

TWO NEW SPECIES OF CAPRINIDAE FROM THE BAYBURT AREA (EASTERN BLACK SEA, TURKEY)

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ABSTRACT.- Two new species of Caprinidae *Sabinia ornata* n. sp. and *Mitrocaprina madeniana* n. sp. have been described from the Maastrichtian sandy limestones of Maden (Bayburt) area.

INTRODUCTION

The aim of this study is mainly to describe the new species of Caprinidae collected from the Sırataşlar ridge, SW Maden-Bayburt area (Fig. 1).

In the eastern Black sea, the Upper Cretaceous rudistid formations show sparse distributions (Fig. 1). The rudists occur in the volcano-sedimenter sequence around Ordu, Giresun, and Trabzon (Özsayar et al., 1981; Özer, 1988, 1991),

but, they are present in turbiditic sequence not including volcanic interbedding in the Bayburt and Erzurum area (Bektaş. et al., 1984). Among these localities only the rudist fauna of Maden (Bayburt) area recently determined by Fenerci (1992).

The Caprinidae specimens are collected by present authors at the different times from Maden area. The holotypes and paratypes of the new species are preserved at Geological Engineering Department of Dokuz Eylül University, İzmir.

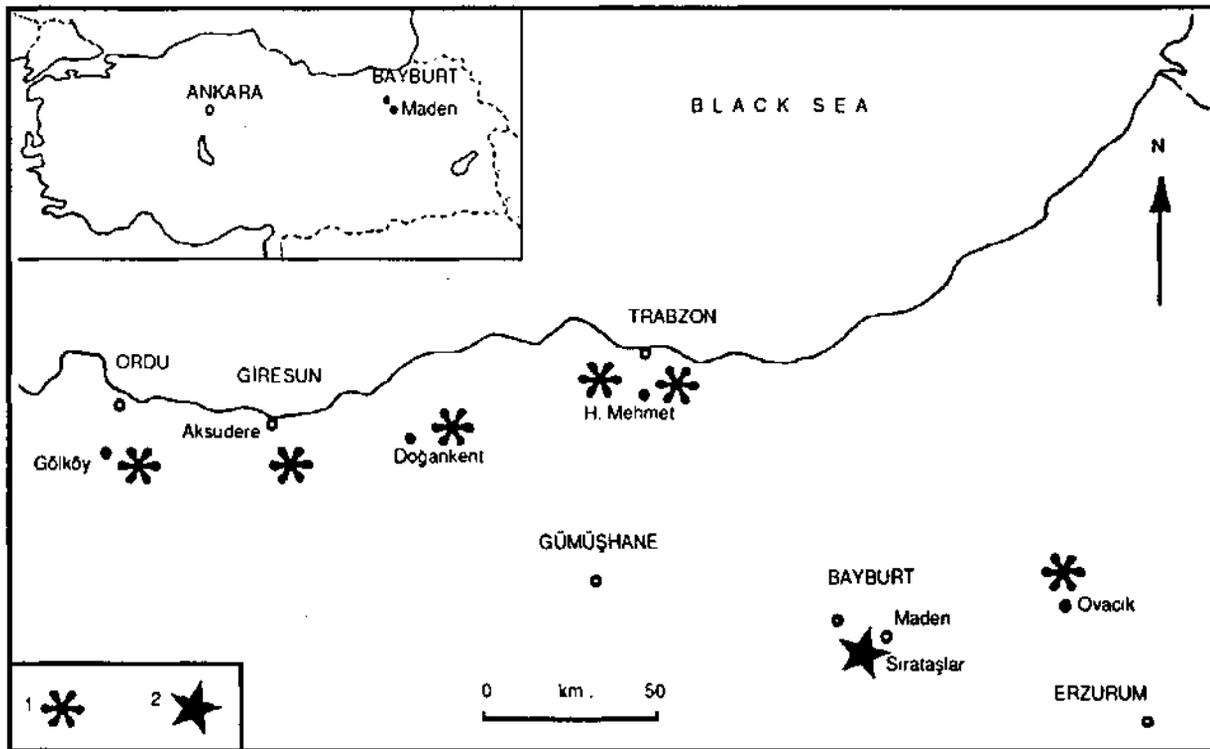


Fig. 1- Map showing distribution of rudistid outcrops (1) in the Eastern Pontids and location (2) of the new species.

STRATIGRAPHIC SETTING

The geology of Maden (Bayburt) area has been studied by Ketin (1951), Gattinger et al. (1962), Özsayar et al. (1981) and Bektaş et al. (1984).

The rudists are found in the reefal limestones overlying the ophiolitic serie. The rudist formation is made up sandy limestones consisting abundant rudists, gastropods, and hermatypic corals. The rudist fauna is poor and consists of *Hippurites sulcatoides* Douville, *Hippurites* sp., *Vaccinites ultimus* Milovanovic, *Joufia cappadociensis* (Cox), and *Sabinia* sp. (Pl. IV, fig. 5; Pl. V, fig. 3,4).

Vaccinites ultimus and *Joufia cappadociensis* are characteristic for the Maastrichtian of Turkey (Özer, 1988, 1992). These species are well known and determined with rudists and benthonic foraminifers indicated a Maastrichtian age in the Eastern Anatolia (Karacabey, 1972) and Central Anatolia (Özer, 1983, 1985). *Vaccinites ultimus* and *Joufia cappadociensis* are also found in the Maastrichtian of Kocaeli Peninsula (Kaya et al., 1986; Özer et al., 1990), and Western Pontids (Kaya et al., 1986a). *Vaccinites ultimus* is widespread in the Maastrichtian of Eastern Als (Sladic, 1957; Sladic-Trifunovic, 1978), Yugoslavia (Sladic-Trifunovic, 1977), Bulgaria (Pamouktchiev, 1961, 1981). and Sicily (Camoin, 1983). *Joufia capadociensis* is known from the Maastrichtian of Romania (Lupu, 1976).

