Fol. Hist.-nat. Mus. Matr., 17: 107–130, 1992

Subfossil Mesocricetus population from the Toros Mountains (Turkey) (Mammalia)

HÍR János

ABSTRACT: The results of the metrical and morphological investigation on a Holocene Mesocricetus molar series is given. The material was collected from a small cave in the Bolkar Dag, 3000 m h. above sea level. The majority of the molars refers to the Mesocricetus auratus WATERHOUSE, 1839 species. The systematic position of few small sized molars is uncertain: Mesocricetus sp. ?

INTRODUCTION

In the summer of 1989 I could take a study-tour to Turkey as scholarshipper. In the course of it I took a trip in the alpine region of the Bolkar Dag as a member of a Turkish-French speleological expedition. Not far from the 2 nd campsite of the expedition I collected a subfossil vertebrate fauna which is rich in species and in individuals as well:

Rana sp.	1
Ophidia indet.	1
Lacerta sp.	1
Aves indet.	2
Chiroptera indet.	2
Erinaceus sp.	1
Crocidura leucodon (HERMANN 1780)	2
Lepus sp.	2
Citellus citellus (LINNAEUS 1766)	11
Dryomys laniger FELTEN et STORCH 1968	8
Allactaga euphratica THOMAS 1881	9
Mus sp.	1
Apodemus (karstomys) mystacinus DANFORD et ALSTON 1877	1
Apodemus sylvaticus-tauricus-flavicollis gr.	72
Spalax nehringi SATUNIN 1898	33
Cricetulus migratorius (PALLAS 1773)	45
Mesocricetus auratus WATERHOUSE 1839	101
Mesocricetus sp. ?	4
Arvicola terrestris persicus	1
Pitymys majori (THOMAS 1906)	4
Microtus (Chionomys) nivalis (MARTINS 1842)	165
Microtus arvalis-socialis-guentheri gr.	145
sum total	612

The preliminary valuation of the fauna was published by HÍR, J. (1992).

The locality is situated in the Northern side of the Bolkar Mountains not far from Darboğaz and Madenköy villages (Fig. 1,2). The frequented campsite and "picnic site" Meydan springmedow is approachable on dirty roads from the two settlement. There is a pathway from the Meydan to the Kara Göl and Çini Göl lakes. Both of them originated in glacial cirques. On the left side of the pathway from the Meydan to the Kara Göl a cave is visible on the border of the Permian black limestone and Eocene nummulitic limestone-conglomerate. The entrance of the cave is situated about 3000 m above the sea level (height:1,6 m, widt: 1,5 m, length: 2,5 m).

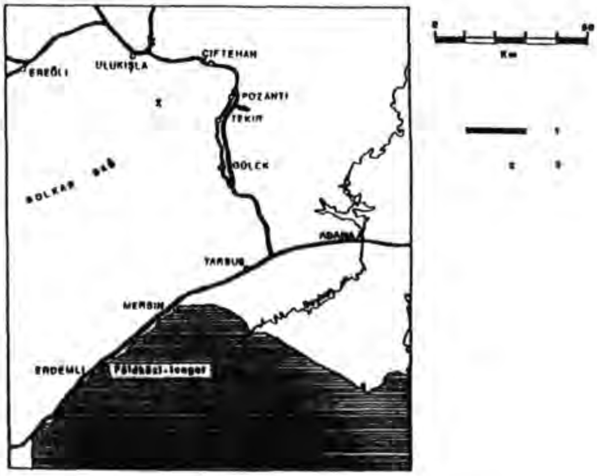

Fig. 1. Gengraphical position of the locality
1. main roads 2. situation of the locality (Földközi-tenger = Mediterranean Sea)

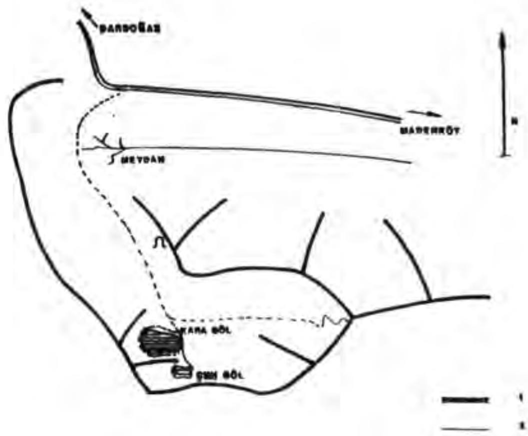

Fig. 2. Nonscaled sketch of the locality's surroundings.
1. ridge line of the mountains 2. river 3. dirty road 4. pathway 5. the locality

The vertebrate bone material was collected from the surface and from the uppermost 10 cm of the soil in the cave. The 40 kg soil sample was washed in sieve at the Meydan spring. The sorting of the washed material was effected in the field. The elaboration began after returning home.

The aim of this article is to give the results of the metrical and morphological investigation of the numerous Mesocricetus material from the fauna.

THE MATERIAL

4 fragmentary crania and 9 maxillae with complette toothrowes, 49 max. fragm. with incomplette toothrowes, 51 M 1, 42 M 2, 39 M 3. 6 mandibulae with complette toothrowes, 23 mand. fr. with incomplette toothrowes, 66 m 1, 76 m 2, 50 m 3.

METHODS

The elaboration was effected by an MBS-9 -type stereomicroscope. The measurements were taken using the ocularmicromether of it to an accuracy of 0.01 mm. The following dimensions were measured: (Fig. (3, 5, 7, 9, 11, 13) (After PRADEL, A. 1981).

L - length of the tooth crown

Wa - anterior width of the crown at the protocene-paracone height in the upper teeth and, correspondly at the protoconid-paraconid height in the lower teeth. At the M2, M3, m3 molars the Wa=W maximal
Wp - posterior width at the hypocone-metacone height in the upper teeth and at the hypoconid-metaconid height in the lower teeth. At the M1, m1 molars the Wp=W maximal

L M 1-3 - length of upper row of molars

L m 1-3 - length of lower row of molars.

The measurements obtained were used to trace L/W scatter diagrams (Fig. 4, 6, 8, 10, 12, 14) and worked aut by the basic statistical parameters:

N - sample size

min.-max. - observation range

X - arithmetic mean

SD - standard deviation

The morphological investigation based on the nomenclature of FAHLBUSCH, V. (1964) and MEIN, P. - FREUDENTHAL, M. (1971). The separation of the different morphotypes is after the presence (+) or absence (-) of certain elements of the tooth crown. The extremely worned teeth are not counted into the morphological analysis.

SUBSCRIPTION

M 1. (Fig.3) The molar is 4 rooted. The anterocone is always well divided and connected with the protocene. On the labial and on the lingual edge of the tooth crown there are strongly developed ridges between the anterocone and the protocene - paracone cone pairs. By the side of the anterocene there are 3 accessory conulets (Fig. 3.): the preanterocone cingulum (PAC) on the anterior side, the parastyle (PAST) on the postero-lingual side, the protostyle (PRST) on the postero-labial side. The frequency and the combination of these elements are visible on the distribution of the morphotypes:

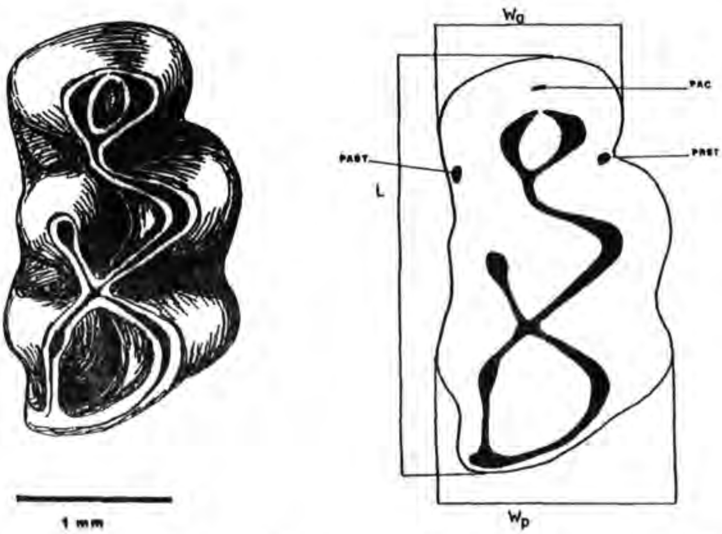

Fig. 3. M. auratus M 1 molar and the investigated measurement and morphological elements of it.

