

Constantin S. Doukas & Constantine D.Theocharopoulos  
University of Athens

## Smaller mammals from the Oligocene of Kyprinos (Thrace, N.Greece)

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The smaller mammal fauna from Kyprinos contains Didelphidae, Talpidae, Heterosoricidae, Cricetidae and Gliridae. One new species is recognized: *Mirabella hansoulii* n. sp. Comparison with other assemblages from the same geological formation suggests a Late Oligocene age for the Kyprinos fauna.

Correspondence: Constantin S. Doukas & Constantine D. Theocharopoulos, Department of Historical Geology and Palaeontology, University of Athens, Panepistimiopolis, 157 84 Athens, Greece. E-mail: cdoukas@geol.uoa.gr

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### INTRODUCTION

A small fauna of Oligocene smaller mammals was collected in the late 70's by Dr. H. de Bruijn and Dr. A. J. van der Meulen, of Utrecht University (NL). This material was donated by the University of Utrecht to the authors and it is now stored in the collections of the Historical Geology and Paleontology Department, National University of Athens, under the registration AMPG-KYP. The locality of Kyprinos is located 4 km south-west of the town of Orestias (Thrace, N. Greece) and the smaller mammals were collected from an abandoned lignite gallery. Later explorations of the area by H. de Bruijn and the authors did not give any further material because the gallery is now closed. From the same geological formation on the Turkish side of the border (distance approx. 90 km 'as the crow flies') a number of mammal assemblages has been studied (Ünay 1989).

### SYSTEMATIC DESCRIPTIONS

Marsupialia ILLIGER, 1811  
Didelphidae (GRAY, 1821)  
**Didelphidae indet.** (Plate 1, figs. 6-7)

**Material and measurements:**  
2 x M1/M2 (1.95x-, 1.99x-)

**Remarks:** The Marsupialia material of two M1-2, has no taxonomic value. Ziegler (in prep.) suggests that the only didelphid genus that survives the 'Grande Coupure' and remains through the Oligocene-Miocene transition was *Amphiperatherium* FILHOL, 1879. The morphology and size of the labial part of the two available specimens is similar to *Amphiperatherium* FILHOL, 1879 (Ziegler & Fahlbusch 1986, Ziegler 1990).

Lipotyphla HAECKEL, 1866  
 Talpidae GRAY, 1825  
**Talpidae indet.** (Plate 1, fig. 4).

**Material and measurements:**  
 1 m2 (1.70x1.36).

**Remarks:** The morphological characters in the single m2 that has been recovered from Kyprinos, resemble *Desmanodon*. The trigonid is narrow and the talonid is wide. The anterolabial cingulum, which is interrupted at the base of the protoconid, is wider and stronger than the posterior one. The oblique cristid ends low against the base of the metaconid. The entocristid is present, but the metacristid is absent. The entostylid is well developed.

Soricidae GRAY, 1821  
 Heterosoricidae VIRET & ZAPFE, 1951  
*Dinosorex* ENGESSER, 1972  
***Dinosorex* sp. indet.** (Plate 1, figs. 1, 2, 3, 5).

**Material and measurements:** see Table 1.

**Description:**

**A1** (4 specimens): The main cusp (paracone) of this antemolar is strong. A small anterolingual cusp of variable strength is present, as well as a stronger posterolingual cusp. A cingulum, which is stronger posterobuccally, runs around the tooth interrupted only in the space between the two lingual cusps. A ridge runs from the anterior tip to the tip of the main cusp. The tooth has one root.

**M1,2 (3):** The mesostyle is not divided. The

anterior arm of the protocone ends at the base of the paracone. A strong hypocone is present, separated by a groove from the protocone, which reaches the base of the metacone. The hypoconal flange is deep and wide.

**a (1):** Small, unicuspid and heart-shaped.

**m1 (2):** The trigonid is somewhat wider than the talonid. The protoconid is the highest cusp. The paraconid is the lowest cusp. The hypoconid is almost of equal size as the entoconid. The entoconid and the entostylid are of equal size. The entocristid is strong and ends against the base of the metaconid. The oblique cristid ends low against the protoconid-metaconid crest. A narrow buccal cingulum runs from the paraconid to the entostylid.

**m3 (2):** This molar is very small. The trigonid is wider than the talonid. The protoconid is the highest cusp. The paraconid and the metaconid are of equal height. The entocristid is strong.