According to the stratigraphic and geographic distribution of *Vaccinites ultimus* and *Joufia capadociensis* in Turkey and also in the Eastern Mediterranean sub-province, a Maastrichtian age has been proposed to the rudists of Maden (Bayburt) area by Fenerci (1992). So, the Maastrichtian age is also accepted here for the new species.

In the studied area, the rudistid reefal limestones are unconformably overlain by the flysch-type sediments of Eocene age.

PALEONTOLOGY

Classis: Bivalvia Linne, 1758

Ordo: Hippuritoida Newell, 1965

Super Familia: Hippuntacea Gray, 1848

Familia: Caprinidae d'Orbigny, 1850

Genus; *Mitrocaprina* Boehm, 1895

Mitrocaprina madeniana n.sp.

(Pl. I, fig. 1-5; Pl. II, fig. 1-5; Text-fig. 2, 3)

Derivation of Name: From Maden where the specimens have been found.

Material: Three specimens with both of the lower and upper valves and upper valve of one specimen.

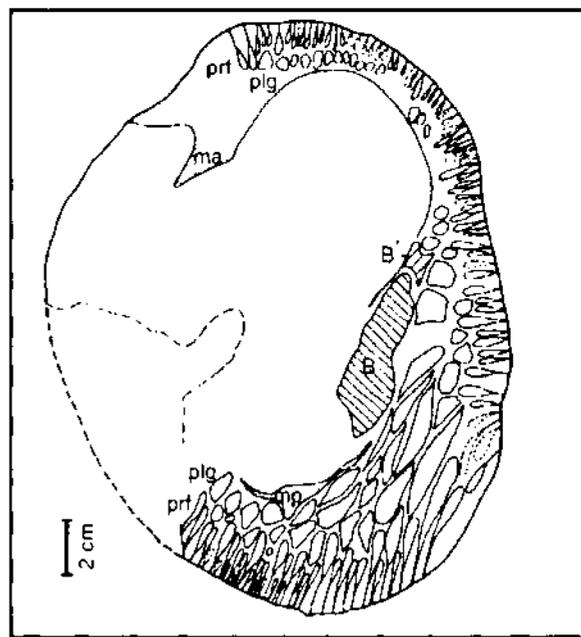


Fig. 2- *Mitrocaprina madeniana* n.sp.

Transverse section of the upper valve passing 12 mm above the commissure, holotype, No. Pm 27. The canal layer consists of two types canals such as pyriform (prf) in the outer part and polygonal (plg) in the inner part. In the posterior side, the canal layer comprise three rows of pyriform canals and also two rows of polygonal canals. Note the second row of polygonal canals which are elongated towards the cardinal area. The teeth (B, B') and myophores (mp, ma) are well preserved. Compare with the Fig. 3 in the Pl. II.

Holotype: Holotype is given in the Pl. I, fig. 1; Pl. II, fig. 1,2,3,4, and Text-fig. 2.

Type locality: In the southwest of Maden (Bayburt) the Sırataşlar ridge, map reference; Trabzon H44-c3; coordinate; 18.350:46.425 and 18.750:46750.

Type level: Maastrichtian.

Diagnosis: Lower valve short and conical. Upper valve capuloid towards the anterior side. Transverse section of the upper valve oval or sub-circular. Teeth robust. Posterior myophore (mp) thin and plate, anterior myophore (ma) grand. Canal layer of the upper valve occupies almost a whole periphery and consists of three outer rows of pyriform canals and two inner rows of polygonal canals. Canal layer thick in the posterior side.

Description: The lower valve is short (50-80 mm) and conical in shape. On the surface of the valve, only thin lamellae can be observed (Pl. I, fig. 1). The transverse section of the valve is ovaloid. The diameter is 60x100 mm in the holotype and 50x80 mm or 60x100 mm in the paratypes (Pl. I, fig. 3-5). The shell wall is thin (4-10 mm) and dark colored in the inner part. The teeth and myophores are clearly preserved in the paratypes. The anterior myophore (ma) is more developed than the posterior myophore (mp) (Pl. I, fig. 3-5).

The upper valve is capuloid in shape and inclined towards the anterior side overlapping the commissure about 10-12 mm (Pl. I, fig. 1; Pl. II, fig. 1). The height of the valve ranges from 50 mm to 70 mm. The transverse section is oval or sub-circular in shape and the diameter varies from 90x110 mm to 140x155 mm. The teeth are very robust and clearly observed. In the holotype the posterior tooth (B) is generally bigger than the anterior tooth (B) and it cover the grand part of the cardinal area. The anterior tooth is located above the posterior tooth (Pl. II, fig. 3, 2). The myophores are well preserved in all of the specimens. The anterior myophore (ma) is better developed than the posterior myophore (mp). The posterior myophore (mp) begins near the posterior tooth (B) being thin plate in shape. The canal layer is well preserved around the periphery of the valve. But, it is better devel-

oped in the posterior side of the valve (Pl. II, fig. 3-5; Fig. 2,3). The thickness of the canal layer is 40 mm in the posterior side, whereas it is diminished towards the anterior side, about 7-10 mm. The canal layer consists of two types of canals such as pyriforms and polygonals. The outer part of the canal layer comprises three rows of pyriform canals like *Plagiptychus* Matheron and they are elongated about 20-30 mm towards the inner part of the canal layer, especially around the posterior side. The inner part of the canal layer consists of two rows of polygonal canals which are located around the posterior side and near the cardinal area. The second row of polygonal canals are generally elongated

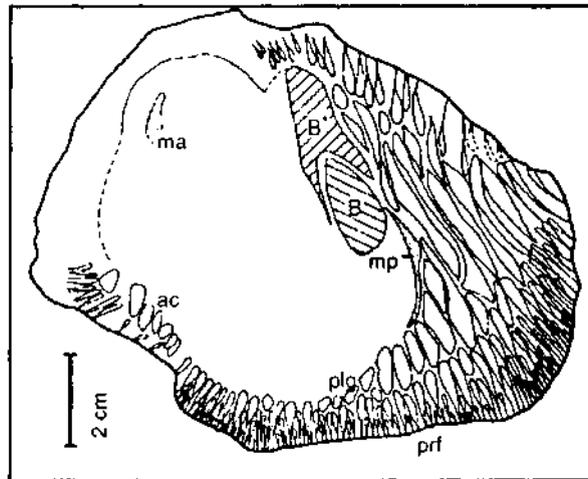


Fig. 3- *Mitrocaprina madeniana* n.sp.
Transverse section of the upper valve passing 10 mm above the commissure, paratype, No. Pm29.