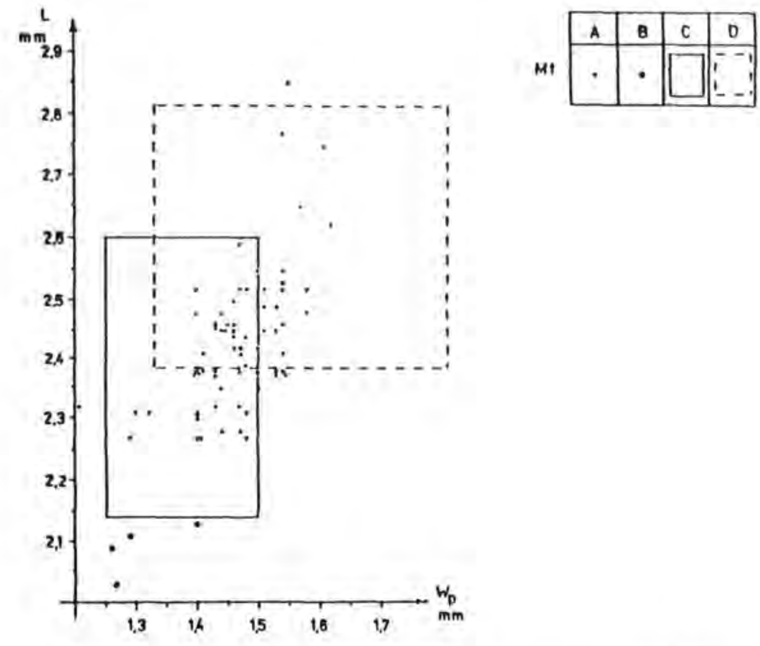

Fig. 4. Scatter diagram of Mesocricetus M 1 molars. A. M. auratus, Meydan B. M. sp., Meydan C. M. auratus, PRADEL A. (1989) D. M. newtoni, POPOV V. (1989)

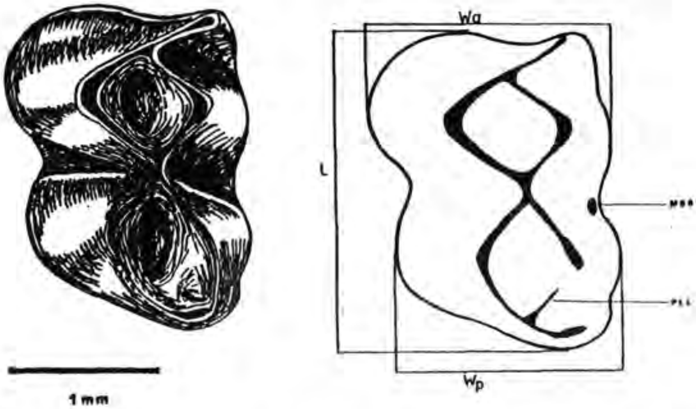

Fig. 5. M. auratus M 2 molar and the investigated measurement and morphological elements of it.

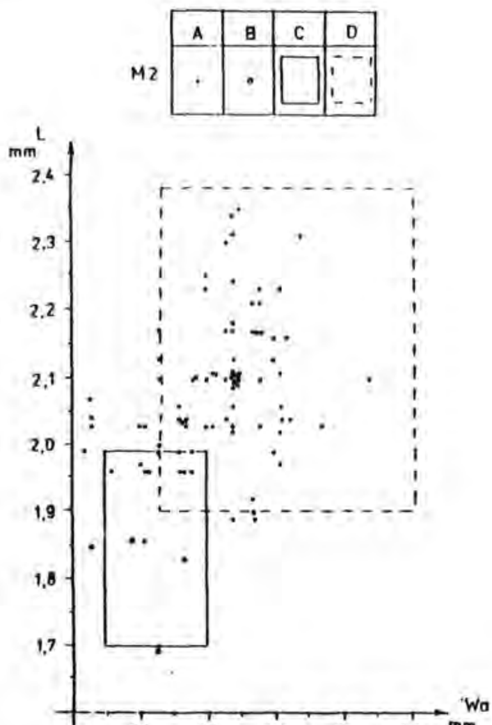

Fig. 6. Scatter diagram of Mesocricetus M 2 molars. A. M. auratus, Meydan B. M. sp. ?, Meydan C. M. auratus, PRADEL A. (1989) D. M. newtoni, POPOV V. (1989)

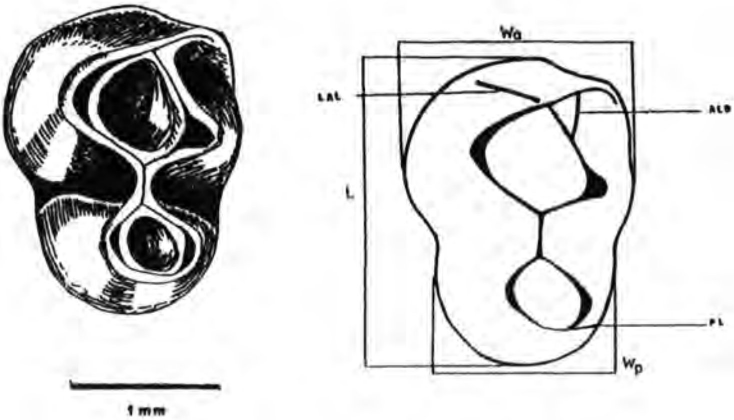

Fig. 7. M. auratus M 3 molar and the investigated measurements and morphological elements of it.

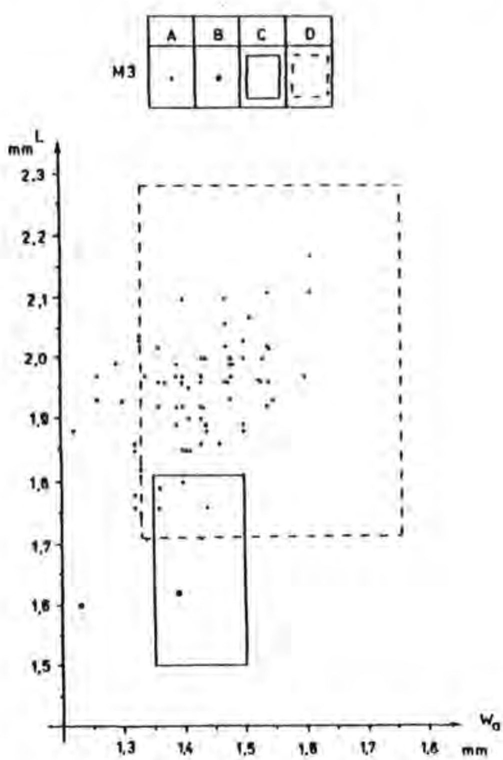

Fig. 8. Scatter diagram of Mesocricetus M 3 molars. A. M. auratus, Meydan B. M. sp. ?, Meydan C. M. auratus, PRADEL A. (1989) D. M. newtoni, POPOV V. (1989)

type		no.	%
1	no accessory elements	48	70
2	PAC +	14	21
3	PAC +, PAST +	2	3
4	PRST +	1	1,5
5	PRST +, PAST +	1	1,5
6	PAST +	2	3,0
		68	100,0

The posterior ridges of the proto- and paracones form an X-shaped pattern with the anterior ridges of the hypo- and metacones. The posteroloph connected with the posterior ridge of the metacone and lingually formes a small spur.

