The find from Çobanpinar is one of the oldest Old World camels and increases our knowledge of this form.

Age of the Locality of Çobanpinar

Mein (1977) placed the locality of Çobanpinar in MN 12 without explanation, which would make the camel from Çobanpinar the oldest known specimen in the Old World. As a result, an accurate estimate of the age of the locality and thus of the camel is important. We used rodents to assess the age of the locality.

During the 1995 summer field work at Çobanpinar, one of us (S. Sen) took a pilot sample of <100 kg of sediment

from the level that contains the large mammal fossils. Screenwashing of the sample also yielded 24 isolated rodent teeth, some of them fragmentary, representing eight species (number of specimens is given in parentheses):

- Byzantinia* sp. I small (3)
- Byzantinia* sp. II large (3)
- Parapodemus* sp. (2)
- Occitanomys* cf. *provocator* de Bruijn, 1976 (5)
- Cf. *Paraethomys* sp. (1)
- Pseudomeriones* cf. *rhodius* Sen, 1977 (8)
- Tamias* sp. (1)
- Hystrix primigenia* (Wagner, 1848) (1)

Byzantinia is a common genus in late Miocene localities of Turkey, where it is represented by two species that are well differentiated by size and morphology. In Greece several Turolian localities also yielded *Byzantinia*. It appears that this genus does not cross the Miocene/Pliocene boundary. *Occitanomys* cf. *provocator* was previously described from Pikermi (Chomateri), a locality dated late Turolian (de Bruijn 1976) or middle Turolian (de Bruijn et al. 1992). *Pseudomeriones rhodius* was found at Maritsa (Rhodes, Greece) and Ano Metochi 3 (northern Greece). These localities were attributed to late Turolian or, in the case of Maritsa, to early Ruscinian (Van der Meulen and Van Kolfschoten 1986). The Çobanpinar *Pseudomeriones* is similar in size to the Greek material, but the specimens from Maritsa are more derived, having more elongated M1 and M2 and shallower protosinusid on the m2. Taking into account the rodent association from Çobanpinar and the stage of evolution of some key taxa, a late Turolian age (MN 13) should be attributed to Çobanpinar.

Propotamochoerus provincialis first appeared in MN 13 and may be present in Çobanpinar (Van der Made, chapter 13, this volume), corroborating the age suggested by the rodents.

Measurements

All measurements are given in mm.

DAP	Anteroposterior diameter, either occlusal or maximal in cheek teeth
DAPb	Basal anteroposterior diameter in cheek teeth
DLL	Labiolingual diameter in incisors
DMD	Mesiodistal diameter in incisors
DMDb	Basal mesiodistal diameter in incisors
DTa	Transverse diameter of the anterior lobe in cheek teeth
DTm	Transverse diameter of the middle lobe in the dp4
DTp	Transverse diameter of the posterior lobe in cheek teeth

Description

Genus *Paracamelus* Schlosser, 1903

Type species: *Paracamelus gigas* Schlosser, 1903

Schlosser (1903) provided both species and genus names for material from China. Later other species were named and included in this genus: *P. alexejeevi*, *P. praebacktrianus*, *P. bessarabiensis*, *P. alutensis*, and *P. aguirrei*.

Paracamelus cf. *aguirrei* Morales, 1984

Synonymy (for *P. aguirrei* and *P. cf. aguirrei*):

1902 Camelidae; Stromer: 110–111, fig. 1.

1973 *Paracamelus spec.*; Raufi and Sickenberg: 84–90, figs. 10c, 10f.

1980 *Paracamelus* sp.; Morales, Soria and Aguirre: 139–142, fig. 1a.

1984 *Paracamelus aguirrei nova sp.*; Morales: 135–161, figs. 16–19.

1993 *Paracamelus*; Pickford, Morales and Soria: 701, fig. 1.

1995 *Paracamelus*; Pickford, Morales and Soria: 641–648 (material from Venta del Moro), plates 79–81.

Sinap Material: Çobanpınar (Geological Survey of Turkey [MTA] collection): left mandible with dp3–m1, right mandible with dp2–m1, symphysis with right di1–dc and left i1 and root of i2, isolated left canine, all probably from the same individual. The specimens were collected during excavations at the site in 1977 by the MTA and are stored in the Museum of the MTA in Ankara, Turkey.

Description: The deciduous incisors are flat (small DLL) and become more asymmetrical from di1 to di3 (fig. 14.1, table 14.1). The crowns are high, crown bases being well marked. The base of the crown of the third incisor is much lower distally than it is mesially. The tips of the crowns are curved mesially and not distally. There is very little relief on the lingual sides of the incisors.