The teeth are very robust and clearly observed. Towards the anterior side, some sections (ac) showing resemblances with the accessory cavities of caprinids, could be seen. Compare with the Fig. 4 in the Pl. II.

(20-37 mm) towards the cardinal area. In the anterior part, one row of little polygonal canals are also present. In the anterior side of some specimens, some sections showing similarities with the accessory cavities of caprinids could be seen (Pl. II, fig. 4,5; Fig. 3).

Discussion: The canal layer of the specimens shows principal features of the genus *Mitrocaprina* Boehm. The specimens present some similarities to *Mitrocaprina vidali* Douville and *Mitrocaprina bulgarica* Tzankov, by the organization of the canal layer of the upper valve. But, they differ from these species by the presence of many pyriform canals, and by the inclination of the upper valve towards the anterior side, while *Mitrocaprina vidali* Douville and *Mitrocaprina bulgarica* Tzankov have a beak inclined to the cardinal area (Douville, 1904; Tzankov, 1965). *Mitrocaprina madeniana* n. sp. distinguish from the all known species of the genus *Mitrocaprina* Boehm by the oval or subcircular transverse section of the upper valve, by the canal layer which are almost observed around the periphery and by the position and well preservation of the cardinal area of the upper valve.

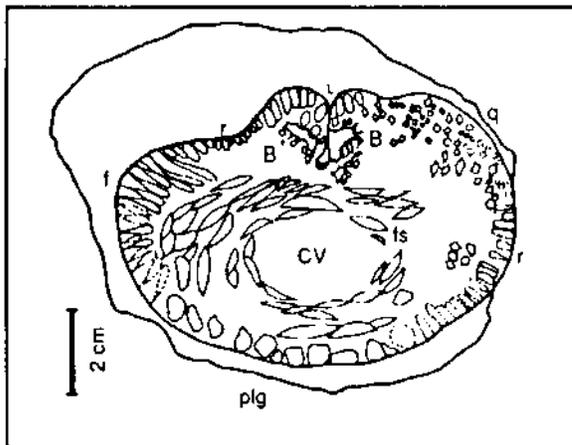


Fig. 4- *Sabinia ornata* n. sp.
Transverse section of the lower valve passing 15 mm below the commissure, holotype, No. Pm25.

The canal layer consists of fusiform (f), rectangular (r), quadrangular (q), and polygonal (plg) canals. Around the central cavity (CV), the fusiform sections (fs) showing some resemblances with the canals of caprinids, are also present. Compare with the Fig.1 in the Pl. IV.

Genus: *Sabinia* Parona, 1909.

Sabinia ornata n.sp.

(Pl. III, fig. 1-5; P. IIV, fig. 1-4; Pl. V, fig. 1,2; Text-fig. 4-6)

Derivation of Name: Because of the ornamentation of the siphonal region of the lower valve.

Material: One sample with two valves, three lower valves with partly preserved upper valve and five lower valves.

Holotype: Holotype is given Pl. III, fig. 1, 2; Pl. IV, fig. 1,4, and Text-Fig. 4, 5.

Type locality: In the southwest of Maden (Balyburt) the Sırataşlar ridge, map reference; Trabzon H44-c3; coordinate; 18.350:46.425 and 18.750:46.750.-

Type Level: Maastrichtian.

Diagnosis: Siphonal region of the lower valve ornamented with longitudinal costae and grooves. Posterior band (S) longitudinal costae, whereas the anterior- band (E) a smooth groove. Interband (I) very wide than the other bands and it represented by the longitudinal costae. Lamellae densely imbricate in the cardinal area. Ligamental ridge (L) long and truncated at the top. Canal layer of lower valve consists of four type canals such as fusiform, rectangular, quadrangular and polygonal. Canal layer of the upper valve thin and compose with fusiform and polygonal canals in small-size.

Description: The lower valve vary from conical to cylindroconical shape (Pl. III, fig. 1, 3-5; Pl. V, fig. 1, 2). The holotype is conical in shape and 60 mm in length, whereas the paratypes are cylindroconical in shape and 80 mm to 120 mm length. The external characters of the valve are not clearly preserved in the holotype, whereas, some lamellae which are characteristic of the new species, could be observed near the cardinal area. The surface of the paratypes is ornamented with 2-3 mm thick costae and grooves 2-3 mm wide (Pl. III, fig. 3, 4, 5; Pl. V, fig. 1, 2). The costae and grooves are located around the siphonal region where the growth lamellae cut the costae a strong zigzag pattern. In the cardinal area of the paratypes, the lamellae are densely imbricated (Pl. V, fig. 1). The ligamental ridge (L) can be seen at the surface as a 0.5 mm wide groove. The posterior band (S) is characterized by a 10 mm wide longitudinal costae (Pl. III, fig. 3-5; Pl. V, fig. 2). The anterior band (E) is marked

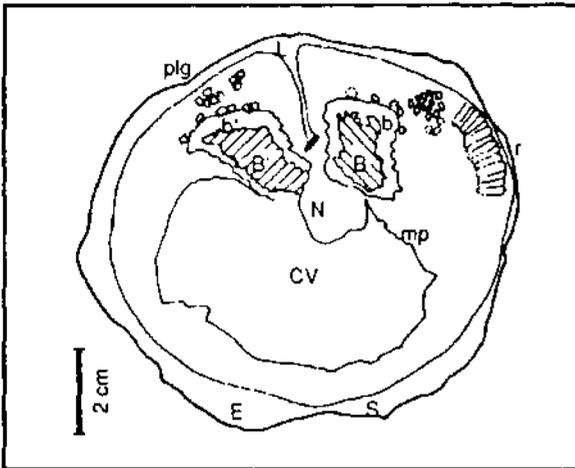


Fig. 5- *Sabinia omata* n. sp.