On the scatter diagram (Fig. 4) we can see 4 small sized molars different from the main mass of the Meydan material.

M 2 (Fig. 5). The molar is 4 rooted. On the anterolabial side there is a well developed cingulum separated by a ditch from the paracone. The 4 main cusps form an X in the center of the tooth crown. The protocone-paracone and the metacone hypocone pairs are divided by a ridge of the lingual and labial margin. Between the paracone and the metacone in the sinus there is a rare conulet: the mesostyle (MSST). Other accessory ridge is the Posterolophule (PLL.) between the posteroloph and the metacone. The distribution of the morphotypes is the next:

type		no.	%
1	no accessory elements	61	80
2	PLL +	14	19
3	PLL +, MSST +	1	1
		76	100

On the scater diagram (Fig. 6) there is only 1 tooth which is undisputably the member of the small sized group and there are 4 problematic molars on the lower margin of the main mass. One of them is from the max. fr. no. 15. where the M 1 is small sized too. But in the max. fr. no. 51. there are small M 2 and normal measured M 3 together.

M 3 (Fig. 7.). The molar is 3 rooted. Among the 4 main cusps of the tooth crown the hypocone and the metacone is reduced. The accessory elements of the tooth are the lingual anterocingulum (LAL), the extra ridge between the paracone and the anterobuccal cingulum (ALD), and the reduced posteroloph (PL). The morphotypes are distributed as follows:

type		no.	%
2	LAL +, ALD-, PL+	2	3
3	LAL -, ALD-, PL+	35	51
4	LAL -, ALD-, PL-	29	42
5	LAL -, ALD-, PL-	2	3
6	LAL -, ALD+, PL+	1	1
		69	100

On the scatter diagram we can recognize 2 small sized molars.

m 1 (Fig. 9.). The molar is 2 rooted. The anteroconid is divided in two by a depresion which is deep on the unworn teeth. Before the anteroconid, on the oral surface of the molar there is an accessory conulet, the preanteroconid cingulum (PAC). The ridge coming down from the anteroconid connected in reversed Y-shape with the anterior arms of the protoconid and metaconid. On the majority of the teeth between the protoconid and the endoconid there is the mesolophid (ML). This is reduced and fuses with the metaconid. On the lingual edge of the crown between the metaconid and the endoconid there is an accessoric conulet: the mesostylid (MSSTD).

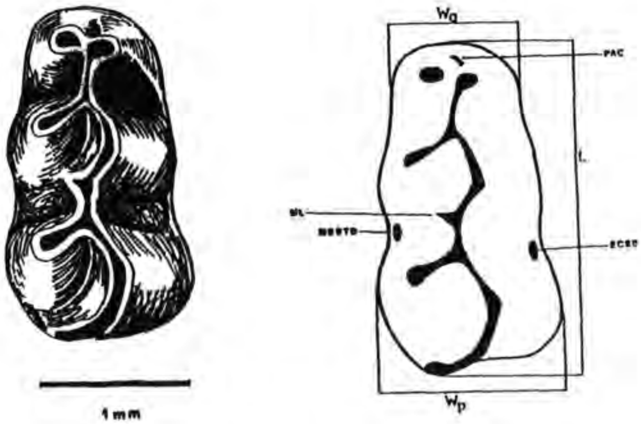

Fig. 9. M. auratus m 1 molar and the investigated measurements and morphological elements of it.

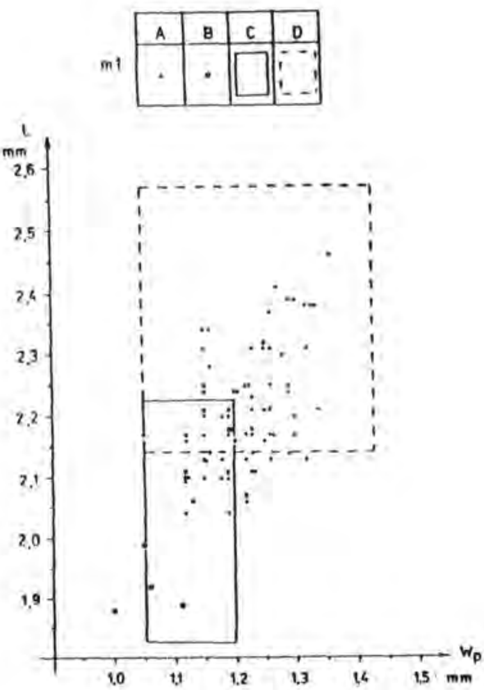

Fig. 10. Scatter diagram of Mesocricetus m 1 molars. A. M. auratus, Meydan B. M. sp. ?, Meydan C. M. auratus, PRADEL A. (1989) D. M. newtoni, POPOV V. (1989)

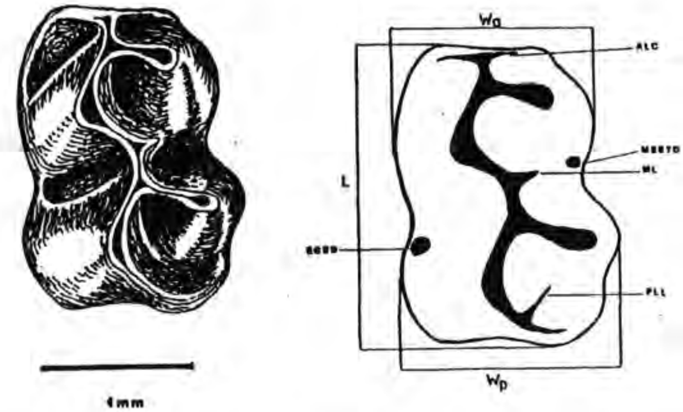

Fig. 11. M. auratus m 2 molar and the investigated measurements and morphological elements of it.

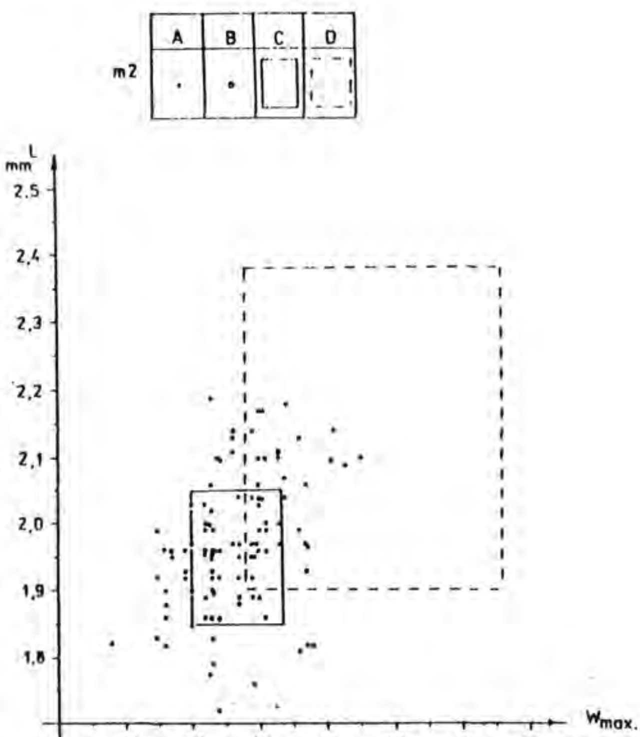

Fig. 12. Scatter diagram of Mesocricetus m 2 molars. A. M. auratus, Meydan B. M. sp. ?, Meydan (missing) C. M. auratus, PRADEL A. (1989) D. M.newtoni, POPOV V. (1989)

