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BUDAPESTINENSIS
DE ROLANDO EÖTVÖS
NOMINATAE

SECTIO GEOLOGICA

Tomus XXXIV

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Nautiloid cephalopods from the Middle Eocene of Iszkaszentgyörgy, Transdanubian Hungary

András GALÁCZ[1]

(with 4 figures)

Abstract

Two nautiloid specimens are described from the Transdanubian (West Hungarian) Middle Eocene. The specimens belong to the species *Euciphoceras regale* (J. SOW.) and *Cimomia elliptica* (SCHAFHÄUTL). While these Nautiloids represent a subordinate part of the otherwise very rich molluscan fauna of the localities, their appearance may suggest connections with areas in the wider paleogeographic surroundings.

Introduction

The Eocene formations, especially the Middle Eocene nummulitic limestones of the Transdanubian Central Range not uncommonly yield nautiloids. These have been usually recorded in faunal lists (see e.g. SZŐTS 1956), but systematic evaluations, or proper descriptions, with the one exception of the works of VOGL (1908, 1910, 1911), are missing. Realizing that Nautiloids are good indications of marine connections, paleocurrents and other paleoceanic parameters, it seemed worth treating the old and new finds with special attention. This paper is a sequel of a former short note (GALÁCZ 1987) aimed to start introducing the Hungarian Tertiary representatives of this somewhat neglected fossil group.

Material

In Iszkaszentgyörgy the Eocene sequence is well-known as a good source of fossils. Most common group is that of the molluscs, including occasional Nautiloids (KECSKEMÉTI-KÖRMENDY & MÉSZÁROS 1980, p. 9; KOPEK 1980, p. 59). There are several Middle and Upper Eocene horizons with rich fossil assemblages exposed in numerous natural and artificial outcrops. These latters are the abandoned bauxite pits, which expose mainly the nummulitic limestones and marls forming the higher cover of the bauxite exploited here. The richest mollusc material came from the cut of the road

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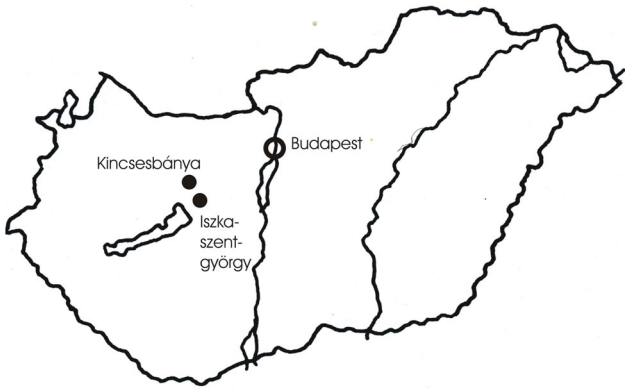
leading to the former coal mine shaft (Kincses II).

One of the here described specimens is from the former collection of the Department of Geology of Eötvös University. It has a label with inventory no. M80, locality as Iszkaszentgyörgy, and a year: 1966. The collector is not recorded. The other specimen is from the collection of Z. EVANICS, a private collector, who kindly provided his material for study. The specimen is labelled as No. 76/596, and was collected in 1990 in Kincsesbánya, near Iszkaszentgyörgy (Text-fig. 1).



Text-fig. 1. Localities of the described Nautiloids

Systematic descriptions

Classis Cephalopoda CUVIER, 1795
Subclassis Nautiloidea AGASSIZ, 1847
Ordo Nautilida AGASSIZ, 1847
Superfamilia Nautilaceae BLAINVILLE, 1825
Familia Nautilidae BLAINVILLE, 1825
Genus *Euciphoceras* SCHULTZ, 1976

Euciphoceras regale (J. de C. SOWERBY, 1823)
Text-figs 2, 3.

1822. *Nautilus regalis* – SOWERBY, J. de C., p. 77, pl. 355.
1849. *Nautilus regalis*, SOWERBY – EDWARDS, p. 46, pl. IV, pl. VIII, fig. 5.
1849. *Nautilus urbanus* SOWERBY – EDWARDS, p. 46, pl. III, fig. 2, pl. VIII, fig. 4.
non 1880. *Nautilus regalis* SOW. – DE GREGORIO, p. 2, pl. B, figs 6, 7.
1891. *Nautilus urbanus*, J. de C. SOWERBY – FOORD, p. 320.
1908. *Nautilus regalis* SOW. – VOGL, p. 639, text-fig. 1.
1976. *Eutrephoceras* (*Euciphoceras*) *regale* (SOWERBY, 1822) – SCHULTZ, 1976a, p. 5, text-fig. 1D.
1976. *Eutrephoceras* (*Euciphoceras*) *regale* (J.SOWERBY, 1922) – SCHULTZ, 1976b, p. 9, text-fig. 1D.

