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Pliospalax Primitivus n. sp. (Rodentia, Mammalia) and Anomalomys Gaudryi Gaillard from the Anchitherium Fauna of Sarıçay (Turkey)

Sarıçay (Türkiye) Anchitherium'lu faunasından Pliospalax primitivus n.sp. (Rodentia, Mammalia) ve Anomalomys gaudryi Gaillard

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ABSTRACT: Two species of micro mammals which belong to the Anchitherium fauna from Sarıçay are described. The first is a new species of Pliospalax known from Turolian (Upper level of Upper Miocene) to Early Villanyian (Latest Pliocene or Earliest Pleistocene) levels. It is described in Middle Astaracian (Upper level of Upper Miocene of Tur-key and compared with other known species from Greece, Ukraine and Turkey. The second one is Anomalomys gaudryi known Middle Miocene levels of European localities.

ÖZ: Sarıçay Anchitherium faunasından iki mikro memeli türü tanımlanmıştır. Birincisi Turoliyenden (Orta Miyosenin üst seviyesi) Alt Villanyien (En Üst Pliyosen ya da En Alt Pleyistosen) seviyesine kadar bilinen Pliospalax cinsinin yeni bir türüdür. Türkiye'nin Orta Astarasiyen (Orta Miyosenin Üst seviyesi) seviyesinden tanımlanan bu yeni tür Yunanistan, Ukrayna ve Türkiye'nin bazı fosil yataklarından bilinen Pliospalax türleriyle karşılaştırılmıştır. İkinci tür ise Avrupa Orta Miyosen lokalitelerinden bilinen Anomalomys gaudryi'dir.

INTRODUCTION

The fossil deposits are located on the east bank of the river Sarıçay (Yusufça Dere) 2.25 km north east of the centrum of Milas and 1.25 km southeast from the new bridge on the Milas-Kırcağız road.

The fossiliferous deposits at Sarıçay were previously discovered and excavated by German group during an extensive survey of Neogene sediments in Turkey. In 1976, Sarıçay was excavated again at the same time as Yenieskihisar by the English and MTA group with the aim of studying the palaeoecology of Miocene sites in Turkey, especially those at which primate fossils have been found.

The fossil bed contains both micro and macro mammals belonging to the Anchitherium fauna. The micro mammals decribed below have been colected from the bed 5 which is shown in the section (fig. 2).

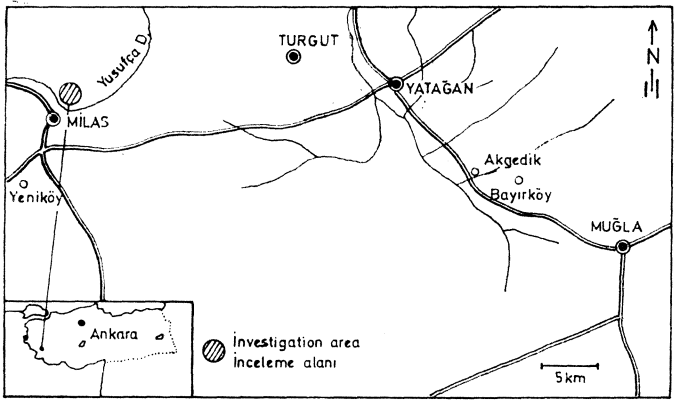

Figure 1: Location map.

Şekil I: Yer buldum haritası.

STRATIGRAPHY

According to Becker Platen (1970) the stratigraphy consist of chancing facies of mostly grey, grey - green or white fluviatile silts, sands and gravels with variable calcite content. The vertebrate remains were reported to be in thin layers or lanses at several different horizons, partly concentrated in pockets and partly occuring as isolated specimens (Sickenberg and others,, 1975).