Transverse section of the lower valve passing 8 mm below the commissure, paratype, No. Pm26.

The teeth (B, B') and sockets (b, b') are well preserved. Only some canals such as rectangular (r) and polygonal (plg) are observed. Compare with the Fig. 2 in the Pl. IV.

with a 11 mm wide groove along the lower valve. This groove is very smooth but not deep. Interband (I) is typically very wide (35-40 mm) than the other bands, and it consists of 6-7 costae which are the same size with those of the posterior and anterior parts (Pl. III, fig. 3, 4, 5). The shape of the transverse section is subcircular to circular. The thickness of the shell wall of the holotype is not the same everywhere; it is 15 mm thick in the siphonal region, whereas 10-20 mm thick between the anterior and cardinal area. The holotype and some paratypes have an inward inflexion in the anterior side of the lower valve, near the ligamental ridge (Pl. IV, fig. 1, 3). The shell wall consists of regular polygonal cells about 0.5 mm in size, and sometimes they are elongated. In some transverse section, the siphonal bands show a slight curve the inner side of the shell wall and cause to undulate the prismatic cells. The ligamental ridge (L) is thin (1-1.5 mm), long (9-22 mm), and it is truncated at the top and widens towards the anterior side. At the top of ligamental ridge (L) black calcite filling is generally observed. The teeth (B, B') are well preserved and

they show zigzag contours (Pl. IV, fig. 2; fig. 4, 5). The anterior tooth (B') are generally bigger than the posterior tooth (B). The tooth of the lower valve (N) is partly preserved. The myophores are not preserved, because of the recrystallization. Only, in one sample, the posterior myophore (mp) can be partly observed (Pl. IV, fig. 2). The central cavity (CV) is oval in shape and more nearer to the siphonal area.

The canal layer of the lower valve is 10-20 mm thick and it comprises of four canal types. These are fusiform, rectangular, quadrangular, and polygonal. These canal types are typically observed in the holotype (Pl. IV, fig. 1; Fig. 4), whereas the paratypes have some canals such as rectangular and quadrangular. The polygonal canals are observed both of sides of the ligamental ridge and at the contours of the upper valve's teeth. Around the ligamental ridge, the polygonal canals are generally of the same size, but some of them are elongated towards the shell wall. In the siphonal area a single row of 11 polygonal canals are also observed. These canals are very large, about 3-7 mm in size, than the other polygonal canals. Many quadrangular canals are located between the ligamental ridge and posterior side of the lower valve. A row of rectangular canals are observed between the quadrangular and polygonal canals in the posterior side, and also between the fusiform and polygonal canals in the anterior side of the valve. In the anterior side, 10-15 mm length, 9 fusiform canals are observed. Some fusiform canals are elongated near the rectangular canals. There are also some fusiform sections around the central cavity (CV), showing resemblances with the canal structures.

The upper valve is strongly inclined towards the cardinal area and the beak overlapping the commissure line descending about 10 mm below (Pl. III, fig. 1). The height of the valve is 90 mm in the holotype. A lot and thin radial canals are seen, because the outer layer is partly eroded (Pl. III, fig. 2). The transversal section, passing 10 mm above the commissure, is circular in shape and the diameter is about 100 mm (Pl. IV, fig. 4). The ligamental ridge (L) is thin, long (14-15 mm), truncated and enlarged at the top towards the posterior side. The

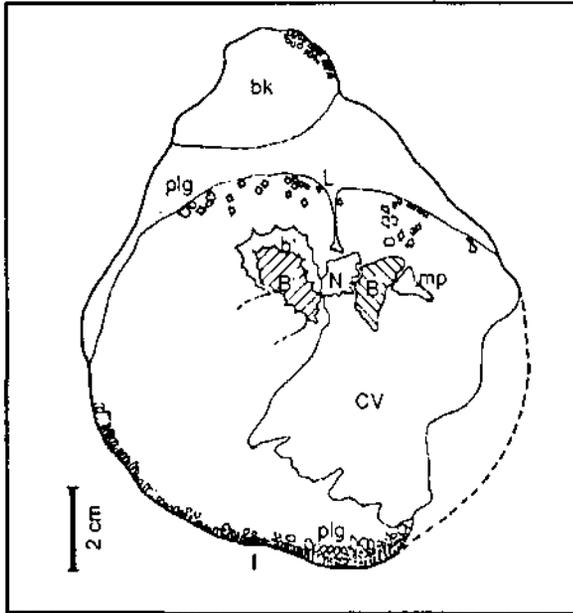


Fig. 6- *Sabinia ornata* n. sp.
Transverse section of the upper valve passing 10 mm above the commissure, holotype, No. Pm25.
The cardinal area is well preserved. The canal layer consists of fusiform (f) and polygonal (plg) canals. The section of the beak (bk) containing canals is also seen in the upper part of the figure. Compare with the Fig. 4 in the Pl. IV.

teeth of the valve are clearly preserved. The anterior tooth (B') is bigger than the other. The edge of the teeth are mostly zigzag in shape. The tooth of the lower valve is well developed. The posterior myophore (mp) is partly preserved.

The canal layer of the upper valve is not wide, about 3-5 mm, and it consists of fusiform and polygonal canals (Pl. IV, fig. 4; Fig. 6). The fusiform canals are 1-5 mm in length, and made generally of one row. However, in the siphonal region two row of the fusiform canals are observed. In the inner part of the canal layer, very little (1 mm) one row of numerous polygonal canal are arranged. In the both side of the ligamental ridge, many polygonal canals are also observed.