Measurements

Specimen	Diameter (D)	Whorl height (Wh)	Wh/D	Whorl breadth (Wb)	Wb/D	Umbilical breadth (U)	U/D
M.60	127	70	0.55	66	0.52	10.5	0.08
	85	50	0.59	54	0.63	6	0.07

Description

A medium-size, slightly squeezed, but otherwise well-preserved internal mould. This is an adult example, showing the crowding of the last three septa at 115 mm diameter, and preserving a short part of the infilled body-chamber. The whorl-section (Text-fig. 3A) is high trapezoidal, with rounded umbilical shoulder, flattish, convergent flanks, rounded ventrolateral margin, and wide, depressed venter. Position of the siphuncle is not visible.

The suture line (Text-fig. 3C) is undulating for the genus, having a narrow umbilical saddle, a very wide, shallow lateral lobe, and a slight ventral lobe.

Comparison and remarks

Eucipheroceras regale is a well-distinguished species by its whorl-section with flattened flanks and venter. The original of *Nautilus regalis* figured by VOGL (1908, text-fig.1) is now in the collection of the Department of Paleontology, Eötvös L. University. This is a big (nearly 200 mm diameter) specimen, septate up to about 160 mm, and shows the characteristic, trapezoidal whorl-section.

Distribution

E. regale seems to be a common nautilid in the Eocene of Europe. In Austria, it occurs mainly in the Middle Eocene (see SCHULTZ, 1976b). The here described specimen came most probably from the „*Nummulites perforatus* marl" of the Upper Lutetian.

Genus *Cimomia* CONRAD, 1866

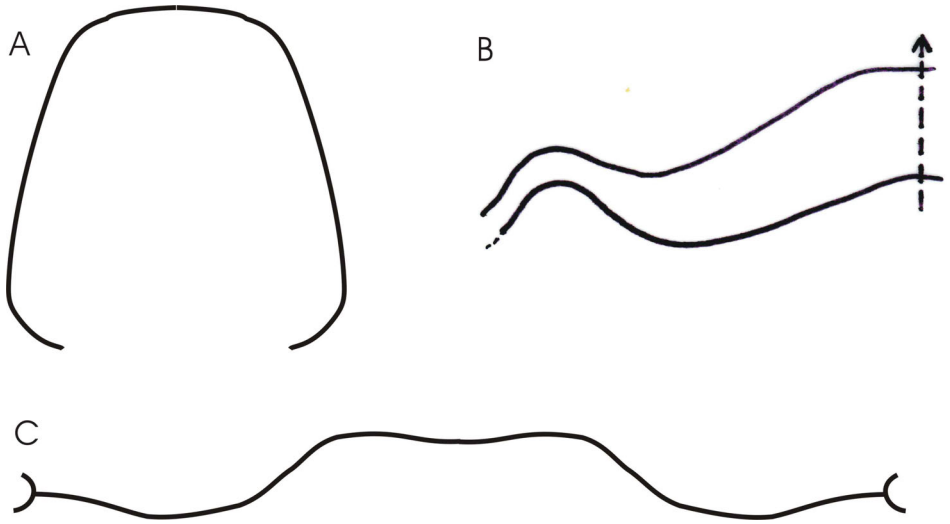
Cimomia elliptica (SCHAFHÄUTL, 1852)
Text-figs 3, 4

1863. *Nautilus ellipticus* mihi – SCHAFHÄUTL, p. 214, pls 57, 58.
1891. *Nautilus ellipticus*, SCHAFHÄUTL – FOORD, p. 324.

Material

A single, small specimen – internal cast – from the so-called „*Nummulites perforatus* horizon" of Kincsesbánya, near Iszkaszentgyörgy, from the collection of Z. Evanics.