Another extra conulet is the ectostylide (ECSD) on the labial margin -between the protoconid and the hypoconid. The posterior ridge of the hypoconid passes into the well developed posterolophid. The distribution of the morphotypes is given in the next:

type		no.	%
Aa	PAC+, ML+, ECSD+, MSSTD+	1	1.3
Ad	PAC+, ML+, ECSD-, MSSTD-	2	2.6
Ba	PAC+, ML-, ECSD+, MSSTD+	1	1.3
Ca	PAC-, ML+, ECSD+, MSSTD+	1	1.3
Cb	PAC-, ML+, ECSD+, MSSTD-	1	1.3
Cg	PAC-, ML+, ECSD-, MSSTD+	1	1.3
Cd	PAC-, ML+, ECSD-, MSSTD-	41	55.4
Da	PAC-, ML-, ECSD+, MSSTD+	3	4.0
Db	PAC-, ML-, ECSD+, MSSTD-	4	5.5
Dd	PAC-, ML-, ECSD-, MSSTD-	19	26.0
		74	100.0

On the scatter diagram (Fig.10.) we can see 4 small sized molars distinct from the main mass of the teeth.

m 2 (Fig. 11.). The molar is 2 rooted. The distinactly marked anterior cingulum goes off from the union of the anterior ridges from the proto- and metaconids. The anterolingual cingulum (ALC) before the metaconid is presented on the majority of the molars. The mesolophid is better developed than the ML of the m 1 teeth. Mesostylid does not exist.

The ectostylide (ECSD) is rare accessory conulet. The posterolophulid (PLL) goes off from the posterolophid to the endoconid. It is presented only on 1 molar. The distribution of the morphotypes is the next:

type		no.	%
Ab	ALC+, ML+, ECSD+	5	6
Ad	ALC+, ML+, ECSD-	69	80
Ad	ALC+, ML+, ECSD-, PLL+	1	1
Bd	ALC-, ML+, ECSD-	1	1
Cd	ALC+, ML-, ECSD-	9	10
Dd	ALC-, ML-, ECSD-	1	1
		86	99

On the scatter diagram (Fig. 12.) there is not any distinctly small sized individual.

m 3 (Fig. 13.). The anterior cingulum is distinct on the front wall of the tooth. The lingual branch of it (anterolingual cingulum = ALC) is well developed. At 5 individuals the anterocingulum is 3 divided because the anterior branches of the protocene and metacone do not fuse in one point (Fig. 13.). The mesolophid is advanced and frequent. At one specimen the ML is forked like a lying Y. The anterolabial extra branch of the hypoconid (HCD-ECSD) is rare. The morphotypes are distributed as follows.

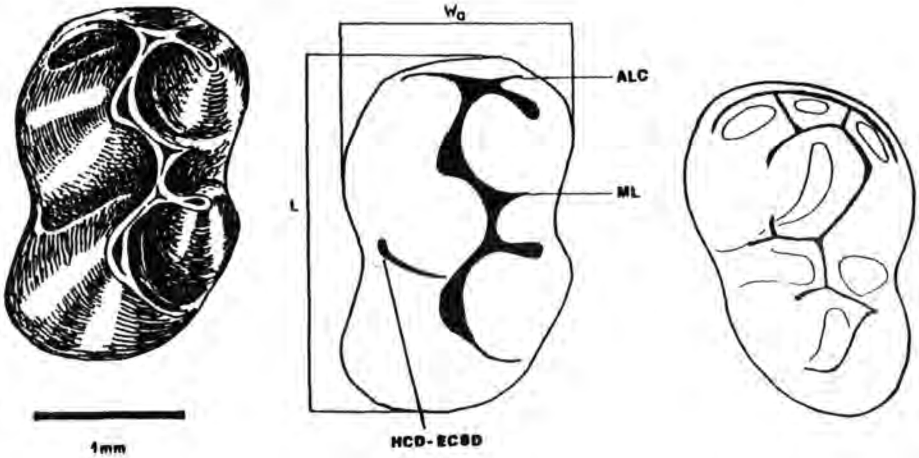

Fig. 13. M. auratus m 3 molar and the investigated measurements and morphological elements of it. On the 3rd sketch the divided anterocingulum and the forked mesolophid is figured.

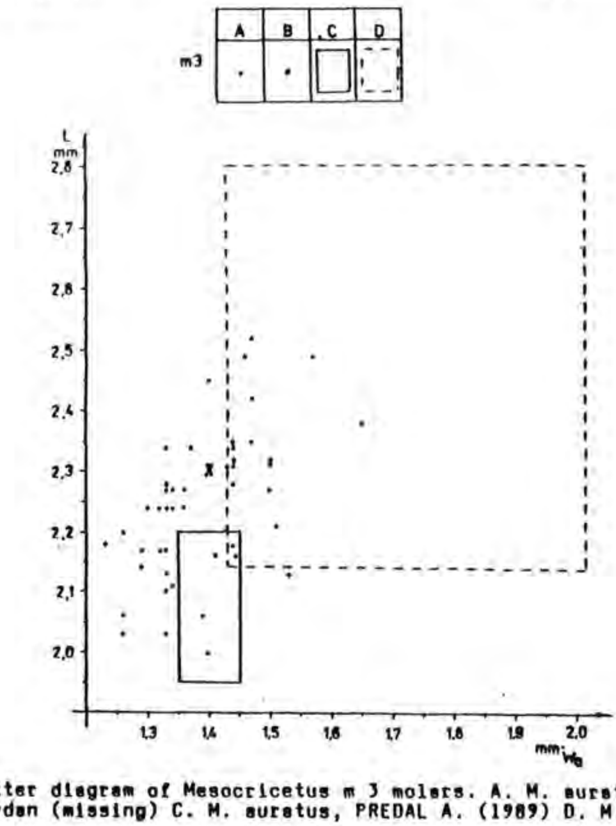

Fig. 14. Scatter diagram of Mesocricetus m 3 molars. A. M. auratus, Meydan B. M. sp. ?, Meydan (missing) C. M. auratus, PREDAL A. (1989) D. M. newtoni, POPOV V. (1989)

type		no.	%
A	ALC+, ML+	57	83
B	ALC+, ML+, HCD-ECSD+	3	4
C	AC 3 divided, ML+	5	7
D	ALC+, ML forked	1	1
E	ALC-, ML+	3	4
		69	99

The mass on the scatter diagram (Fig. 14.) is homogeneus. No small sized molars.