According to the unclassified report of the English and Turkish group, two lithological units can be distinguished. The lower unit, which has maximum thickness of 11 m, consists of cyclical silts and gravels above bedded sandstones, and the upper unit which is much thicker, consists of unfossiliferous green.grey silts and sandstones. The two unites are separated by a well developed white calcified horizon. The fossils are concentrated in the top 4 m of lower unit at Sarıçay. A detailed section of the top 4 m of the lower unit is shown fig. 2. The fossils were concentrated at the gravel-silt junction in two levels (beds 5 and 8). The lateral extent of the beds varies considerably. Some of the gravel beds can be traced over 30-40 m, until they are concealed by the ovelying Pleistocene deposits, and the others are less than one metre in extent.

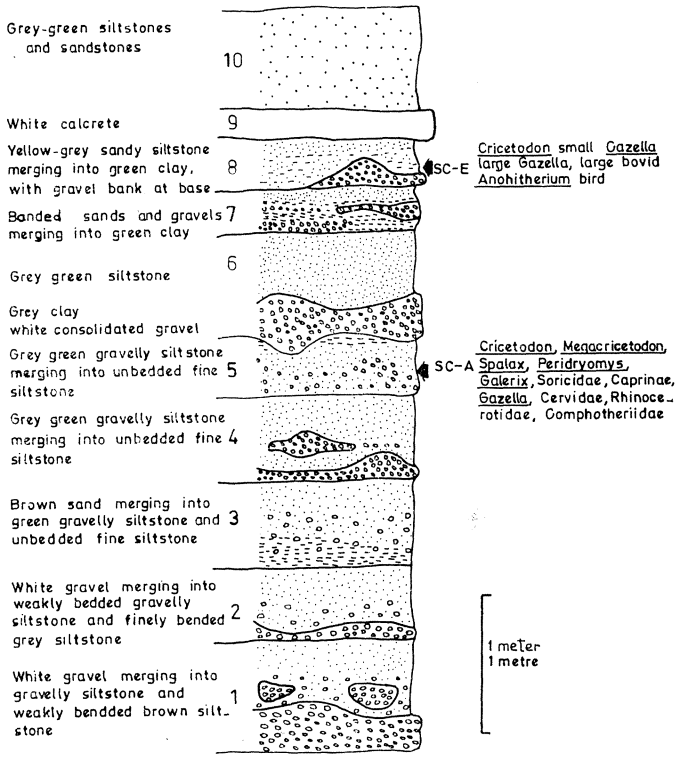

Figure 2: Section of the top half of the lower unit at Sarıçay (Copied from the unsclassified report of the English MTA group).

Şekil 2: Sarıçay alt biriminin üst yarısının kesiti (İngiliz ve MTA gurubunun sınıflanmamış raporundan alınmıştır).

FALEONTOLOGY

Order: Rodentia Bowdich, 1821
Family: Spalacidae Gray, 1821
Genera: Pliospalax kormos, 1932
Pliospalax primitiviıs n. sp.
(Fig. 4: 1-14; Plate I,Fig. 1-14; Plate II, Fig. 1.9)

Derivatio nominis: The species is named after its primitive characters.

Type locality: Sarıçay
Age: Middle Astaracian

DIAGNOSIS

Unworn or little worn M_x is characterized by two labial and two lingual re-entrant folds and an isolated anterior lobe. All unworn or little worn lower teeth have rather strong mesolophids. The mesoloph of M_1 is variable and its posterior cingulum is well developed.

Difterential Diagnosis

Pliospalax primitivus is the largest form among the other species of this genera (Fig. 3).