Text-fig. 2. *Eutrephoceras regale* (SOW.). Iszkaszentgyörgy, Middle Eocene. Collection of the Department of Paleontology. A: ventral view; B: lateral view (x0.9)



Text-fig. 3. Suture-lines and cross-section of the described forms. A and C: Cross-section and suture-line of *Euciphoceras regale* (SOW.) at 90 mm diameter (x1); B: Suture-lines of *Cimomia elliptica* (SCHAFHÄUTL) at 52 mm diameter (x2)

Measurements:

Specimen	Diameter (D)	Whorl height (Wh)	Wh/D	Whorl breadth (Wb)	Wb/D	Umbilical breadth (U)	U/D
76/596	90	57	0.63	? 42	? 0.47	? 4	? 0.05
	61	36	0.59	? 24	? 0.39	-	–

Description

A small, somewhat compressed specimen consisted entirely of the phragmocone. Seemingly a subadult specimen, because there are no traces of sutural crowding around the last visible sutures. Near the end of the septate part the distortion is smaller, here the whorl with narrow umbilicus shows high-oval cross-section with low, rounded umbilical wall, slightly convex, convergent flanks and narrow, arched venter. Maximum width of the whorl appears below the middle of the flanks, near to the umbilical margin. Siphuncle cannot be seen.

The suture-line (Text-fig. 3B) shows a narrow umbilical saddle and a wide, shallow lateral lobe, then runs straight across the venter.

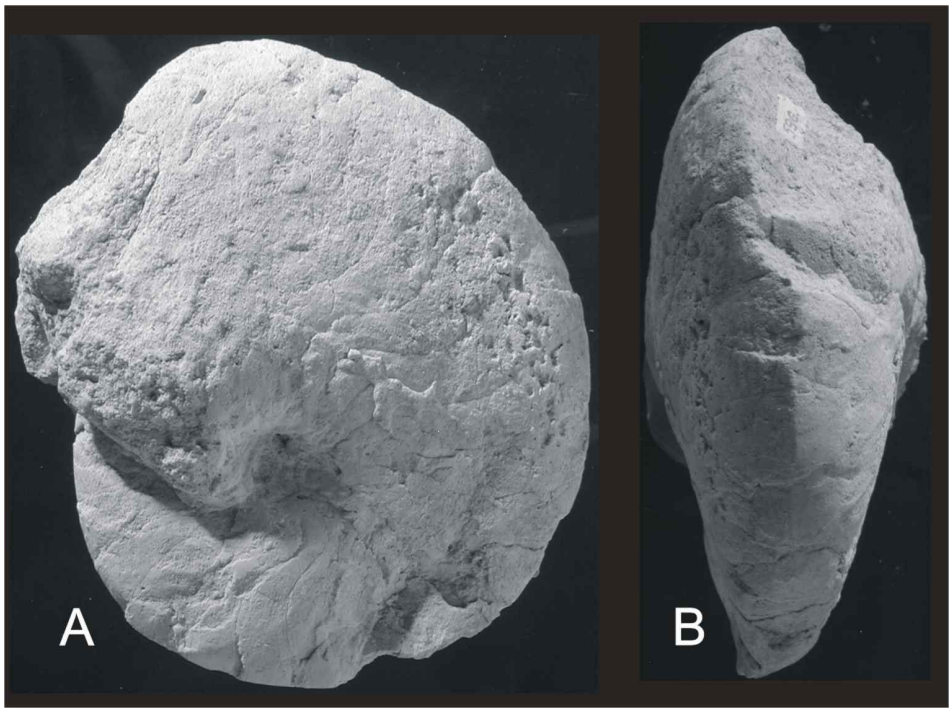
Comparison and remarks

This is a young specimen, with its dimensions half as those of the type. With its narrow, high-oval whorl-section it matches „*N.*" *ellipticus* SCHAFHÄUTL, the only narrow-whorled form within the genus. „*Nautilus*" *ellipticus*, designated by SCHAFHÄUTL belongs into genus *Cimomia* on the basis of its suture-line with shallow

lateral lobe and narrow, but highly-rounded umbilical saddle (see also KUMMEL 1956). It differs from the other Eocene *Cimomia* species by its narrow, high-oval whorl-section.

Distribution

C. elliptica seems to be a rare species, even the description given by FOORD (1891) refers to specimens in the Natural History Museum from the type locality Kressenberg (Bavaria). The Bavarian specimens, just as the here described example, came from the Middle Eocene Lutetian.