MEASUREMENTS MESOCRICETUS AURATUS

	M 1			M 2		
	L	Wa	Wp	L	Wa	Wp
N	68	68	68	87	87	87
min.-max.	2.26-2.85	1.01-1.34	1.20-1.62	1.83-2.35	1.32-1.74	0.80-1.54
X	2.36	1.17	1.49	2.07	1.53	1.34
SD	0.1295	0.0853	0.0816	0.1115	0.0865	0.0919

	M 3		
	L	Wa	Wp
N	77	77	67
min.-max.	1.71-2.17	1.22-1.61	1.01-1.26
X	1.94	1.39	1.12
SD	0.0932	0.0922	0.0665

	m 1			m 2		
	L	Wa	Wp	L	Wa	Wp
N	77	77	77	101	101	100
min.-max.	2.04-2.46	0.63-0.98	1.05-1.36	1.72-2.18	1.18-1.50	1.18-1.53
X	2.20	0.80	1.20	1.94	1.30	1.33
SD	0.0855	0.0778	0.0668	0.1045	0.0677	0.0715

	m 3	
	L	Wa
N	71	71
min.-max.	2.00-2.52	1.23-1.65
X	2.16	1.34
SD	0.1522	1.3455

Mesocricetus sp. ?

	M 1-3	M 1			M 2		
	L	L	Wa	Wp	L	Wa	Wp
N	1	4	4	4	2	2	2
min.-max.	5.9	2.03-2.13	0.99-1.12	1.20-1.4	1.69-1.86	1.39-1.43	1.26-1.2
X	-	2.09	1.40	1.30	1.77	1.41	1.27

	L	Wa	Wp
N	4	4	4
min.-max.	1.88-1.99	0.56-0.66	1.0-1.11
X	1.92	0.60	1.05

The dates are listed in the appendix.

APPENDIX - dates in mm

1. Mesocricetus auratus scull fragments

no.		1s	1d	2s	2d	3s	3d	4d	5s	5d	6s	7s	7d	16s	16d
measurements															
L M 1-3		6.40	6.25	-	6.30	-	6.20	6.05	6.10	-	6.20	6.40	-	-	-
	L	2.46	2.48	2.52	2.46	-	2.42	2.27	2.38	-	2.41	2.55	-	-	-
M 1	Wa	1.30	1.29	1.20	1.19	-	1.22	1.13	1.15	-	1.34	1.19	-	-	-
	Wp	1.43	1.58	1.40	1.54	-	1.47	1.48	1.40	-	1.57	1.54	-	-	-
morph.		-	-	1	1	-	1	1	1	-	1	1	-	-	-
	L	2.03	1.92	2.10	2.06	2.11	2.11	2.03	2.03	1.99	2.10	2.23	2.23	2.17	2.17
M 2	Wa	1.58	1.57	1.54	1.61	1.55	1.51	1.67	1.51	1.48	1.54	1.61	1.50	1.54	1.53
	Wp	1.39	1.33	1.40	1.51	1.43	1.43	1.54	1.40	1.33	1.44	1.50	1.44	1.40	1.39
morph.		-	-	1	1	1	1	1	1	1	1	1	1	2	1
	L	1.96	1.96	-	1.97	-	1.89	1.93	1.88	-	2.06	1.93	-	-	-
M 3	Wa	1.53	1.53	-	1.48	-	1.44	1.55	1.44	-	1.47	1.48	-	-	-
	Wp	1.05	1.05	-	1.12	-	1.19	1.16	1.12	-	1.09	1.12	-	-	-
morph.		-	-	-	3	-	3	3	3	-	3	4	-	-	-

2. Maxillae and maxillar fragments

no.	8.	10.	11.	12.	13.	15.	17.	18.	19.	20.	21.	22s	22d	23.	24.	25.
L M 1-3	6.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L	2.38	-	-	-	-	-	-	2.27	-	-	-	-	-	-	2.45	-
M 1 Wa	1.13	-	-	-	-	-	-	1.15	-	-	-	-	-	-	1.19	-
Wp	1.43	-	-	-	-	-	-	1.40	-	-	-	-	-	-	1.51	-
morph.	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
L	1.96	2.04	2.25	1.99	2.17	2.11	2.06	-	2.17	-	-	-	2.24	2.06	2.21	2.10
M 2 Wa	1.48	1.62	1.50	1.60	1.58	1.61	1.54	-	1.43	-	-	-	1.54	1.46	1.57	1.48
Wp	1.40	1.47	1.37	1.33	1.41	1.47	1.33	-	1.33	-	-	-	1.36	1.29	1.43	1.43
morph.	1	1	2	-	1	-	2	-	2	-	-	-	1	2	1	1
L	1.89	2.00	1.96	1.92	2.10	1.89	-	-	1.96	2.11	1.97	1.93	1.96	1.97	-	1.96
M 3 Wa	1.39	1.50	1.47	1.54	1.47	1.50	-	-	1.34	1.61	1.34	1.26	1.43	1.40	-	1.54
Wp	1.11	1.09	1.06	1.12	1.18	1.26	-	-	1.12	1.23	1.12	1.02	1.09	1.08	-	1.19
morph.	3	4	4	-	3	-	-	-	4	-	4	2	3	4	-	4

26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42

	26.	27.	28.	29.	30.	31.	32.	33.	34.	35.	36.	37.	38.	39.	40.	41.	42.
L M 1-3									-	-	-	-	6.00	-	-	-	-
L	-	-	2.85	-	2.38	-	-	-	-	-	-	2.65	2.27	-	2.41	2.52	-
M 1 Wa	-	-	1.29	-	1.22	-	-	-	-	-	-	1.30	1.08	-	1.19	1.19	-
Wp	-	-	1.55	-	1.53	-	-	-	-	-	-	1.57	1.40	-	1.54	1.48	-
morph.	-	-	2	-	1	-	-	-	-	-	-	2	2	-	1	2	-
L	1.89	2.02	-	-	-	-	-	-	-	2.10	2.10	2.31	2.03	1.97	2.16	-	2.10
M 2 Wa	1.54	1.61	-	-	-	-	-	-	-	1.54	1.74	1.54	1.47	1.61	1.62	-	1.48
Wp	1.33	1.41	-	-	-	-	-	-	-	1.40	1.54	1.51	1.36	1.47	1.47	-	1.33
morph.	-	1	-	-	-	-	-	-	-	1	1	2	1	-	1	-	1
L	2.03	-	-	1.96	-	2.03	2.17	2.04	1.79	-	-	-	1.86	1.86	-	-	1.90
M 3 Wa	1.50	-	-	1.40	-	1.33	1.61	1.33	1.36	-	-	-	1.46	1.43	-	-	1.43
Wp	1.09	-	-	1.25	-	1.08	-	1.20	1.02	-	-	-	1.11	1.13	-	-	1.15
morph.	3	-	-	3	-	3	-	3	4	-	-	-	3	-	-	-	6

	43.	44.	45.	46.	47.	48.	49.	51.	52.	53.
L	2.17	2.03	2.00	2.13	1.96	2.34	1.96	1.83	1.96	2.11
M 2 Wa	1.57	1.54	1.43	1.60	1.41	1.54	1.36	1.47	1.41	1.54
Wp	1.47	1.39	1.39	1.43	1.36	1.51	1.27	1.36	1.27	1.47
morph.	1	1	1	1	-	1	1	-	1	1
L	2.00	-	2.10	2.00	1.99	1.97	1.92	1.92	-	1.97
M 3 Wa	1.53	-	1.40	1.48	1.48	1.60	1.36	1.39	-	1.39
Wp	1.15	-	1.16	1.12	1.26	1.15	1.13	1.18	-	1.12
morph.	3	-	3	3	3	4	4	-	-	4
L									2.28	-
M 1 Wa									1.18	-
Wp									1.47	-
morph.									1	-