Discussion: *Sabinia ornata* n. sp. shows some resemblances to *Sabinia klinghardtii* Bohm

with the shape of the upper valve (Bohm, 1927), to *Sabinia aniensis* Parona and *Sabinia serbica* Kuhn and Pejovic with the shape of the canal of the upper valve (Parona, 1908; Kuhn and Pejovic, 1959). But, it differs from these species by the disposition of the canals of the upper and lower valve.

New species distinguish from all known species of *Sabinia* Parona by the characteristic structure of the siphonal region.

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PLATES

PLATE-I

Fig. 1 -5- *Mitrocaprina* madeniana n. sp.
Maastrichtian, Sırataşlar ridge, Maden, Bay-
burt.

Fig. 1- Upper and lower valves, posterior side, holo-
type, No. Pm 27, X0.6 Note thin lamellae (ar-
row) on the surface of the lower valve.

Fig. 2- Upper valve, view of the radial canals, para-
type, No. Pm 28, X0.5.

Fig. 3- Lower valve, transverse section near the com-
missure, paratype, No. Pm 31, X0.8. Some ca-
nals (arrow) of the upper valve are also ob-
served in the posterior side.

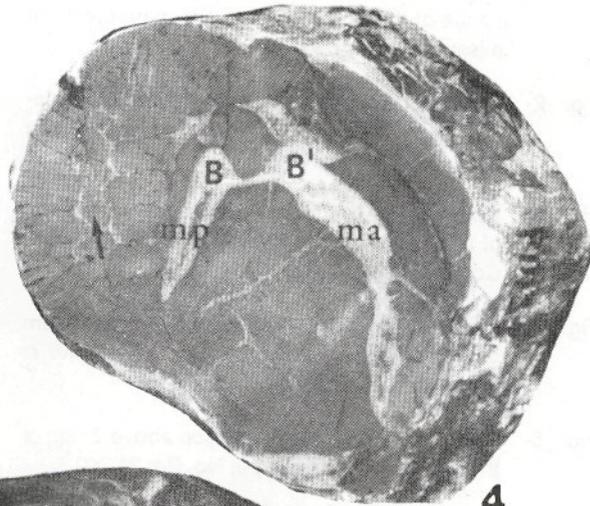
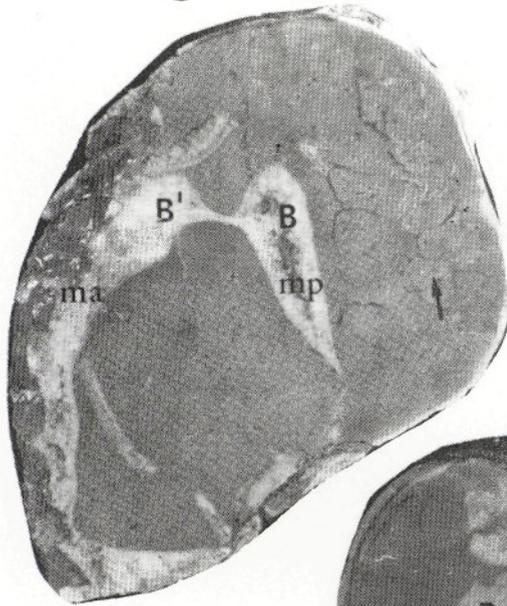
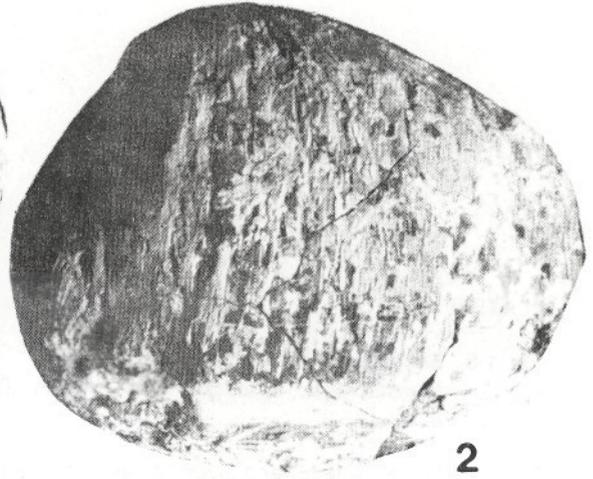
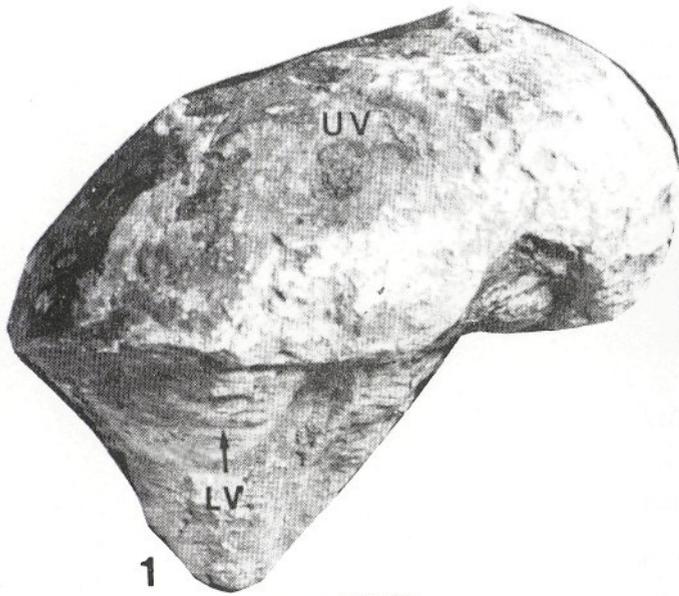
Fig. 4- Lower valve, transverse section near the com-
missure, paratype, No. Pm 31, X0.7. Note the
canals (arrow) of the upper valve.

Fig. 5- Lower valve, transverse section below 10 mm
of the commissure, paratype, No. Pm 29 X0.7.