P. primitivus differs from P. maeoveii and P. sotirisi (=P. macoveii according to Şen, 1976 and Şen and De

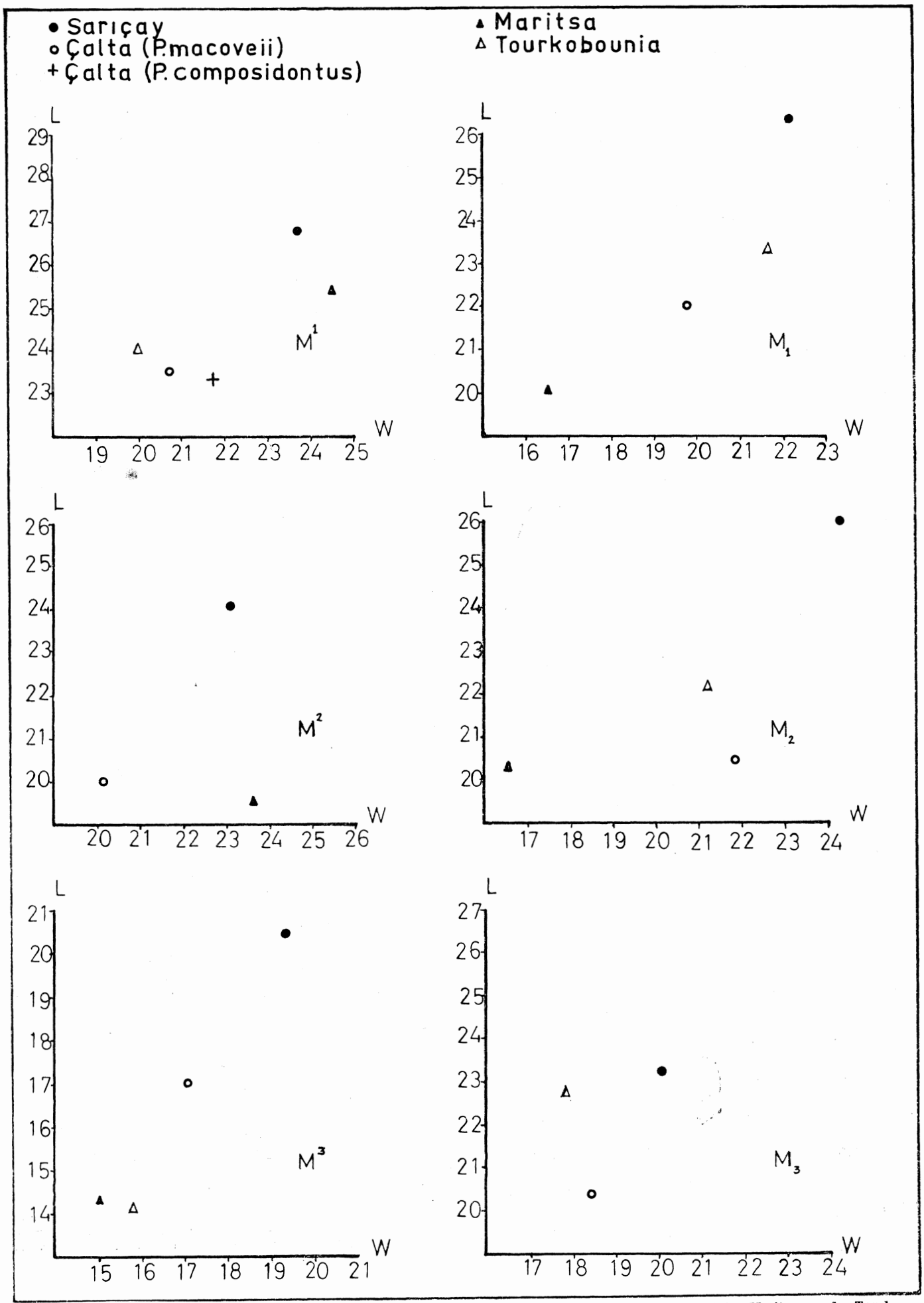

Figure 3: Length-width scatter diagrams of upper and lower teeth of Pliospalax **species from Sarıçay, Çalta Maritsa and Tourkobounia-I (average measurements are given).**

Şekil 3: Sarıçay, Çalta, Maritsa ve Tourkobounia-I deki Pliospalax **türlerinin alt ve üst dişlerinin uzunluk - genişlik dağılımı diyagramı (Ortalama değerler verilmiştir).**

Bruijn, 1977[1]) in having isolated anterior lobe in M_1, strong mesolophids in all lower teeth and more developed posterior cingulum in M_1.

Althoung P. primitivus is similar to P. tourkoboiiniensis in having isolated anterior lobe in M_1, there are other differentiating features such as strong mesolophid in all lower teeth and more developed posterior cingulum in upper M_1.