3. single upper teeth

M 1

no.	I/1.	I/2.	I/3.	I/4.	I/5.	I/6.	I/7.	I/8.	I/9.	I/10.	I/11.	I/12.	I/13.	I/14.
L	1.62	2.38	2.38	2.52	2.46	2.75	2.44	2.53	2.46	2.31	2.45	2.35	2.38	2.28
Wa	1.25	1.29	1.15	1.16	1.20	1.27	1.22	1.27	1.23	1.05	1.09	0.97	1.23	1.12
Wp	1.62	1.53	1.40	1.47	1.46	1.61	1.46	1.54	1.45	1.40	1.44	1.50	1.54	1.44
morph.	1	2	2	2	1	1	2	3	4	1	1	1	2	1
no.	II/2.	II/3.	II/4.	II/5.	II/6.	II/7.	II/8.	II/9.	II/10.	II/11.	II/12.	II/13.	II/14.	II/15.
L	2.45	2.38	2.77	2.32	2.42	2.27	2.45	2.41	2.30	2.55	2.59	2.48	2.44	2.49
Wa	1.08	1.12	1.23	1.15	1.23	1.05	1.12	1.27	1.08	1.19	1.16	1.12	1.13	1.18
Wp	1.44	1.54	1.54	1.47	1.46	1.29	1.46	1.41	1.40	1.50	1.47	1.40	1.48	1.51
morph.	1	1	1	1	2	1	1	3	1	6	1	2	1	1
no.	II/16.	II/17.	II/18.	II/19.	II/20.	II/21.	II/22.	III/1.	III/2.	III/3.	III/4.	III/5.	III/6.	III/7.
L	2.50	2.52	2.48	2.52	2.49	2.37	2.42	2.39	2.46	2.45	2.38	2.38	2.31	2.32
Wa	1.25	1.26	1.08	1.23	1.26	1.12	1.16	1.19	1.19	1.25	1.26	1.12	1.08	1.13
Wp	1.46	1.51	1.44	1.58	1.53	1.43	1.50	1.48	1.19	1.53	1.47	1.41	1.48	1.43
morph.	2	2	1	1	5	1	1	1	1	2	6	1	1	1
no.	III/8.	III/9.	III/11.	III/13.	III/14.	III/17.	III/18.							
L	2.35	2.52	2.38	2.31	2.38	2.31	2.32							
Wa	1.19	1.19	1.02	1.01	0.97	0.95	1.13							
Wp	1.44	1.54	1.50	1.30	1.40	1.32	1.20							
morph.	1	1	1	1	1	1	1							

M 2

no.	I/1.	I/2.	I/3.	I/4.	I/5.	I/6.	I/7.	I/8.	I/9.	I/10.	I/11.	I/12.	I/13.	II/1
L	2.31	1.85	2.10	2.10	2.16	2.09	2.13	2.21	2.10	1.96	2.04	2.04	2.10	1.86
Wa	1.64	1.33	1.54	1.54	1.60	1.54	1.54	1.58	1.43	1.46	1.47	1.61	1.50	1.41
Wp	1.39	1.25	1.40	1.40	1.40	1.40	1.43	1.47	1.34	1.32	1.39	1.51	1.40	1.25
morph.	1	4	1	1	1	1	3	1	4	1	1	1	1	2

no.	II/2.	II/3.	II/4.	II/5.	II/6.	II/7.	II/8.	II/9.	II/10.	II/11.	II/12.	II/13.	II/14.	II/15.
L	2.07	2.18	2.03	2.23	1.89	2.10	2.02	1.97	2.04	2.03	2.30	1.89	2.13	1.99
Wa	1.33	1.54	1.41	1.58	1.57	1.54	1.54	1.40	1.46	1.50	1.53	1.40	1.43	1.46
Wp	1.19	1.44	1.30	1.47	1.34	1.44	1.33	1.27	1.30	1.39	1.40	1.26	1.29	1.27
morph.	1	2	2	1	1	1	1	2	1	1	1	2	1	1

no.	II/16.	II/17.	II/18.	III/1.	III/2.	III/3.	III/4.	III/5.	III/6.	III/7.	III/8.
L	2.04	2.35	2.03	1.96	1.90	2.04	1.99	2.17	2.03	2.04	2.02
Wa	1.53	1.55	1.40	1.46	1.57	1.33	1.32	1.57	1.33	1.46	1.53
Wp	1.46	1.40	1.33	1.30	1.43	1.19	1.08	1.39	1.26	1.27	1.26
morph.	1	2	1	1	-	1	1	1	1	1	-

M 3

no.	I/1.	I/2.	I/3.	I/4.	I/5.	I/6.	I/7.	I/8.	I/9.	I/10.	II/1.	II/2.	II/3.	II/4.
L	2.11	1.76	1.85	2.07	2.00	1.76	2.02	1.88	2.00	1.71	1.97	1.71	1.96	1.85
Wa	1.54	1.44	1.40	1.51	1.43	1.32	1.47	1.50	1.53	1.43	1.43	1.34	1.47	1.40
Wp	1.16	-	1.01	1.13	1.13	1.06	1.05	-	1.20	-	1.19	1.02	1.13	1.08
morph.	2	4	5	4	5	4	4	3	3	4	3	4	4	4

no.	II/5.	II/6.	II/7.	II/8.	II/9.	II/10.	II/11.	II/12.	II/13.	II/14.	II/15.	II/16.	II/17.	II/18.
L	1.99	2.02	1.86	1.82	1.99	2.02	1.97	1.78	1.93	1.80	1.90	1.75	1.85	1.92
Wa	1.39	1.36	1.32	1.33	1.48	1.54	1.26	1.32	1.30	1.40	1.41	1.33	1.32	1.40
Wp	1.15	1.13	1.05	1.08	1.23	1.23	1.06	-	1.08	-	1.12	1.01	1.01	1.12
morph.	3	3	3	4	3	4	3	3	3	4	4	3	4	4

no.	III/1.	III/2.	III/3.	III/4.	III/5.	III/6.	III/7.
L	1.96	1.76	1.88	1.99	2.02	1.95	1.96
Wa	1.36	1.36	1.22	1.29	1.54	1.41	1.37
Wp	1.09	1.04	1.00	1.08	1.22	1.15	1.15
morph.	3	3	3	3	3	3	3

4. Mandibles and mandibular fragments

no.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
L m 1-3	6.0	6.6	-	-	-	-	6.2	-	6.1	6.10	6.50	-	-	-	-	-	-	-
L	2.07	2.25	-	-	-	-	2.17	-	2.17	-	2.24	-	-	-	2.10	-	-	-
m 1 Wa	0.84	0.84	-	-	-	-	0.84	-	0.70	-	0.84	-	-	-	0.74	-	-	-
Wp	1.22	1.29	-	-	-	-	1.22	-	1.30	-	1.29	-	-	-	1.12	-	-	-
morph.	-	Cd	-	-	-	-	-	-	Cd	-	Cd	-	-	-	Od	-	-	-
L	1.92	2.04	1.86	1.82	1.89	2.10	-	1.92	1.93	1.89	2.04	1.78	1.97	1.81	1.96	-	-	-
m 2 Wa	1.34	1.40	1.26	1.37	1.37	1.41	-	1.30	1.40	1.40	1.40	1.33	1.33	1.43	1.26	-	-	-
Wp	1.37	1.37	1.34	1.47	1.33	1.51	-	1.39	1.47	1.40	1.44	1.30	1.47	1.46	1.26	-	-	-
morph.	-	Ad	Ad	-	Ad	Ab	-	Cd	Cd	-	Ad	-	Ab	-	Ad	-	-	-
L	2.13	2.41	2.24	2.16	2.06	-	2.34	2.20	2.38	2.32	2.45	-	2.24	2.18	-	2.52	2.31	2.24
m 3 Wa	1.41	1.47	1.36	1.44	1.39	-	1.54	1.44	1.47	1.48	1.50	-	1.46	1.44	-	1.50	1.39	1.37
morph.	A	A	A	A	A	-	A	E	A	E	A	-	A	A	-	A	A	A