Text-fig. 4. *Cimomia elliptica* (SCHAFHÄUTL). Kincsesbánya, Middle Eocene. EVANICS collection (No. LC 76/596). A: lateral view; B: ventral view. Natural size.

Conclusions

As in other rich Middle Eocene localities of the Transdanubian Central Range, in the Iszkaszentgyörgy-Kincsesbánya fossil sites nautiloids also occur. Nevertheless, this occurrence yielded these forms in low proportion knowing the huge mollusc material collected previously from these fossil-rich beds. This can probably due to the fact that the so-called *perforatus* beds are the first fully marine formations here and in the wider, Bakony Mountain area following a coal-bearing terrestrial sequence. The appearing nautiloids may indicate that after a long terrestrial period not only the fully marine

environment, but the wider, high-sea connections became established only for later Middle Eocene times.

Acknowledgements

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Taxonomical revision of the Late Würm *Sorex* (Mammalia, Insectivora) remains of Hungary, for proving the presence of an alpine ecotype in the Pilisszántó Horizon

L. Gy. MÉSZÁROS[1]

(with 2 figures, 1 table and 1 plate)

Abstract

Fossil bone assemblages of 14 localities, ranged in the Pilisszántó Horizon (Late Würm), are stored in the collection of the Geological Museum of Hungary and Hungarian Natural History Museum. *Sorex araneus* findings were reported from five of them (Balla Cave, Bivak Cave, Peskő Cave, Petényi Cave, Pilisszántó Shelter). Taxonomic revision of *S. araneus* showed that several specimens belong to *S. alpinus* in Balla Cave and Petényi Cave. The presence of this form, supported by other Boreo-Alpine fauna elements, indicates not only a significantly cold climate in the Pilisszántó Horizon, but the development of a special ecotype in the named localities. However. as the sites are only 400–800 m above see level, mountainous relief and periglacial climate yielded open mountain vegetation above the zone of pine forests.

Introduction

The present author formerly studied Soricidae material of the Late Würm Vaskapu Cave in Bükk Mountains, Hungary (MÉSZÁROS, 1999). Beside many *Sorex araneus* and *S. minutus* findings he determined Alpine shrew, *Sorex alpinus* from the fauna. This was the first detailed description of this form from the fossil fauna of Hungary. He declared, that "being two hardly distinguished species, some *S. alpinus* occurrence might have been mentioned in the literature as the very common Quaternary shrew, *S. araneus*" and "this problem needs a comprehensive review in the future".

The fossil fauna of 14 localities were ranged in the Pilisszántó horizon of the Late Würm glacial period by the book of JÁNOSSY (1979) about the biostratigraphy of the Hungarian Pleistocene.

Five of them (Balla Cave, Ballavölgy Cave, Görömböly-Tapolca Cave, Remetehegy Shelter, Peskő Cave) are stored in the Geological Museum of Hungary (GMH). A few

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specimens from Pilisszántó Shelter are also registered here. Among these we could have found *Sorex* remains only in Balla Cave, Peskő Cave and Pilisszántó Shelter samples.

The material of 5 sites (Diósgyőr-Tapolca Cave, Kiskevély Cave, Remete Cave, Szelim Cave, Tarkő Shelter) are registered in the collection of the Geological and Palaeontological Department of the Hungarian Natural History Museum (HNHM), but without *Sorex* occurrence. A few specimens of the fossil fauna of Jankovich Cave are present in the HNHM, but the others are in the GMH. *Sorex* forms could have been determined from Bivak Cave, Petényi Cave and Pilisszántó Shelter in the HNHM collection.

Therefore the present paper discusses the taxonomical revision of the *Sorex* species of Balla Cave, Peskő Cave, Pilisszántó Shelter (GMH), Bivak Cave, Petényi Cave and Pilisszántó Shelter (HNHM) (Tab. 1, Fig 1).

Table 1- *Sorex araneus* and *Sorex alpinus* occurrences in the Hungarian localities from Pilisszánó Horizon. * *S. alpinus* is reported by VÉRTES (1965) from Peskő Cave, but it was not find by this study on the present GMH material from this site. ** after MÉSZÁROS (1999 and 2003).