**Discussion:** The assignment of the Kyprinos species to *Dinosorex*, is based on the well developed lingual cusps of the upper M1-M2. In *Heterosorex*, these cusps are not well developed (Doukas 1986, Van den Hoek Ostende 1995). *Dinosorex* sp. indet. is larger than *D. huerzeleri* and smaller than *D. anatolicus*. The entocristid of the m1, although strong, is lower than the one in *D. huerzeleri* and higher than in *D. anatolicus*. It differs from *D. huerzeleri* from Rickenbach in the less developed entocristid of the m1 and the larger size of m1 and m3. *D. anatolicus* is considered as one of the

	length		n	width	
	range	mean		mean	range
A1	1.90-2.10	1.99	4	1.31	1.25-1.40
M1/M2	1.75-1.87	1.83	3/1	2.10	
a1		1.33	1	1.12	
m1	2.16-2.19	2.17	2	1.57	1.49-1.66
m3	1.52-1.56	1.54	2	0.73	0.65-0.82

Table 1. Material and measurements (in mm) of *Dinosorex* sp. indet.

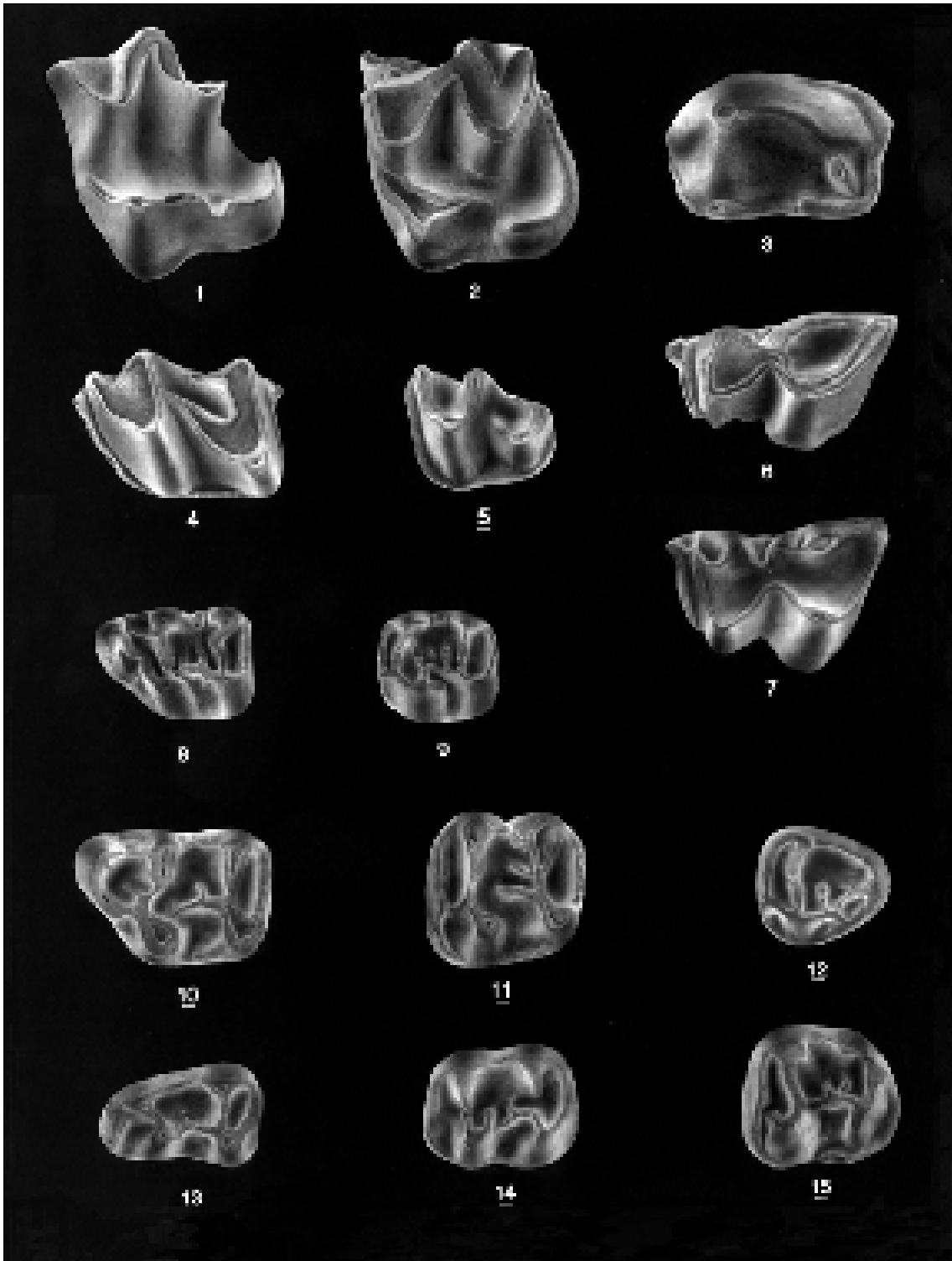


Plate I *Dinosorex* n. sp. fig. **1**: M1/2; fig. **2**: M1/M2; fig. **3**: A1; fig. **5**: m3. Talpidae indet. fig. **4**: m1/2. Didelphidae indet. fig. **6**: M1/2; fig. **7**: M1/2. *Pseudocricetodon moguntiacus* cf. *orientalis* fig. **8**: M1; fig. **9**: M2. *Kerosinia* aff. *variabilis* fig. **10**: M1; fig. **11**: M2; fig. **12**: M3; fig. **13**: m1; fig. **14**: m2; fig. **15**: m3. All specimens figured as left. Underlined figures are inverse.

more primitive representatives of *Dinosorex* (Van den Hoek Ostende 1995). The *Dinosorex* from Kyprinos is, at least in the development of the entocristid of the m1, more primitive (Engesser 1975, Van den Hoek Ostende 1995). Unfortunately, the P4 is, in analogy with other Oligocene species of *Dinosorex*, not known. Our knowledge of the representatives of the genus is insufficient to reconstruct lineages. The sad tradition of the absence of P4 in the Oligocene species of *Dinosorex* continues with the Kyprinos material. Due to the lack of sufficient specimens, not only from the Kyprinos locality but also from the other Oligocene localities from Europe and Anatolia, any attempt from our part to reconstruct phylogeny would be in vain. However, a rather bold suggestion would be that the Kyprinos species is the ancestor of *D.anatolicus*.

Rodentia BOWDICH, 1821