P. primitivus is rather different from P. composidontus in that, the M_1 of Sarıçay species has longer than that of P. composidontus. Although, the M_1 of P. eomposidontus is worn (Topachevski, 1969; fig. 6, p. 18) the posterior cingulum does not fuse with the entoconid. In the samples of Sarıçay, this fusion is present in little worn teeth.

Holotype; A right M_1 no. MMS/m. 15, Fig.4:1, PL II: Figl.
Measurements of holotype: 26 X 21,5
Measurements and material

	Length			Width	
	range	mean	number	mean	range
M_1	25.5-28.0	26.4	5	22.1	21.0-24.0
M_2	24.0-28.5	26.0	4	24.3	24.0-25.0
M_3	22.5-24.0	23.2	2	20.0	18.0-22.0
M^1	25.5-28.5	26.9	6	23.6	21.0-25.5
M^2	23.5-25.0	24.1	5	23.1	21.5-25.0
M^3	20.0-21.0	20.5	3	19.3	18.0-20.5

Description

M_1. The unworn two teeth (Fig.4: 1,2) show two lingual and two labial re-entrant folds. The antero-labial and the postero-lingual re-entrant folds are confluent, so the anterior lobe is isolated. The deepest postero-labial re-entrant fold ends at about 1.7 mm from the occlusai surface. The postero-lingual is the shortest one. In the slightly worn teeth, the posterior cingulum fuses with the entoconid, with further wear, the protokonid fuses with the anterior cingulum at a later stage of attrition entoconid and metaconid fuse. Mi has one anterior and one posterior root centrally connected by a cret.

M_2. An unworn tooth (Fig.4: 5) shows one well developed labial which ends at about 1.7 mm from the occlusai surface like that of M_1 and one lingual re-entrant fold. Second lingual fold is deep but closed. It has the trace of very small antero-labial fold in the antero-labial corner of its occlusai surface. The mesolophid is strong. It can be seen in the worn teeth. In the worn teeth, the postero-lingual fold is developed as an enamel island. M_2 is two rooted.

M_3. The morphology of M_3 is very similar to that of M_2. But the posterior lobe is more reduced. In an unworn tooth, (Fig.4: 8), one labial reaching to the basis of the crown and three lingual re-entrant folds can be seen. The central one of the three lingual folds is open lingually, the others are closed. The Antero-lingual fold between the anterior cingulum and the metaconid is long but shallow. The closed postero-lingual fold is deep. It is seen as an enamel island in the worn teeth. The mesolophid is rather strong.

M_1. A slightly worn Mi (Fig. 4:9) has one lingual, three labial re-entrant folds, The lingual fold ends at about 2.5 mm from the occlusal surface (PI. I:4a). The postero-labial fold is shorter and not as deep as the others. The posterior cingulum is well developed. In the worn specimens, two labial folds are seen due to the fusion of the posterior cingulum with the metacon. Four out of six specimen have variable sized mesoloph. Mi has one thick lingual and two thin labial roots.

M_2. An unworn tooth (Fig.4:12) shows one lingual fold which ends at about 2.5 mm from the occlusal surface and one less deep labial re-entrant fold. The latter is separeted into two branches by mesolophid. The paracon is connected with the protocon by a cret nearly parallel to the anterior cingulum. There is a shallow and closed fold which disappears quickly by wear between this cret and the anterior cingulum. The metacon is fused with the posterior cingulum. The mesoloph is well developed in all M_2 and reaches to the labial border in one sample. In the worn teeth, the anterior branch of the labial fold is developed as an enamel island.

M_3. The crowns of the two M_3 are higher anteriorly than posteriorly. One of theese teeth (Fig.4: 13) has on lingual and one labial re-entrant folds. They are congluent. Although the other (Fig; 4: 14) is unworn, it does not show lingual fold. The shapes of theese two M_3 are not completely similar to each other so, they show different pattern especially in their anterior lobe. A worn M_3 shows one labial forked fold.