Locality	Stored in	*Sorex araneus* or *alpinus* occurrence
Balla Cave	GMH	*araneus, alpinus*
Ballavölgy Cave	GMH	–
Bivak Cave	HNHM	*araneus*
Diósgyőr-Tapolca Cave	HNHM	–
Gömböly-Tapolca Cave	GMH	–
Jankovich Cave	GMH, HNHM	–
Kiskevély Cave	HNHM	–
Peskő Cave	GMH	*araneus* (*alpinus**)
Petényi Cave	HNHM	*araneus, alpinus*
Pilisszántó Shelter	GMH, HNHM	*araneus*
Remete Cave	GMH	–
Remetehegy Shelter	HNHM	–
Szelim Cave	HNHM	–
Tarkő Shelter	HNHM	–
Vaskapu Cave	PM	*araneus, alpinus***

Morphological terms and the measurements (in millimetres) are used after REUMER (1984). Abbreviation used in the text and the tables: GMH = Geological Museum of Hungary, HNHM = Hungarian Natural History Museum, PM = Pásztó Museum, Hungary, Nógrád Village, Inv. Nr. = inventory number, I = incisor, A = antemolar, M = molar, L = length, W = width, H = height.

Localities

Balla Cave

The locality is situated in the Bükk Mountains, at about 500 m north-northeast of Balla Hill, near Répáshuta village, at an altitude of 600 m above see level. JÁNOSSY (1979) reported Pilisszántóian fauna in one of the layers of the sediment. Rich and well-preserved *Sorex* assemblage is stored in the collection of the GMH from the site.

Alpine fauna element (VÉRTES 1965):

Microtus nivalis

Sorex species (present study):

Sorex araneus
Sorex alpinus

Bivak Cave

The locality is situated in the Western side of the Pilis Hill, which is the highest top of the Pilis Mountains, about 18 km north-northeast of Budapest, at an altitude of 560 m above see level. The „Cave" is a small, fissure-like shelter, containing layered sediments, which yielded rich Pleistocene and Holocene faunas.

Alpine fauna elements (VÉRTES 1965):

Microtus nivalis
Lepus timidus
Capra ibex

Sorex species (according to the present studies):

Sorex araneus

Remarks: *Crocidura leucodon* occurrences dominate the Soricidae fauna of Bivak Cave. Seven *Crocidura* remains, but only one *Sorex* mandible was found in the fossil sample. The dominance of *Crocidura* indicates warmer and drier climate in Bivak Cave than at other sites. However, all *Crocidura* specimens came from the Holocene layers of the site, while Alpine elements and *S. araneus* were found in the Pleistocene ones.

Peskő Cave

The cave is situated in the Bükk Mountains, as horizontally and vertically very near to the Petényi (Peskő 2) Cave. The remains from the "brick red" and "yellowish" strata of its sediments are determined as Pilisszántóian fauna by JÁNOSSY (1979). Beside many arctic and alpine forms, VÉRTES (1965) reports *S. alpinus* in the fauna. Unfortunately, we have found only one *Sorex* skull fragment in the collection of GMH. The alpine shrew could not present in the sample.

Alpine fauna elements (VÉRTES 1965):

Pyrrhocorax pyrrhocorax
Sorex alpinus
Lepus timidus
Microtus nivalis

Rupicapra rupicapra
Capra ibex
Sorex species (present study):
Sorex araneus

Petényi Cave

The locality is situated in the southern side of Peskő Hill in the Bükk Mountains, about 13 km north-northeast of Eger, at an altitude of 735 m above see level. It is a rock shelter of 13 m length and 8 m width. Five Holocene and one Pleistocene layers were present in the sediments of the site.

Alpine fauna element (VÉRTES 1965):
Microtus nivalis
Soricidae species (this study):
Coicidura suaveolens (H5 layer)
Crocidura leucodon (H5 layer)
Crocidura sp. (H3 layer)
Neomys fodiens (P1 layer)
Sorex minutus (H3 and H5 layers)
Sorex araneus (P1, H3 and H5 layers)
Sorex alpinus (P1 layer)
Sorex sp. indet. (P1, H1, H2 and H5 layers)

Remarks: The fossiliferous layers of the site yielded Pleistocene and Holocene faunae as well. *Crocidura* and *Sorex minutus* are present in the Holocene samples, *S. araneus*, *Sorex* sp. indet. occur in both periods, while the Alpine fauna elements, *S. alpinus* and *Neomys fodiens* were found only in Pleistocene layers.