*Paracricetodontinae* MEIN & FREUDENTHAL, 1971

#### Genera included:

*Paracricetodon* SCHAUB, 1925:

Oligocene, Europe

*Trakymys* ÜNAY, 1989: Oligocene, Turkish Thrace

*Mirabella* DE BRUIJN *et al.*, 1987: Oligocene, Greece; Early to Middle Miocene, Switzerland, Germany, Greece and Turkey.

**Type genus:** *Paracricetodon* SCHAUB, 1925

***Paracricetodon* aff. *kavakderensis*** ÜNAY, 1989 (Plate 2, figs. 4-10)

**Material and measurements:** see Table 2.

#### Description

**M1:** The anterocone is narrow. The labial branch of the anteroloph reaches the paracone base, while the lingual branch ends against the anterior wall of the protocone. The anterior arm of the protocone reaches the labial border (in 3 out of 5 specimens, hereafter indicated as 3/5), or bends towards and ends against the anterocone. The labial part of the protoloph is posteriorly directed but the lingual part is anteriorly directed. The protoloph usually ends against the protocone (4/5) and in one specimen against the anterior arm of the protocone. In three specimens a trace of the posterior arm of the protocone is present. A strong S-shaped posterior paracone-spur continues all the way to the tip of the metacone. There is a weak mesostyle in two specimens. In three specimens, the weak entoloph connects the posterior wall of the protocone to the anterior wall of the hypocone (Plate 2, fig. 4), while in two others the posterior arm of the protocone continues as the entoloph and connects low against the anterior wall of the hypocone. The anterior arm of the hypocone, developed as the mesoloph, is of medium length (3/5) or short (2/5). The sinus is small, shallow and lingually open in all but one M1. The metaloph ends against the hypocone. The posteroloph reaches the tip of the metacone.

**M2:** The labial branch of the anteroloph is long and continues all the way to the tip of the paracone (6/10). The anterior arm of the

	length		n	width	
	range	mean		mean	range
M1	2.63-2.78	2.69	5	1.75	1.71-1.79
M2	2.08-2.15	2.11	5/10	1.85	1.69-1.99
M3	1.80-1.84	1.82	2	1.83	1.82-1.95
m1	2.09-2.19	2.14	3	1.42	1.40-1.45
m2	2.00-2.17	2.10	4	1.63	1.51-1.72
m3	2.07-2.16	2.12	4/5	1.61	1.57-1.67

Table 2 Material and measurements (in mm) of *Paracricetodon* aff. *kavakderensis* ÜNAY, 1989