UV, LV Upper and lower valves.

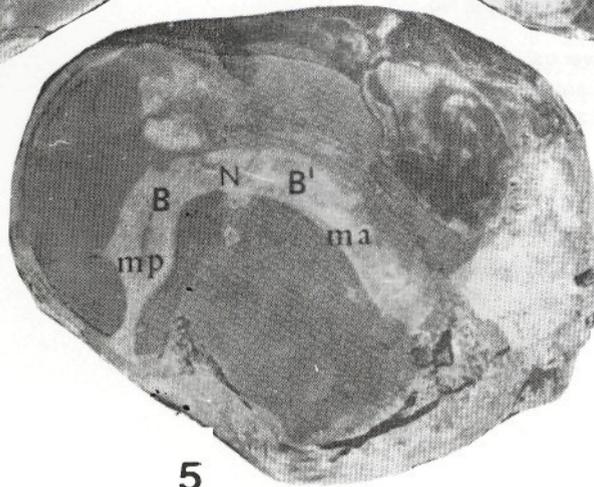
B , B ' Posterior and anterior teeth.

mp, ma Posterior and anterior myophores.



3

4



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PLATE-II

Fig. 1 -5- *Mitrocaprina madeniana* n. sp.
Maastrichtian, Sırataşlar ridge, Maden, Bay-
burt.

Fig. 1- Upper and lower valves, anterior side, holo-
type, No. Pm 27, X0.6. Note the capuloid
shape of the upper valve overlapping the com-
missure line (arrows).

Fig. 2- Upper and lower valves, external surface, holo-
type, No. Pm 27, X 0.5. Note the radial canals
(arrows) of the upper valve.

Fig. 3- Upper valve, transverse section above 12 mm
of the commissure, holotype, No. Pm 27, X0.6.
Compare with the Text-Fig. 2

Fig. 4- Upper valve, transverse section above 10 mm
of the commissure, paratype, No. Pm 29, X0.7.
Compare with Text-fig. 3.

Fig. 5- Upper valve, transverse section above 7 mm of
the commissure, paratype, No. Pm 31, X0.7.

UV, LV Upper and lower valves.

B, B' Posterior and anterior teeth.

mp, ma Posterior and anterior myophores.

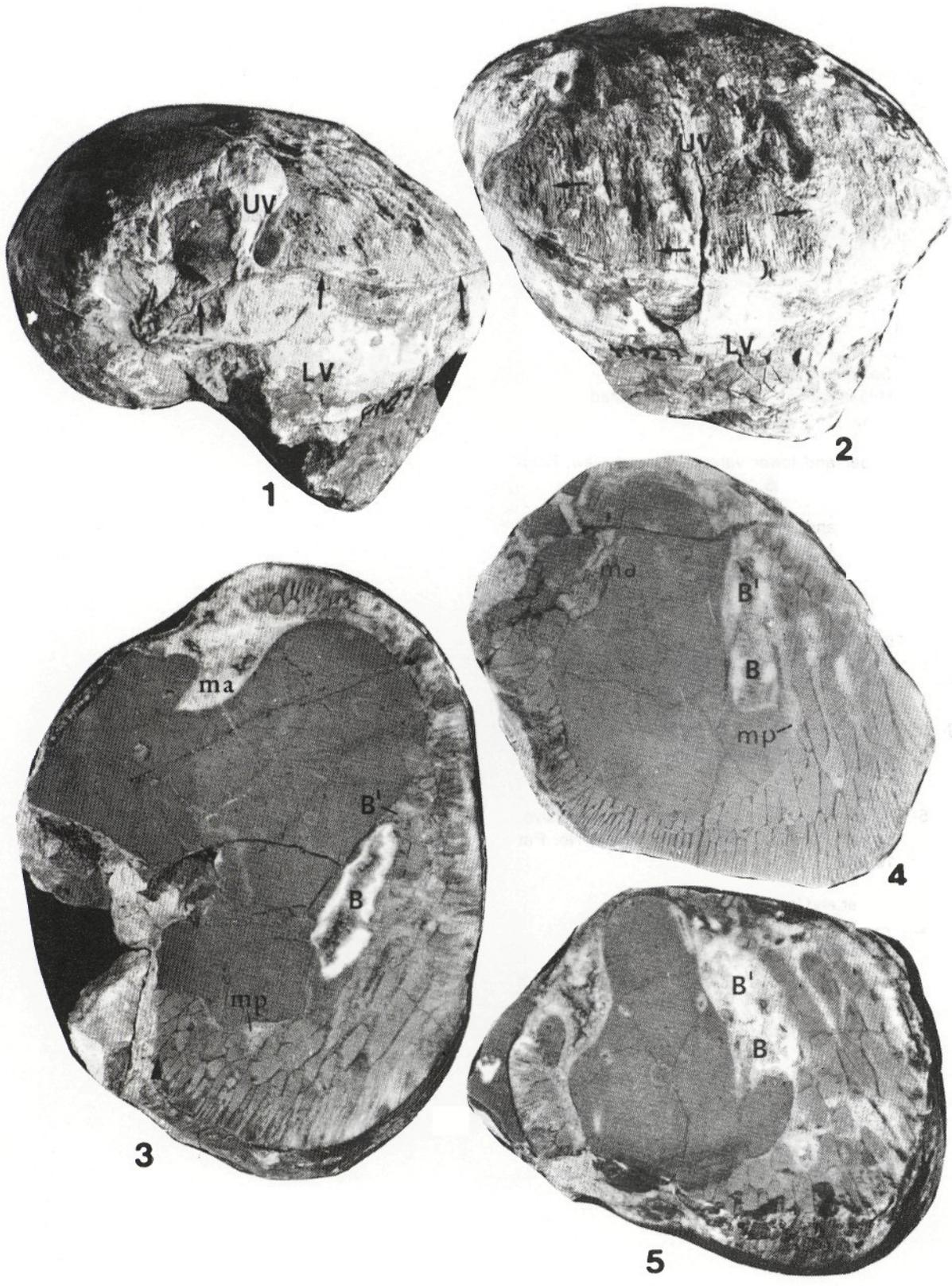


PLATE-III

Fig. 1 -5- *Sabinia ornata* n. sp.