Discussion

This group is first found amoung the Anchitherium fauna. With the absence of any contemporary group, at this level it is uncomparable. But, according to Kormos (1932), Pliospalax which is known from Turolian to Early Villanyian is characterized by the presence of two lingual and two labial reteatrant folds in unworn M_1. This description given for Pliospalax is so general that, it also involves the Middle Astaracian forms found in Sarıçay. To interprete Middle Astaracian forms of Sarıçay as a new genera, a new description for Pliospalax is needed. Such a classification is not quite sound at present since the history of this family is not well known in the Miocene and Pliocene. Therefore, for the present time, Sarıçay population is interpreted as anew species of this genera.

Sometimes, the traces of mesoloph/id and posterior cingulum are seen in Pliospalax species of younger levels. But, these properties are not as common and as well developed in any population of Pliospalax described up to the present time as Sarıçay population. For instance, no description can be found for the stratigraphically younger Pliospalax species which has strong mesolophids in all lower teeth whereas all the lower teeth of Sarıçay species show strong mesolophids without exception.

If the presence of strong mesoloph/id and posterior cingulum in lower and upper teeth are interpreted as archaic

(1) In P. sotirisi, the postero-labial fold extends nearly to the basis of the crown (De Bruijn et Van der Meulen, 1975, PI. 6 fig. lb) this fold is shorter in P. raacoveli (Şen, 1977 PL XIV, *fig.* 3b). The length of this fold shows that P. sotirisi is more evolved. So, whether P. sotirisi and P. macoveii are really synonymous or not seems doubthfull.