PLATE 2 *Mirabella hansoulii* n. sp. fig. **1**: M1 holotype; fig. **2**: M2, Bransatoglis cf. sjeni fig. **3**: M1/2, *Paracitodon* aff. *kavakderensis* fig. **4**: M1; fig. **5**: M2; fig. **6**: M2; fig. **7**: M3; fig. **8**: m1; fig. **9**: m2; fig. **10**: m3. All specimens figured as left. Underlined figures are inverse.

protocone is either connected with the paracone (6/10) or reaches the anterolabial border (4/10); in one of these four it is interrupted. The protoloph is as in M1. The posterior arm of the protocone is present in all the M2 and is developed as a short second mesoloph. The posterior paracone-spur is as in M1. A mesostyle is present in two specimens only. The entoloph is weak and very low and connects the posterior wall of the protocone to the anterior wall of the hypocone (Plate 2, figs. 5-6). The anterior arm of the hypocone is of medium length (6/10) or short (4/10). The sinus is as in M1, and is lingually open (5/8) or partly closed (3/8). The metaloph ends against either the anterior arm of the hypocone (5/8) or the hypocone itself (3/8). The posteroloph is as in M1. There is a small pit posterolabially of the paracone (3/10).

**M3:** The anteroloph is as in M2. The anterolophule is low and ends against the anterior wall of the protocone. The long and strong anterior branch of the protocone is connected to the paracone. The protoloph ends against the anterior part of the protocone in one M3, while in the second it connects to the anterior arm of the protocone. In both M3 the posterior arm of the protocone is present. In one specimen there is a double entoloph. The sinus is small. The hypocone is very small. The strong anterior arm of the hypocone is of medium length. The metaloph is strong and complete (1/2) or short and separated from the hypocone. The metacone is incorporated into the posteroloph.

**m1:** The anteroconid is low and ridge-like. In two specimens the anterior arm of the protoconid is absent, in the third it is present and ends against the anterolophid. An anterior metaconid-spur meets the anterolophid. The anterior metalophulid is absent (2/3), and when present it is weak and ends against the anterior arm of the protoconid. The posterior arm of the protoconid is either connected to the metaconid (2/3) or ends free (1/3). The ectolophid is very low. A weak entolophid

reaches the entoconid tip. The mesolophid (=anterior arm of hypoconid of Ünay 1989) is low and of medium length. The sinusid is shallow. The ectomesolophid is well developed (2/3) or weak (1/3). The transverse hypolophulid ends against the ectolophid just in front of the hypoconid. The long and strong posterior arm of the hypoconid reaches the base of the entoconid. The posterolophid starts low on the posterior wall of the hypoconid and runs all the way to the tip of the entoconid.

**m2:** The labial branch of the anterolophid is short but the lingual branch is long reaching the tip of the metaconid. The metalophulid ends against the anterior arm of the protoconid. The posterior arm of the protoconid is strong and reaches the base of the metaconid (3/4) or ends free (1/4). The ectolophid is low. The mesolophid is weak and short (3/4), or of medium length (1/4). The ectomesolophid is well developed. The lingual part of the hypolophulid is transverse as in the m1 but the labial part is anteriorly directed, ending against the ectolophid. In 1 specimen there is a connection between the hypolophulid and the mesolophid. The strong and long posterior arm of the hypoconid ends free. The posterolophid and the entolophid are as in the m1.

**m3:** The anterolophid is as in m2. The metalophulid is as in m2 in all specimens except in one in which is interrupted just before it reaches the anterior arm of the protoconid. The posterior arm of the protoconid ends free and it is either long (4/5) or short (1/5). The ectolophid is low and irregular. A weak entolophid reaches the entoconid tip. The mesolophid is absent in all specimens (4/5) except in one in which is weak and short. The ectomesolophid is developed as a bulge on the ectolophid. The entoconid is well developed. The posterolophid reaches the base of the entoconid (2/4). There is no posterior arm of the hypoconid.

**Discussion:** The material from *Kyprinos* appears to have an intermediate position

between *P. kavakderensis* and *P. kodjayar - mensis*. The anterior arm of the protocone is shorter, the position of the protoloph is more posterior and the anterior arm of the hypocone is shorter than in *P. kavakderensis*. This suggests that Kyprinos is younger than Kavakdere. The lower molars with their shorter posterior arm of the proto-hypoconid, support this assignment. The higher frequency of a well-developed posterior arm of the protocone in both the M1 and M2 in our material is very interesting, since this is considered a primitive character. The M3 from Kyprinos are wider than those of either *P. kavakderensis* or *P. kodjayarmensis*. The Paracricetodon species from Kyprinos is similar to *P. kavakderensis*. The reason to describe it as *P. aff. kavakderensis* is the much larger M3, the presence of the posterior arm of the protocone in the M1 and especially in the M2 and the absence of the posterior arm of the hypoconid in all the m3 available.