Maastrichtian, Sirataşlar ridge, Maden, Bayburt.

Fig. 1- Upper and lower valves, external view, holotype, No. Pm 25, X0.5.

Fig. 2- Upper and lower valves, view of the siphonal region, holotype, No. Pm 25, X0.6. Note the radial canals (arrow) of the upper valve.

Fig. 3- Lower valve, external view of the siphonal region, paratype, No. Pm 14, X1. Note the costae of the interband (I) showing the resemblance with those others costae.

Fig. 4- Lower valve and partly preserved upper valve, view of the siphonal region, paratype, No Pm 16.X0.5.

Fig. 5- Lower valve and partly preserved upper valve, external view of the siphonal region, No. Pm 18, X0.9.

UV, LV : Upper and lower valves.

S, E : Posterior and anterior siphonal bands.

I : Interband.

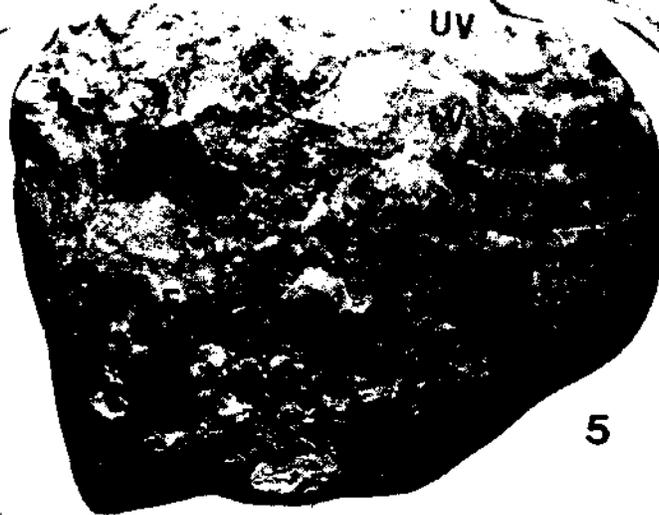
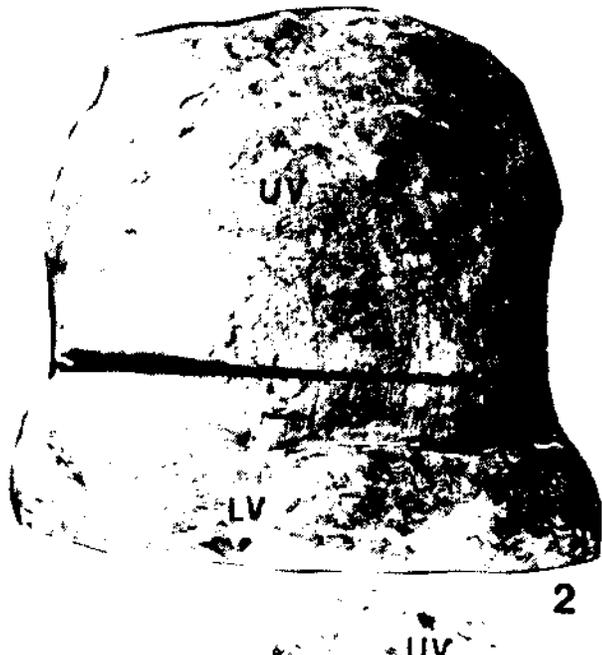
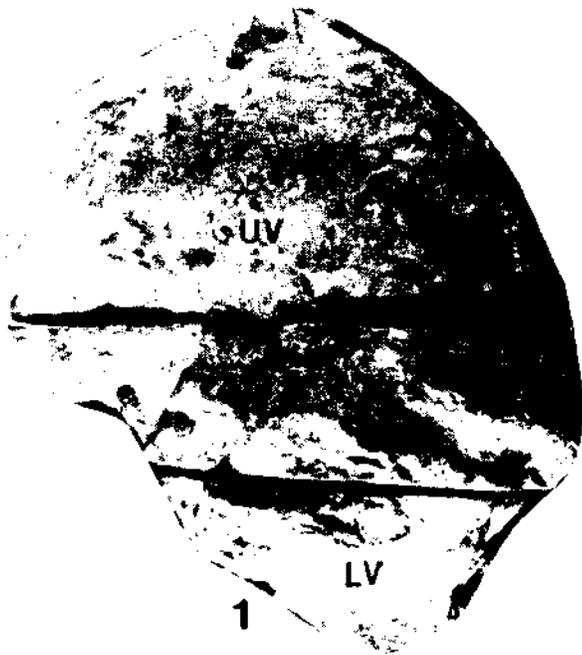


PLATE-IV

Fig. 1-4- *Sabinia ornata* n. sp.
Maastrichtian, Sirataşlar ridge, Maden, Bay-
burl.

Fig. 1- Lower valve, Transverse section below 15 mm
of the commissure, holotype, No. Pm 25, X0.7.
Compare the canals (r, f, plg, q) with the text-
fig. 4.

Fig. 2- Lower valve, transverse section below 8 mm of
the commissure, paratype, No. Pm 26, X0.8.
Compare with the text-fig. 5.

Fig. 3- Lower valve, transverse section, commissure
unknown, paratype, No. Pm 14, X1.2. Note the
rectangular canals (r).

Fig. 4- Upper valve, transverse section above 10 mm
of the commissure, holotype, No. Pm 25, X0.7.
The section of the upper valve's beak (bk) is
also seen. Compare with the text-fig. 6.

Fig. 5- *Hippurites sulcatoides* Douville
Maastrichtian, Sirataşlar ridge, Maden, Bay-
hurt. Lower valve, transverse section, commis-
sure unknown, No. Pm 6, X1.3. The ligamental
ridge shows a slight bending inward. The pos-
terior pillar is short while the anterior is slightly
narrow-necked.