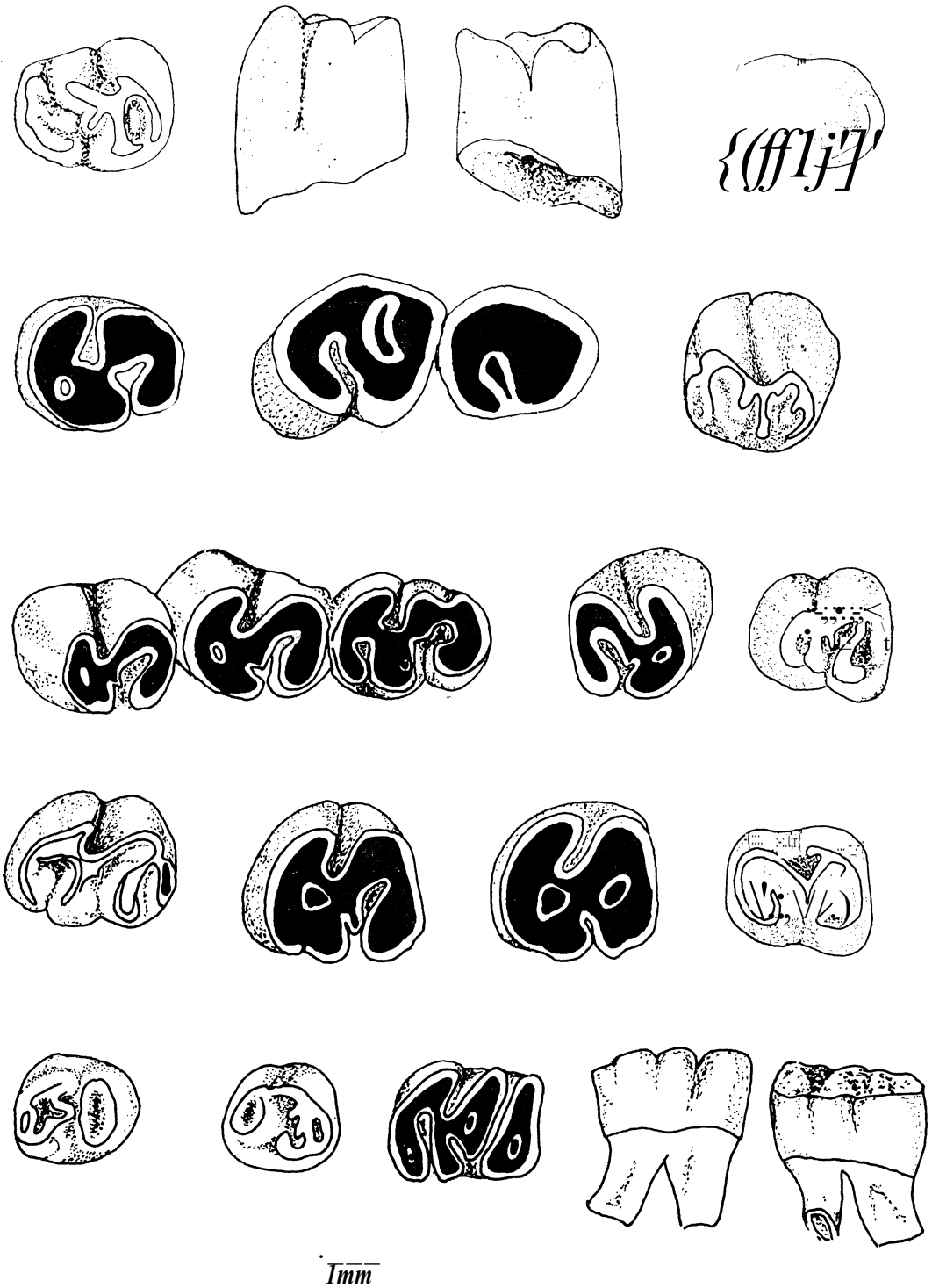

Figure 4: Pliospalax primitivus n.sp. la) Occlusal view of M_1dext. Holotype, X10 lb) Labial view of the same specimen lc) Lingual view of the same specimen; 2)Occlusal view of M_1sin., X10; 3)Occlusal view of M_1sin., Xl0; 4)Occlusal view of M_1- M_2dext , X10; 5)Occlusal view of M_2 dext., X10; 6) Occlusal view of M_1- M_3 sin., X10; 7) Occlusal view of M_2 dext., X10; 8) Occlusal view of M_3 sin., X10; 9) Occlusal view of M_1dext., X10; 10) The occlusal view of M_1 dext., X10; 11) Occlusal view of M_1dext., Xl0; 12) Occlusal view of M_2 sin., X10; 13)Occlusal view of M3 dext., Xl0; 14)Occlusal view of M_2 sin., Xl0; Anomalomys gaudryi Gaillard 15a) Occlusal view of M_3 sin. X15; 15b) Lingual view of same specimen; 15c) Labial view of same specimen; 15d) Labial view of same specimen.

Şekil 4: Pliospalax primitivus n.sp. la) Sağ M_1in çiğneme yüzeyinden görünümü, Türörnek, X10; lb) Aynı örneğin dış yüzden görünümü; lc) Aynı örneğin iç yüzünden görünümü; 2)Sol M_1in çiğneme yüzeyinden görünümü, X10; 3)Sol M_1in çiğneme yüzeyinden görünümü, X10; 4)Sağ M_1- M_2 nin çiğneme yüzeyinden görünümü, X10; 5)Sağ M_2 nin çiğneme yüzeyinden görünümü, Xl0; 6)Sol M_1- M_3ün çiğneme yüzeyinden görünümü, X10; 7)Sağ M2 nin çiğneme yüzeyinden görünümü, X10; 8) Sol M_3ün çiğneme yüzeyinden görünümü, X10; 9)Sağ M_1in çiğneme yüzeyinden görünümü, X10; 10) Sağ M_1in çiğneme yüzeyinden görünümü, X10; 11)Sağ M_1in çiğneme yüzeyinden görünümü, Xl0; 12)Sol M_2nin çiğneme yüzeyinden göriinümii, X10; 13)Sağ M_3 ün !)iğneme yüzeyinden göriinümü, X10; 14)Sol M_3 ün çiğneme yüzeyinden görünümü, X10; Anomalomys gaudryi Gaillard 15a) Sol M_2 nin çiğneme yüzeyinden görünümü, X15; 15b) Aynı örneğin içyüzden görünümü; 15c) Aynı örneğin dış yüzeyden görünümü.

features, then it can be argued the Pliospalax species in younger levels were derived from the Miocene groups. Actually, the properties of the teeth of this species are scattered to the younger Pliospalax species. However, the stratigraphically oldest Sarıçay species is larger and rather hypsodont. So, the relationship among the Pliospalax species may be rather complex from the evolutionary point of wiev. But, by the specialities of the properties of this species such as, the snape, the simplified sturucture and the hypsodonty of the teeth are much closer to the stratigraphically younger Pliospalax species than Anomalomys which was considered as the ancestor to Pliospalax (De Bruijn and others 1970) The presence of Anomalomys and Pliospalax in the same bed also proves that the former to be ancestor to the latter is impossible.