***Mirabella* DE BRUIJN *et al.*, 1987**

**Emended diagnosis:** Rather large muroids. The anterior outline of the anterocone of the M1 is rounded. Anterior slope of anterocone of the M1 with or without a narrow valley that reaches neither the tip nor the base of the anterocone. M1 wider over the protocone/paracone than over the hypocone/metacone. Protolophule of the M1 and M2 and hypolophid of the m1 and m2 constricted but usually complete in earliest species, strongly suppressed in later ones. The anterior arm of the protocone may be present in the M2.

**Remarks:** De Bruijn & Saraç (1992), assign *Mirabella* to the Paracricetodontinae based on the structural similarity of *M. cf. anatolica* from Kilçak 3B to *P. kodjayarmensis*. In addition, the assignment of *Mirabella* to Paracricetodontinae is strengthened by the obvious structural similarity of the Oligocene molars to *Paracricetodon*.

***Mirabella hansoulii* n. sp.** (Plate 2 figs. 1,2)

**Derivatio nominis:** In honor of Dr. Hans de Bruijn who first recognized the genus and suggested that our material belongs there. Here we use the diminutive of his first name in Greek (Hansoulis), expressing endearment.

**Diagnosis:** Low crowned and small sized *Mirabella*.

**Differential diagnosis:** *M. hansoulii* is smaller and structurally more primitive than all the known species of the genus. It differs from *M. anatolica* in the not divided anterocone, the better developed metalophule of the M1, M2, the less developed posterior paracone-spur in the M1, M2, the presence of the anterior arm of the protocone in the M2 and the wider sinus in the M1, M2.

**Type locality:** Kyprinos (Thrace, Northern Greece)

**Type level:** Late Oligocene

**Holotype:** M1 sin. KYP-191, M2 sin KYP-192, Plate 2, figs. 1, 2

The wear stage and the fit of the two figured cheek teeth suggest that they are representing one individual.

**Material and measurements:** 1 M1 (2.24x1.48), 2 M2 (1.60x1.53, 1.76x1.61)

**Description**

**M1:** Anterocone narrow and single with a rounded outline. The lingual branch of the anteroloph ends low against the anterior wall of the protocone. The labial branch ends free in the anterosinus. A ridge that connects the paracone with the anterocone closes the anterosinus. The protosinus is small and lingually closed by a short cingulum. The anterior arm of the protocone is strong and ends free in the anterosinus. The protoloph is transverse and ends against the posterior arm of the protocone. A weak posterior paracone-spur ends

free in the mesosinus. The entoloph is very strong and broad. The mesoloph is long and strong. The mesosinus is labially closed by a low cingulum. A very wide and strong protrusion of the entoloph divides the sinus into two parts; the anterior one inserts between the protocone and the paracone, while the posterior one is very small and shallow. The sinus is lingually open. The metalophule is anteriorly directed and ends against the anterior arm of the hypocone. The posteroloph is strong and ends before it reaches the metacone base. The posterosinus is deep but narrow.

**M2:** The very weak and low lingual branch of the anteroloph is slightly shorter than the labial one. The labial branch of the anteroloph ends against the paracone base restricting a wide and deep anterosinus. A ridge that divides the anterosinus into two parts, a small labial one and a larger lingual one, connects the paracone with the labial branch of the anteroloph in one of the two specimens, while the other one is interrupted. The protoloph is anteriorly directed and ends against the anterior part of the protocone in one or against the short but strong anterior arm of the protocone in the other. The posterior protoloph is interrupted. It consists of a ridge that originates from the paracone and a ridge that originates from the posterior arm of the protocone. A paracone spur is present and ends just before it reaches the tip of the mesoloph. The entoloph is strong and high. The strong and high mesoloph is long. A weak and low ridge labially closes the mesosinus. A bulge-like entomesoloph is present in one M2. In the same specimen a crest that originates from the posterior wall of the protocone is directed towards the hypocone without reaching it. The anterior part of the sinus inserts between the protocone and the paracone. The metalophule is transverse but interrupted in one M2. In the second one the

labial part of the metalophule is transverse while the lingual part bends to reach the anterior arm of the hypocone. Posteroloph and posterosinus are as in the M1.