no.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	32.	33.	34.	35.
L m 1-3							[illegible]	-	-	5.90	-	6.30	-	-	-	-
L	2.21	-	2.31	-	-	-	2.17	-	-	2.13	2.16	2.04	2.17	-	-	-
m 1 Wa	0.80	-	0.77	-	-	-	0.85	-	-	0.66	0.74	0.84	0.70	-	-	-
Wp	1.34	-	1.16	-	-	-	1.15	-	-	1.15	1.19	1.12	1.12	-	-	-
morph.	Cd	-	Cd	-	-	-	Od	-	-	Cd	Ob	-	Ob.	-	-	-
L	-	2.09	-	-	1.82	1.99	-	1.90	1.96	1.86	-	1.97	-	2.07	1.96	1.96
m 2 Wa	-	1.40	-	-	1.41	1.34	-	1.29	1.40	1.33	-	1.30	-	1.40	1.37	1.40
Wp	-	1.53	-	-	1.48	1.46	-	1.33	1.47	1.26	-	1.37	-	1.44	1.40	1.40
morph.	-	Ad	-	-	-	Ad	-	Ad	Ad	Ab	-	-	-	Ad	Ad	Cd
L	-	2.34	-	2.14	-	2.17	-	-	-	2.13	-	2.24	-	-	-	2.24
m 3 Wa	-	1.43	-	1.47	-	1.40	-	-	-	1.43	-	1.48	-	-	-	1.47
morph.	-	A	-	A	-	A	-	-	-	C	-	A	-	-	-	C

5. single lower teeth

m 1

no.	I/1.	I/2.	I/3.	I/4.	I/5.	I/6.	I/7.	I/8.	I/9.	I/10.	I/11.	I/12.	I/13.	I/14.
L	2.20	2.14	2.16	2.14	2.17	2.24	2.13	2.20	2.34	2.25	2.11	2.13	2.23	2.25
Wa	0.85	0.80	0.63	0.70	0.80	0.81	0.73	0.84	0.80	0.70	0.74	0.84	0.77	0.77
Wp	1.19	1.23	1.12	1.29	1.26	1.20	1.15	1.18	1.18	1.15	1.23	1.26	1.23	1.26
morph.	Cd	Cd	Cd	Cg	Aa	Da	Cd	Cd	Cd	Cd	Cd	Cd	Dd	Cd

no.	I/15.	I/16.	I/17.	I/18.	I/19.	I/20.	I/21.	I/22.	I/23.	I/24.	I/25.	II/1.	II/2.	II/3.
L	2.13	2.46	2.06	2.25	2.31	2.39	2.10	2.20	2.38	2.21	2.11	2.31	2.31	2.31
Wa	0.77	0.91	0.74	0.66	0.77	0.84	0.74	0.74	0.84	0.87	0.63	0.74	0.84	0.76
Wp	1.32	1.36	1.22	1.22	1.25	1.29	1.15	1.15	1.32	1.15	1.12	1.23	1.26	1.15
morph.	Dd	Cd	Ca	Cd	Cd	Cd	Db	Cd	-	Cd	Cd	Ba	Dd	Cd

no.	II/4.	II/5.	II/6.	II/7.	II/8.	II/9.	II/10.	II/11.	II/12.	II/13.	II/14.	II/16.	II/17.	II/18.
L	2.38	2.38	2.25	2.24	2.10	2.41	2.13	2.13	2.17	2.10	2.17	2.18	2.18	2.21
Wa	0.95	0.91	0.88	0.73	0.64	0.81	0.91	0.80	0.84	0.73	0.77	0.73	0.81	0.77
Wp	1.33	1.33	1.22	1.15	1.12	1.27	1.22	1.18	1.19	1.19	1.26	1.19	1.23	1.23
morph.	Db	Cd	Da	Dd	Dd	Ad	Dd	Cd	Ad	Cd	Cd	Dd	Cd	Cd

no.	II/19.	II/20.	II/21.	II/22.	II/23.	II/24.	II/25.	III/1.	III/2.	III/4.	III/5.	III/6.	III/7.	III/8
L	2.39	2.17	2.20	2.21	2.28	2.37	2.32	2.21	2.31	2.18	2.11	2.04	2.14	2.17
Wa	0.81	0.63	0.77	0.77	0.84	0.91	0.76	0.74	0.77	0.70	0.76	0.67	0.70	0.74
Wp	1.30	1.05	1.30	1.26	1.16	1.26	1.25	1.19	1.32	1.19	1.23	1.19	1.16	1.23
morph.	Cd	Dd	Dd	Cd	Cd	Dd	Cd	Cd	Cd	Cd	Da	Dd	Dd	Cd

no.	III/9.	III/10.	III/11.	III/12.	III/13.	III/16.	III/19.	III/23.	III/25.
L	2.10	2.06	2.30	2.16	2.16	2.24	2.11	2.21	2.10
Wa	0.66	0.73	0.77	0.74	0.84	0.84	0.77	0.98	0.77
Wp	1.12	1.13	1.23	1.20	1.25	1.20	1.19	1.25	1.18
morph.	Cb	Dd	Cd	Dd	Cd	Dd	Dd	Dd	Dd

m 2

no.	I/1.	I/2.	I/3.	I/4.	I/5.	I/6.	I/7.	I/8.	I/9.	I/10.	I/11.	I/12.	I/13.	I/15.
L	1.85	1.97	1.96	1.88	2.14	2.11	1.96	1.96	2.04	1.88	2.00	1.89	2.10	2.10
Wa	1.30	1.29	1.35	1.37	1.33	1.36	1.30	1.30	1.37	1.32	1.30	1.32	1.40	1.47
Wp	1.30	1.36	1.41	1.36	1.36	1.33	1.33	1.32	1.40	1.26	1.32	1.39	1.39	1.55
morph.	Ad	Ad	Ad	Bd	Ad	Ad	Ad	Ad	Ad	Ad	Ad	Ad	Ad	-
no.	I/16.	I/17.	I/18.	I/19.	I/20.	I/21.	II/1.	II/2.	II/3.	II/4.	II/5.	II/6.	II/7.	II/8.
L	2.10	1.90	2.14	1.95	1.99	1.96	1.79	2.06	1.99	2.13	1.95	2.06	1.92	2.13
Wa	1.29	1.29	1.39	1.39	1.34	1.33	1.27	1.41	1.33	1.41	1.34	1.34	1.32	1.36
Wp	1.34	1.33	1.37	1.37	1.41	1.30	1.33	1.47	1.30	1.46	1.37	1.40	1.33	1.36
morph.	Ad	Ad	Ad	-	Ad	Ad	Cd	Cd	Ad	Ad	Ad	Ad	Ad	Ad
no.	II/9.	II/10.	II/11.	II/12.	II/13.	II/14.	II/15.	II/16.	II/17.	II/19.	II/20.	II/21.	III/1.	III/2.
L	1.96	1.92	2.17	2.14	1.96	1.97	2.11	1.82	1.96	1.95	2.10	2.06	1.86	2.03
Wa	1.32	1.20	1.36	1.43	1.32	1.37	1.43	1.18	1.26	1.27	1.41	1.29	1.26	1.32
Wp	1.34	1.25	1.40	1.51	1.26	1.39	1.40	1.18	1.27	1.27	1.33	1.33	1.32	1.29
morph.	Ad	Ad	Ab	Ad	Ad	Ad	Ad	Cd	Ad	Ad	Ad	Ad	Ad	Ad
no.	III/3.	III/4.	III/5.	III/6.	III/7.	III/8.	III/9.	III/10.	III/11.	III/12.	III/13.	III/14.	III/15.	III/16.
L	1.96	2.17	1.92	1.90	1.99	1.97	1.97	1.93	2.18	2.00	1.82	1.99	1.90	1.83
Wa	1.29	1.40	1.30	1.29	1.29	1.30	1.26	1.29	1.34	1.32	1.26	1.23	1.19	1.25
Wp	1.29	1.40	1.34	1.30	1.32	1.39	1.30	1.29	1.44	1.27	1.20	1.25	1.26	1.33
morph.	Ad	Ab	Cd	-	Ad	Ad	Ad	Ad	Ad	Ad	Ad	Ad	Ad	-
no.	III/17.	III/18.	III/19.	III/20.	IV/1.	IV/2.	IV/3.	IV/4.	IV/5.	IV/6.	IV/7.	IV/8.	IV/9.	IV/10.
L	2.00	1.97	1.99	1.96	1.93	2.03	1.86	2.04	1.92	2.00	2.03	1.86	1.72	2.10
Wa	1.40	1.43	1.40	1.29	1.33	1.30	1.19	1.33	1.29	1.40	1.36	1.29	1.26	1.33
Wp	1.41	1.40	1.33	1.33	1.32	1.29	1.26	1.39	1.29	1.43	1.40	1.41	1.34	1.34
morph.	Ad	-	Cd	Ad	Cd	Ad	Ad	-	Ad	Ad	Ad	-	-	Ad[x]
no.	IV/11.	IV/12.	IV/13.	IV/14.	IV/15.	IV/16.	IV/17.	IV/18.						
L	1.97	1.89	2.02	1.95	1.76	2.06	2.10	2.04						
Wa	1.40	1.32	1.33	1.29	1.33	1.39	1.43	1.34						
Wp	1.47	1.27	1.30	1.33	1.39	1.33	1.41	1.40						
morph.	-	Ad	Ad	Ad	-	Dd	Ad	Ad						