Genera: Anomalomys Gaillard, 1900
Anomalomys gaudryi Gaillard, 1900
(Fig.4: 15; Plate II, Fig. 9)

1900 Anomalomys gaudryi Gaillard (non vidi)
1925 Anomalomys gaudryi Schaub, 66-68
1928 Miospalax imonacensis Stromer,
1946 Anomalomys gaudryi Viret and Schaub, 342-352
1953 Anomalomys gaudryi Schaub and Zapfe, 162.
1967 Anomalomys gaudryi Kowalski, 9-10.
Locality: Sarıçay
Age: Middle Astaracian
Material and measurements: 1 left M_2 17 X 13.5
Description

M_2 The occlusal surface of M_2 consists of three transversal lobes. The antero-labial and the second lingual synclinal are confluent. Postero-lingual one ends at the middle of the occlusal surface. In the anterior lobe, the trace of first lingual synclinal is seen. The presence of the funnel in the middle lobe is also seen clearly. The mesolophid is short and does not reach to the lingual border of the tooth. A narrow lingual synclinal separates the mesolophid from the entokonid. The posterior ridge is connected with the hypoconid. Another narrow and long fold separates the en. toconid from the posterior cingulum. In the posterior lbe, a small enamel island is present. It has one anterior and one posterior root.

Discussion

Although there is single M_2, it allows specific determi-nation because it shows typical characters of Anomalomys gaudryi. The structure of this tooth is more closely similar to the samples described by Schaub (1925) and Schaub and Zapfe (1953) than the samples figured by Viret and Schaub (1946). The crowns of the teeth of A. gaudryi from Opole (Kowalski, 1967) are higher than the Sarıçay tooth. According to Fejfar (1972), the samples such as, A. gaudry from Opole and Miospaiax monacensis Stromer (1928) are more evolved Sarmation types of A. gaudryi

The measurements of Sarıçay tooth are seen to be between the minumum and maximum measurements of the M_2 of Anomalomys gaudryi from different localities (Fi. 5).

A. gaudryi is known from many Miocene faunas of Europe, e.g., Neudorf (Helvetian), San Quirico near Barcelona (Upper Vindobonian), La Grive St. Alban (Upper Vindobonian), Steinheim am Albuch (Sarmatian) and Opole (Sarmatian).

	La Grive	Neudorf	Opole	Sarıçay
Length	1.56-1.86	1.71-1.79	1.50-1.60	1.70
Width	1.26-1.60	1.12-1.25	1.20- 1.40	1.35

Figure 5: The; comparison of the measurements of A. gaudryi's M_2 from different localities

Şekil 5: Çeşitli lokalitelerden bulunan A. gaudryi M_2 ölçülerinin karşılaştırması.

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PLATE I

Pliospalax primitivus n. sp.

Figure 1: M^1 dext. X10
Figure 2: M^1 dext., X10
Figure 3: M_1 dext., X10
Figure 4: M_1 dext., X10; 4a) From lingual; 4b) From labial.
Figure 5: M_1 dext., X10
Figure 6: M_1 dext., Xl0
Figure 8: M_2 sin., Xl0
Figure 8: M_2 dext, Xl0
Figure 9: M_2 sin., X10
Figure 10: M_2 sin., X10
Figure 11: M_2 sin., X10
Figure 12: M_3 dext., X10
Figure 13: M_3 sin., X10
Figure 14: M_3 sin., X10

LEVHA I

Pliospalax primitivus n. sp.