**Discussion:** Although the number of specimens of *M. hansoulii* from Kyprinos is restricted, these teeth meet the requirements for the ancestry of the subsequent Miocene species. Extrapolating the evolutionary trends given by De Bruijn & Saraç (1992, p. 36), the ancestor of the known *Mirabella* species was supposed to be characterised by upper molars with a wide lingual sinus in the M1-2 and a wide anterolingual sinus in the M1. Furthermore, the protolophule and the metalophule were expected to be slightly suppressed. All the cusps in the M1-2 showed are not yet much laterally compressed. The labial outline of the M1 is expected to be straight with no angular indentation at the point where the posterior spur of the paracone meets the mesoloph.

Our material exhibits all the above characters. Additionally, the anterocone shows no sign of a valley on its anterior wall. No sign of a labial spur of the anterolophule is present. The posterior paracone-spur is weak and low and is not placed at the labial border. In the M2, the anterior arm of the protocone is present and forms part of the proto-paracone connection. Furthermore, the protocones in the M1-2 show a posterior protrusion, which gives an almost crescent shape to this cusp.

The discovery of the ancestor of the later highly specialized cricetid is very interesting. The short anterior branch of the protocone, the posteriorly directed protolophule and the well-developed true mesoloph shows that our species is more derived than all *Paracricetodon* species.



Table 3 Material and measurements (in mm) of *Kerosinia* aff. *variabilis* ÜNAY, 1989

	length		n	width	
	range	mean		mean	range
M1	1.52-1.72	1.63	6	1.17	1.11-1.20
M2	1.25-1.44	1.33	7	1.33	1.25-1.42
M3	1.10-1.23	1.16	7	1.10	0.98-1.17
m1	1.15-1.39	1.30	6	0.85	0.75-0.90
m2	1.26-1.48	1.35	10	1.14	1.10-1.21
m3	0.99-1.28	1.24	6	1.10	0.87-1.14

Adelomyarionini ÜNAY, 1989

*Kerosinia* ÜNAY, 1989

*Kerosinia* aff. *variabilis* ÜNAY, 1989 (Plate 1, figs. 10-15)

**Material and measurements:** see Table 3.

### Description

**M1:** The anterocone can be either narrow or pointed or wide and blade-shaped. In two out of six specimens the anterocone is connected to the paracone by a posterior anterocone-spur. In one of these two M1, this ridge is close to the buccal side, in the other it ends free. The very short anterior arm of the protocone ends free in two specimens. In one of these it is directed towards the anterocone. The anterosinus is closed either by a cusp-like ridge (2/6) or by a ridge that runs from the anterocone to the base of the paracone. The lingual branch of the anteroloph is connected to the anterior arm of the protocone in all but one specimen. The protoloph is anteriorly directed and ends against the anterior arm of the protocone in five specimens, while in one it is transverse and interrupted. The entoloph ends free (3/6) or against the posterolabial corner of the protocone. The mesoloph is short (3/6) or absent. A ridge that bears a mesostyle labially closes the mesosinus. The deep sinus is lingually closed either by a ridge that descends from the anterior wall of the hypocone (3/5) or by the endostyle (2/5). The metalophule ends against the anterior

arm of the hypocone; it is either anteriorly directed (3/6) or transverse (3). In one of these it is interrupted. The posteroloph is always connected to the base of the metacone.

**M2:** The long labial branch of the anteroloph is always well developed. The lingual branch of the anteroloph is much shorter. It is faint (5/6), reaching the anterolingual border only in one of these specimens. It is strong and reaches the hypocone in one M2. The protocone is slightly anteriorly directed and confluent with the anterior arm of the protocone (6/7) or has a more transverse direction and is separated from the entoloph by a notch (1/7). The entoloph is connected to the protocone at its anterior arm (3/7) (in two of these it barely reaches it), at its posterolabial part (1/7) or it ends free (3/7). The mesoloph is absent (4/7) or short (3/7). In one out of seven specimens a second entoloph connects the posterior arm of the protocone with the hypocone. The posterior paracone-spur, which has a labial position, runs all the way from the paracone to the metacone tip (2/7). A short anterior metacone-spur is present (2/7). A short spur which originates at mid-height of the posterior wall of the paracone is present (2/7). In one of these two specimens a mesostyle is present. A mesostyle is also present in one other specimen that has a second cusplule at its posterolingual side in contact with the metacone. A low ridge connects the base of the paracone with the base of the metacone

(1/7). The metalophule is parallel to the protoloph and confluent with the anterior arm of the hypocone. A very short cusp-like ridge originates from the metalophule and runs parallel to the entoloph (1/7). The posteroloph originates at the mid-height of the posterior wall of the hypocone in 1/7.