m 3

no.	I/1.	I/2.	I/3.	I/4.	I/5.	II/1.	II/2.	II/3.	II/4.	II/5.	II/6.
L	2.24	2.52	2.27	2.49	2.35	2.32	2.24	2.38	2.28	2.32	2.31
Wa	1.36	1.47	1.50	1.46	1.47	1.44	1.32	1.65	1.44	1.50	1.44
morph.	A	A	B	B	A	A	A	A	E	A	A
no.	II/7.	II/8.	II/9.	II/10.	II/11.	II/12.	II/14.	II/15.	II/16.	II/17.	II/18.
L	2.28	2.18	2.31	2.34	2.24	2.17	2.31	2.17	2.14	1.95	2.27
Wa	1.33	1.23	1.43	1.33	1.33	1.32	1.50	1.33	1.29	1.32	1.33
morph.	A	A	A	A	A	A	A	A	A	A	A
no.	II/19.	II/20.	III/1.	III/2.	III/3.	III/4.	III/5.	III/6.	III/7.	III/8.	III/9.
L	2.31	2.34	2.17	2.49	2.45	2.13	2.16	2.13	2.27	2.24	2.34
Wa	1.40	1.37	1.29	1.57	1.40	1.53	1.41	1.33	1.36	1.34	1.44
morph.	A	A	A	D	A	A	A	A	A	C	A
no.	III/10.	III/11.	III/12.	III/13.	III/14.	III/15.	III/16.	III/17.	III/18.	III/19.	III/20.
L	2.24	2.06	2.42	2.06	2.35	2.21	2.03	2.30	2.10	2.20	2.27
Wa	1.30	1.26	1.47	1.39	1.44	1.51	1.33	1.40	1.33	1.26	1.34
morph.	A	A	A	A	A	C	A	-	A	A	A
no.	IV/1.	IV/2.	IV/3.	IV/4.	IV/5.	IV/6.					
L	2.31	2.30	2.03	2.11	2.00	2.31					
Wa	1.40	1.40	1.26	1.34	1.40	1.40					
morph.	A	A	A	A	A	C					

6. Mesocricetus sp. ?

	L	Wa	Wp	morph.
Max. no. 9.				
L M 1-3: 5.9;				
M 1 :	2.13	1.05	1.40	-
max. no. 14.				
M 2 :	1.69	1.43	1.26	-
M 3 :	1.62	1.39	0.98	-
Max. no. 50.				
M 1 :	2.11	1.01	1.29	1
M 2 :	1.86	1.39	1.29	2
Single upper molars				
M 1 no. II/1.:	2.09	0.99	1.26	1
III/16.:	2.03	1.12	1.27	1
M 3 no. III/8.:	1.60	1.23	-	3
Single lower molars				
m 1 no. II/15:	1.99	0.66	1.05	Cd
III/3 :	1.89	0.56	1.11	Dd
III/20:	1.88	0.56	1.00	Dd
III/26:	1.92	0.62	1.06	Dd

SYSTEMATICS AND DISCUSSION

CRICETIDAE ROCHEBRUNE 1883
CRICETINAE ROCHEBRUNE 1883
Mesocricetus NEHRING 1839
Mesocricetus auratus (WATERHOUSE 1839)

In the Mesocricetus genera living in Asia Minor a group of the authors acknowledges the existence of the Mesocricetus brandti (NEHRING 1898) species (HAMAR, M.-SCHUTOWA, M. 1966; STORCH, G. 1975; FELTEN, H.-SPITZENBERGER, F.-STROCH, G. 1971; SPITZENBERGER, F. 1972). Another group (HARRISON, D.-BATES, P. 1991; CORBET, G.-HILL, J. 1991) in recent times rejectes this opinion and synonymizes the M. brandti with the M. auratus. The author followes the latter opinion, because in the available literature there is not any data of the differences in the dentition between the two taxa.

The statistical difference of the measurements between the Mesocricetus newtoni (NEHRING 1898) after the dates of MAYHEW, D. (1978), POPOV, V. (1989), PRADEL, A. (1989) and the Mesocricetus auratus from Meydan is very week. Ne results are probable after the morphological investigation of Mesocricetus newtoni materials.

Mesocricetus sp.

The systematic position of the few small sized molars is uncertain, and without more comparitive material we can not take a standpoint in this matter.

The published Pleistocene materials from the Aegean region are all larger sized (STORCH, G. 1975; MAYHEW, D. 1978; KUSS, E.-STORCH, G. 1978). Only the first representative of the Mesocricetus genera: the M. primitivus is smaller described from the Pliocene fauna of Maritsa, Rhodes (BRUIJN DE H.-DAWSON, M.-MEIN, P. 1970).

ACKNOWLEDGEMENTS

The author would like to express his sincere thanks to Prof. Dr. Yücel ASKIN, President of the Turkish Speleological Society, to Onur ÖZBEK and Guiles CARPO, - leaders of the Turkish - French Toros Expedition'89-for their help in the field work. I want to thank to Prof. Dr. Dénes JÁNOSSY - retired director of the Paleontological Collection of the Hungarian Natural - history Museum-, to Dr. György TOPÁL - director of the Mammalian Collection of the Museum, to Prof. Dr. Miklós KRETZOI for their help in the elaboration. I should like to thank to Dr. Friderika SPITZENBERGER - Naturhistorisches Museum, wien) for her kind help by correspondence.

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Dr. HÍR János
H-3600 PÁSZTÓ
Pf.: 15.