Şekil 1: Sağ M_1, X10
Şekil 2: Sağ M_1, X10
Şekil 3: Sağ M_1, X10
Şekil 4: Sağ M_1, X10 4a) iç yüzden; 4b) Dış yüzden
Şekil 5: Sağ M_1, X10
Şekil 6: Sağ M_1, X10
Şekil 7: Sol M_2, X10
Şekil 8: Sağ M_2, X10
Şekil 9: Sol M_2, X10
Şekil 10: Sol M_2, X10
Şekil 11: Sol M_2, X10
Şekil 12: Sağ M_3, X10
Şekil 13: Sol M^3, XlO
Şekil 14: Sol M^3, X10

PLATE II

Pliospalax primitivus n. sp.

Figure 1: M1 dext., holotype, X10; la) From labial; lb) From lingual
Figure 2: M1 sin., X10
Figure 3: M_1 sin.., X10
Figure 4: M_2 dext, X10
Figure 5: M_2 dext, X10
Figure 6: M3 sin., X10
Figure 7: M_1 - M_2 sin., X10; 7a) From labial
Figure 8: M_1 - M_2 dext, X10

Anomalomoys gaudryi Gaillard

Figure 9: M_2 sin., X15; 9a) From lingual; 9b) From labial

LEVHA II

Pliospalax priniitivus n. sp.

Şekil 1: Sağ M1, türörnek, X10; la) Dış yüzden; lb) İç yüzden
Şekil 2: Sol M1, X10
Şekil 3: Sol M1, X10
Şekil 4: Sağ M_2, X10
Şekil 5: Sag M_2, X10
Şekil 6: Sol M_3, Xl0
Şekil 7: Sol M_1 -M_2, X10; 7a) Dış yüzden
Şekil 8: Sağ M1 -Ma, X10

Anomalomoys gaudryi Gaillard

Şekil 9: Sol M_2, X15; 9a) İç yüzden; 9b) Dış yüzden

PLATE I

LEVHA I

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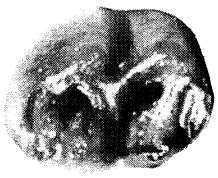

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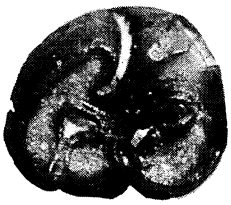

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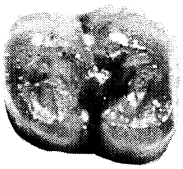
4a.

4b.



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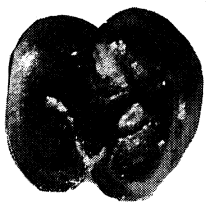

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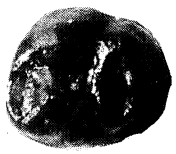

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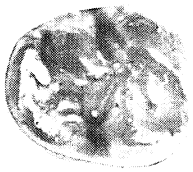
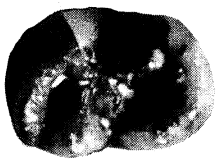


1

1a.

1b.



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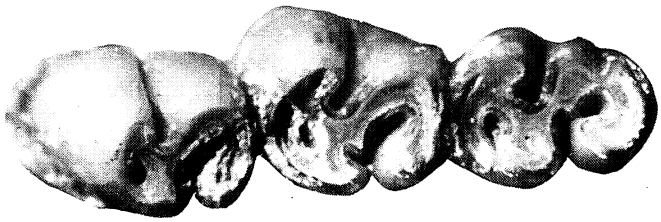
6



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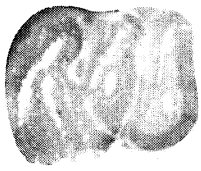

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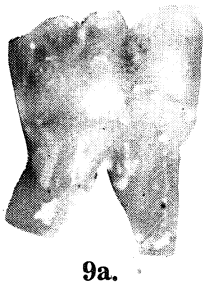

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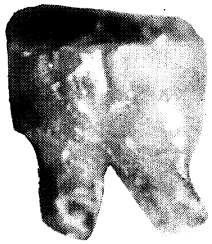

9b.