L : Ligamental ridge.

Sp, Ep : Posterior and anterior pillars.

CV : Central cavity.

mp : Posterior myophore.

B, B', N : Teeth.

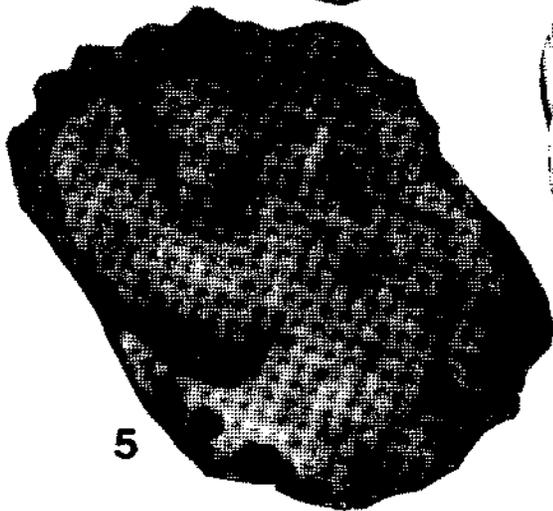
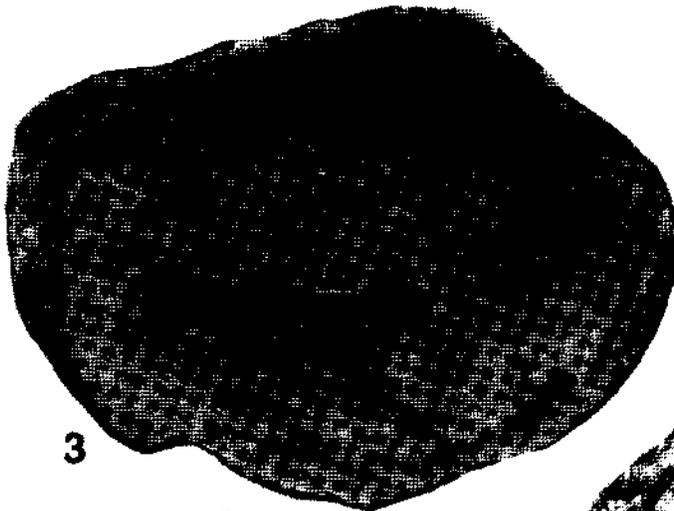
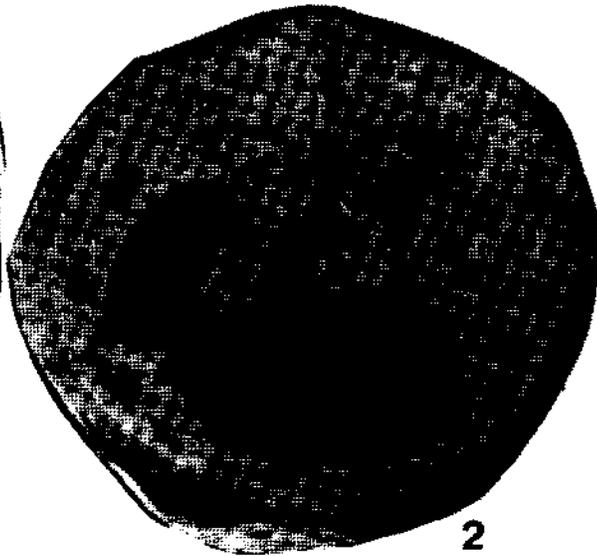
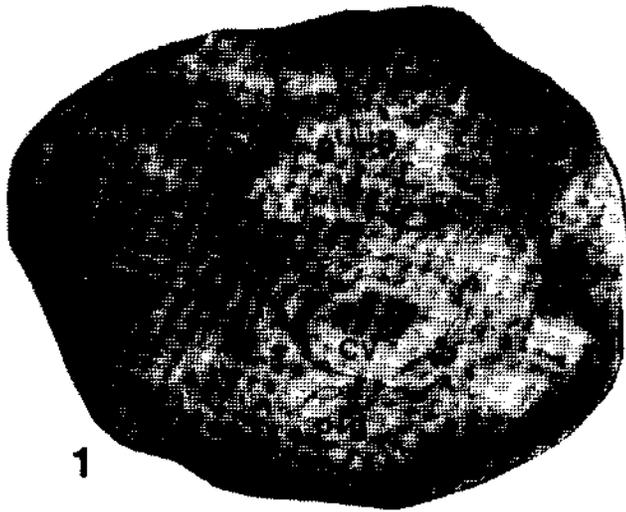


PLATE -V

- Fig. 1 -2- *Sabinia ornata* n. sp.
Maastrichtian, Sırataşlar ridge, Maden, Bay-
burt.
- Fig. 1- Lower and partly preserved upper valve, view
of the posterior side very near to the cardinal
area, paratype, No. Pm 26, X0.6. Note the la-
mellae (arrow) densely imbricated around cardi-
nal area
- Fig. 2- Lower valve, external view of the siphonal re-
gion, paratype, No. Pm 15, X0.8.
- Fig. 3- *Vaccinites ultimus* Milovanovic
Maastrichtian, Sırataşlar ridge, Maden, Bay-
burt. Lower valve, transverse section, commis-
sure unknown, No. Pm 12 X0.9.
- Fig. 4- *Joufia cappadociensis* (Cox)
Maastrichtian, Sırataşlar ridge, Maden, Bay-
burt. Upper valve, transverse section nearer the
commissure, No. Pm 22, X0.8. The cardinal
area is well preserved. Note the canal layer
consisting of a single row radial canals.

UV, LV : Upper and lower valves.

S, E : Posterior and anterior siphonal bands.

I : Interband.

L : Ligamental ridge.

B, B' : Teeth.

Sp, Ep : Posterior and anterior pillars.

mp, m : Posterior and anterior myophores.