**M3:** The occlusal surface of the M3 is triangular to rounded. The labial branch of the anteroloph is well developed, the lingual branch reaches the hypocone in 3 out of 7 specimens. The anterolophule is absent in one specimen. The protocone has a centro-lingual position (3/7). The protoloph is either complete and ends against the anterior part of the protocone (2/7) or absent (1/7). It is fused to the anterior arm of the protocone (2/7) or separated from it by a notch (2/7). The entoloph is either absent (2/7) or developed as the posterior arm of the protocone. The metaloph is absent (2/7), a semicircular ridge (3/7) or well developed and straight (2/7). The posteroloph is interrupted.

**m1:** The anteroconid is entirely incorporated in the anterolophid. A true anterolophulid is present in some specimens (3/6). The anterior metalophid is absent. The metaconid and the protoconid are connected via the posterior arm of the protoconid. The anterosinusid is lingually closed by the anterolophid (3/4). In one out of five specimens a posteriorly directed spur that originates from the anteroconid reaches the base of the metaconid. The well-developed ectolophid is either straight (4/6) or slightly S-shaped (2/6). It has one end at the posterior wall of the protoconid and the other either at the anterior wall of the hypoconid (5/6) or against the labial part of the hypolophulid (1/6). The entolophid is strong and complete. The mesoconid is almost always absent (5/6). The mesolophid is absent. The sinusid has its posterior part closed by a cingulum. The hypolophulid is always complete (6/6). It either has (a) a transverse direction (4/6) and ends against the anterior arm of the hypoconid (2/4) or the

ectolophid (2/4) or (b) it is posteriorly directed (2/6) and ends against the hypoconid (1/2). The posterolophid reaches the entoconid in two out of six specimens only. The common situation is the short and wide posterolophid that does not reach either the lingual border or the entoconid (4/6). A hypoconulid is present in two specimens.

**m2:** The anterolophid of the m2 is very strong. The anterolophulid is either extremely low and weak or lacking completely in six m2. In the others it connects the anterolophid with the anterior arm of the protoconid. The anteroconid is present. The metalophulid is either directed towards the anterior arm of the protoconid (7/10), connects to the posterior arm of the protoconid (2/10) or ends against the protoconid (1/10). The posterior arm of the protoconid may be strong and free ending (6/10), very short but strong (1/10), confluent with the ectolophid (1/10) or connecting to the metalophid (2/10). The ectolophid is absent in one specimen. If present (9/10) ends low against the posterior wall of the posterior arm of the protoconid. The mesolophid is short and weak. The hypolophulid is: (a) missing (2/10); (b) interrupted before reaching the anterior arm of the hypoconid (5/10), in two of these a spur that might reach the posterolophid is also present; (c) confluent with the anterior arm of the hypoconid (2/10); in one of these, a spur that originates from the hypolophulid is directed towards the lingual edge of the posterior arm of the protoconid; (d) connected to the posterolophid and the anterior arm of the hypoconid ends free in the mesosinusid. Therefore, we agree with the suggestion of Ünay (1989, p. 53) that the labial part of the hypolophulid is the homologue of the anterior arm of the hypoconid. A weak ectomesolophid may be present. The posterolophid is connected to the entoconid in all but one specimen. The entolophid is developed as a long cingulum or as a low continuous ridge from the tip of the metaconid to the tip of the entoconid. The sinusid is posteriorly directed and closed labially by a

low cingulum (2/10), by the entostyloid ridge (1/10) or by a ridge that originates from the anterolabial wall of the hypoconid (7/10).

**m3:** The anterolophid of the m3 is as in the m2. The anterolophid is either absent (2/6), formed by the anterior arm of the protoconid (1/6) or a weak ridge that connects the anterior wall of the protoconid to the anterolophid (3/6). The metalophid is always connected to the posterior arm of the protoconid. The ectolophid may be absent (2/6), if present ends against the posterior wall of the posterior arm of the protoconid (4/6). In one specimen, the mesolophid is present. It is weak and short and a second mesolophid (the labial part of the hypolophid?) is present also. The hypolophid and the posterior arm of the hypoconid are absent. The posterolophid continues along the lingual border to form an entolophid. The sinusid is closed by a cingulum along the labial border.