The deciduous canine has a low crown. The crown does not have two lobes as in giraffids. There is no additional lingual cusp or cingulum as in the i3 of *Paracamelus* from Venta del Moro (pl. 79, fig. 2 in Pickford et al. 1995), and the

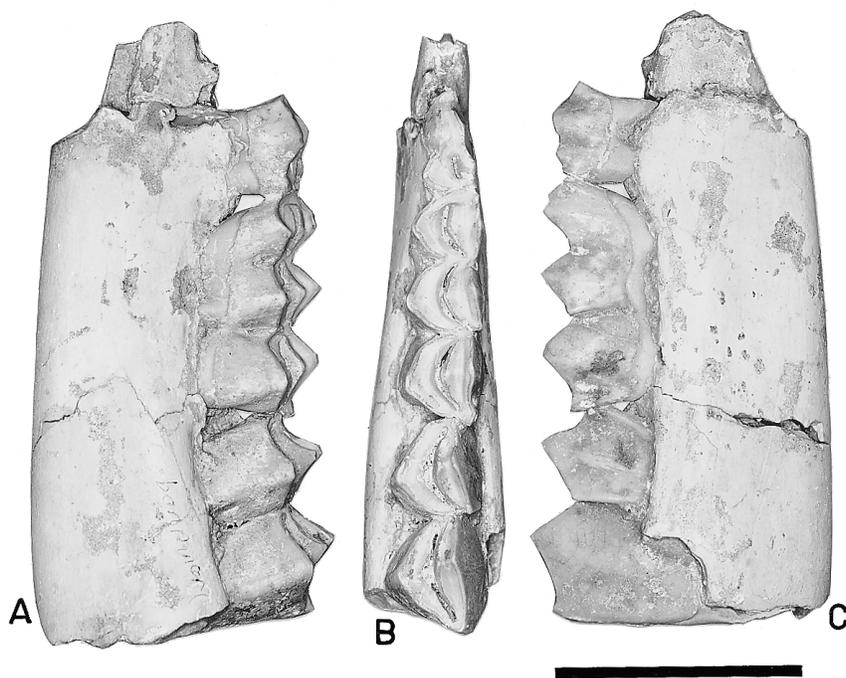


Figure 14.1. Right mandible of *Paracamelus* cf. *aguirrei* from Çobanpınar. (A) Buccal, (B) occlusal, and (C) lingual views. Scale bar = 5 cm.

Table 14.1. Measurements of the Teeth of *Paracamelus* cf. *aguirrei* from Çobanpinar

Side	Measurement (mm)	Tooth			Measurement (mm)	Tooth						
		di1	di2	di3		dc	d2	d3	d4	mI		
L	DMD	12.5			DAP	16.5		20.0	46.7	43.6		
	DMDb	10.4			DAPb				42.7	≤39.5		
	DLL	9.3			DTa	6.7		8.9	14.2	≥19.1		
									DTm		15.7	
									DTp		10.1	17.6
R	DMD	13.1	13.5	12.3	DAP	14.8	13.0	19.2	47.4	42.6		
	DMDb	10.9	11.4		DAPb				43.3	≤38.1		
	DLL	8.9	9.3	6.0	DTa	6.3	5.8	8.5	14.4	≥18.6		
									DTm		15.6	
									DTp		5.4	10.4

specimens are also much smaller and have lower crowns, as in the Venta del Moro specimen. The difference between this specimen and that from Venta del Moro and the low crown of the canine lead us to believe that the entire anterior dentition might be decidual. The cutting edge of the incisors is very curved, whereas in ruminants it tends to be much less curved.

The dp2 is a small tooth with a single cusp, from which an anterior and a posterior crest depart; there are two divergent roots. The dp3 is also relatively small. Three crests depart from the protoconid in anterior, posterolingual, and postero-buccal directions. The postero-buccal crest leads to the hypoconid and then continues in a posterolingual direction. The posterior lobe is much wider than the anterior lobe. The dp4 has three lobes. The tooth has a selenodont structure. Each lobe has a fossid that does not communicate with the adjacent fossid(s). There are no buccal pillars. The lingual wall is fairly flat. The crown is high. The m1 resembles the dp4, except that it lacks the anterior lobe and the crown is higher. The height of the entoconid is >37 mm.

Remarks: As is evident from the description, the combination of characters fits those of a camel but not a ruminant. The occlusal (42.6, 43.4 mm) and basal (≤38.1 mm, ≤39.5 mm) lengths of the m1 indicate a very large animal; for comparison, the length of the m1 of *P. gigas* is 34.7 mm (Zdansky 1926). The length of the M1 is more or less comparable to the m1 length. M1 lengths for *P. aguirrei* are 39 and 39.5 mm and for *P. alexejevi*, 30, 30, 32, 32, and 32 mm (Morales 1984). The species of the genus *Camelus* are smaller than those of the genus *Paracamelus*. *Paracamelus gigas* is the type species of the genus *Paracamelus*. Schlosser (1903) named the genus and species by describing two teeth from China. He believed that the teeth represented a first and a second upper molar. Their measurements are given as 47 mm × 38 mm and 50 mm × 41 mm, respectively. The M2 was still in the maxilla. The supposed M1 is an isolated tooth and seems to be too large for an M1, but more likely represents an M2. This specimen was

figured and should be considered as the type (lectotype, because Schlosser did not indicate the type). These specimens are even larger than their homologues from Venta del Moro. The material from Çobanpinar is referable to either *P. aguirrei* or *P. gigas*.