**Discussion:** *Kerosinia* aff. *variabilis* from Kyprinos shows interesting differences from the material of *Kerosinia variabilis* described from the type locality. The anterior arm of the protocone forms the lingual part of the protoloph in all the M1. In *K. variabilis* from the type locality this occurs in only some of the specimens. According to Ünay (1989) this condition is also present in *Adelomyarion vireti*. It is possible that *Kerosinia* from Kyprinos is more primitive than the one from Kocayarma. Other characters in the upper and the lower molars are also indicative of a more primitive stage of evolution. Although Ünay (1989) gives an excellent description of the material from the type locality, she gives no information about the morphology of the material from Kavakdere, besides that 'there appears to be no difference in dental morphology' and a slight decrease in size. The more primitive morphology and smaller size of our material, compared to the material from the type locality, suggests an older age.

Pseudocricetodontini ENGESSER, 1987

*Pseudocricetodon* THALER, 1969

*Pseudocricetodon moguntiacus* cf. *orientalis* ÜNAY, 1989 (Plate 1, figs. 8 and 9)

**Material and measurements:** 2 M1 (1.29x0.94, 1.53x1.11); 1 M2 (1.00x0.91)

**Remarks:** The material of *P. moguntiacus* from Kyprinos is similar to *P. moguntiacus orientalis* from Kocayarma (Ünay 1989). Instead of a second connection between the anteroloph and the paracone, a faint crest that originates from the protoloph ends against a small cusplule located in the middle of the anterosinus. The long anterior arm of the protocone ends against the anterocone, while in the material from the type locality this occurs in 22% of the specimens only. This might imply a slightly older age for the Kyprinos material (Wang *et al.* 1994, Freudenthal *et al.* 1994). The protoloph is transverse and ends against the posterior arm of the protocone, a morphotype not seen in the extensive collection of Kocayarma where it usually connects to the entoloph. Although a suggestion has been made that *P. moguntiacus orientalis* should be transferred to *Lignitella* and raised to species level (Freudenthal *et al.* 1994), not being able to add anything on the subject, we follow Ünay (1989) in her superb work on the Oligocene material from Turkey.

Gliridae THOMAS, 1897

*Bransatoglis* HUGUENEY, 1967

*Bransatoglis sjeni* ÜNAY, 1989 (Plate 2, fig. 3)

**Material and measurements:** 1 M1/M2 (1.34 x 1.47)

**Remarks:** The specimen from Kyprinos falls within the morphological variation and the size range of *Bransatoglis sjeni* from Kocayarma. The occlusal surface is strongly concave. The total number of ridges is eight. The anteroloph is not connected to either the protocone or the paracone. An extra ridge is present between the anteroloph and the pro-

toloph and also between the posterior centroloph and the metaloph. The posteroloph is connected to the protocone.

## CONCLUSION

The fauna of Kyprinos is interesting but contains few specimens. The marsupials and the insectivores can not testify to anything else but their presence. The cricetids, however, give at least 'food for thought'. The presence of the genus *Mirabella* is considered to be of particular interest because this is the first occurrence of a hitherto Miocene genus in Oligocene sediments. It is remarkable that in the same geological formation and in a distance of less than 100 km an excellent and detailed study of a number of sites has been done (Ünay, 1989) without finding a trace of *Mirabella*. The small number of specimens can explain the absence of known faunal elements (e.g. *Trakymys*) in the Kyprinos assemblage, in contrast to Ünay's large samples. However, the absence of *Mirabella* from Ünay's samples is intriguing.

The age of the Kyprinos fauna seems to be Late Oligocene. The stage of evolution of *P. aff. kavakderensis* versus *P. kavakderensis* and *P. kodjayarmensis*, shows that the fossiliferous level of Kyprinos is intermediate between Kavakdere and Kocayarma. This conclusion is supported by the material of *Kerosinia aff. variabilis*, which, although highly variable, shows slight but consistent primitive characters compared to the material from Kocayarma. Since the age of Kyprinos has been demonstrated to be intermediate between Kavakdere and Kocayarma, the absence of *Mirabella* from the latter locality is interesting. Since the Kocayarma collection is large, we suspect that its absence there is due to differences in biotopes. This can also explain the absence, in Kyprinos, of Eomyidae. All interested parties wish for an extension of the present Kyprinos material. Especially a larger sample of *Mirabella* is needed to see the variables of this early species named after a dear friend.

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