Discussion

Paracamelus from Çobanpinar is one of the oldest camels of the Old World. The genus has been cited or described from the latest Miocene (MN 13) at Venta del Moro (Morales et al. 1980; Morales 1984; Pickford et al. 1993; Pickford et al. 1995), Librilla (Alberdi et al. 1981) and in the Odessa limestone (Gabunia 1981). Venta del Moro is calibrated as 5.8 Ma, on the basis of biostratigraphy and paleomagnetism (Opdyke et al. 1996). The locality of Librilla is in beds overlying radiometrically dated rocks with ages between 6.2 ± 0.3 and 7.00 ± 0.03 Ma (Montenat et al. 1975). Webb (1965) cited camels from Eldar and the Ischim River. Eldar is correlated with MN 11 (Mein 1977) or MN 10 (de Bruijn et al. 1992), but a faunal list given by Gabunia (1981) does not include camels. We do not know the age of the Ischim River remains, nor can we confirm the presence of camels at this locality. The oldest record of *Paracamelus* in China is in the Yushe area, with an estimated age of ~5.5 Ma (Flynn 1997). A phalanx of a camel from Jalalabad (Raufi and Sickenberg 1973) might be of about the same age, but the accompanying fauna is scanty, and the age of the locality cannot be independently determined. The MN 13 *Paracamelus* specimens tend to be larger than the more recent camels (Morales 1984). The large size of the fossil from Jalalabad is similar to that of the specimen from Venta del Moro, suggesting that the locality is MN 13 or only slightly younger. Stromer (1902) described a camel bone from Wadi Natrun, a locality that is also correlated with MN 13 (Mein 1990).

There are thus six or seven localities in Europe, Asia, and Africa that are placed in MN 13 and/or have estimated ages between 6.2 and 5.5 Ma. The presence of camel

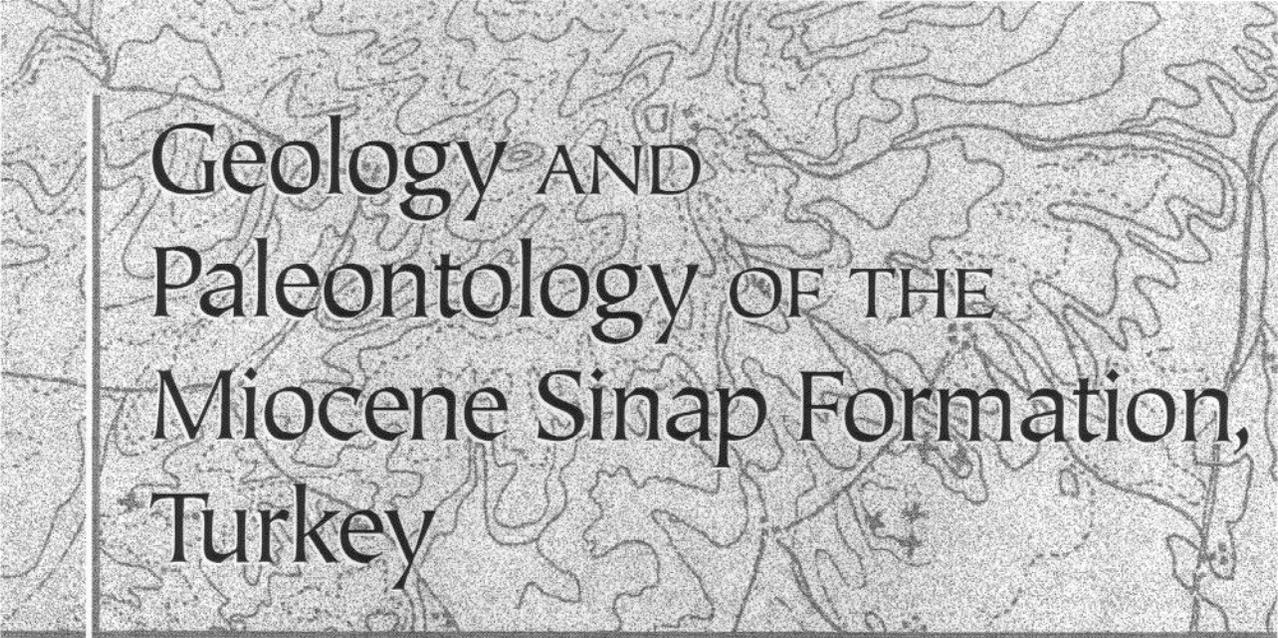
remains at MN 10 or other pre-MN 13 localities cannot be confirmed: the accumulating evidence suggests that Camelidae dispersed during MN 13 from North America to the Old World.

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