Pilisszántó Shelter

The rock shelter is situated in Upper Triassic (Dachstein) limestone of the Pilis Hill, in the vicinity of Pilisszántó village, about 10 km north-northeast of Budapest, at an altitude of 423 m above see level. One of the richest cave fauna of the Hungarian Upper Pleistocene was found in this site. The cause of the richness of the faunal assemblage might be that this locality was at the time of deposition superbly suited for human settlement and also for birds of prey and carnivorous mammals (JÁNOSSY 1979).

Alpine fauna elements (JÁNOSSY 1979):
Aquila chrysaetos
Lagopus mutus
Calidris alpinus
Pyrrhocorax graculus
Lepus timidus
Microtus nivalis
Capra ibex
Rupicapra rupicapra
Soricidae species (this study):
Sorex araneus

Sorex sp. indet.

Remarks: all the studied forms came from the Pleistocene "brown clay" layer of the site. In the Holocene sample also *Crocidura* sp. indet. is present.

Systematic description

Classis Mammalia LINNAEUS, 1735
Order Insectivora BOWDICH, 1821
Family Soricidae FISCHER VON WALDHEIM, 1817
Genus *Sorex* LINNAEUS, 1758

Sorex araneus LINNAEUS, 1758
Pl. 1, Figs 1-5

Ecology

S. araneus lives now in a great part of Europe and continental Asia, north of the steppe zone, mainly in the wet-soiled woods.

Balla Cave

Material and measurements
Inv. Nr. V.10146:
skull fragment
left P^4 BL = 1.63, LL = 1.20, W = 1.50
M^1 BL = 1.50, LL = 1.43, AW = 1.60, PW = 1.70
right P^4 BL = 1.55, LL = 1.25, W = 1.78
M^1 BL = 1.53, LL = 1.48, AW = 1.63, PW = 1.70
M^2 BL = 1.25, LL = 1.20, AW = 1.61, PW = 1.45
skull fragment
left P^4 BL = 1.63, LL = 1.22, W = 1.75
M^1 BL = 1.48, LL = 1.43, AW = 1.60, PW = 1.75
right P^4 BL = 1.60, LL = 1.33, W = 1.71
M^1 BL = 1.48, LL = 1.40, AW = 1.58, PW = 1.75
skull fragment
right A^2-A^4, P^4 BL = 1.68, LL = 1.35, W = 1.70
M^2 BL = 1.23, LL = 1.22, AW = 1.65, PW = 1.58
right maxillary fragment
fragmentary I^1 and A^3, P^4 BL = 1.68, LL = 1.35, W = 1.85
M^1 BL = 1.50, LL = 1.50, AW = 1.63, PW = 1.71
M^2 BL = 1.10, LL = 1.31, AW = 1.63, PW = 1.40
right maxillary fragment
P^4 BL = 1.55, LL = 1.25, W = 1.63
M^1 BL = 1.40, LL = 1.38, AW = 1.55, PW = 1.61
BL = 1.25, LL = 1.23, AW = 1.65, PW = 1.40
right maxillary fragment
P^4 BL = 1.61, LL = 1.20, W = 1.60
3 complete left mandibles

1: I_1 L = 4.19, H = 1.05
A_1 L = 1.10, H = 0.80
A_2 L = 1.28, H = 0.93
M_1 L = 1.75, W = 1.03
M_2 L = 1.48, W = 0.98
M_3 L = 1.18, W = 0.68
2: I_1 L = 3.63, H = 1.05
A_1 L = 1.03, H = 0.60
A_2 L = 1.20, H = 0.65
M_1 L = 1.75, W = 0.98
M_2 L = 1.45, W = 0.98
M_3 L = 1.08, W = 0.63
3: I_1 L = 4.06, H = 1.03
A_1 L = 1.10, H = 0.73
A_2 L = 1.25, H = 0.88
M_1 L = 1.75, W = 1.03
M_2 L = 1.50, W = 0.88
M_3 L = 1.10, W = 0.68
2 complete right mandibles
I1 L = 3.97, H = 1.05,
A1 L = 1.18, H = 0.75,
A2 L = 1.05, H = 0.88,
M1 L = 1.63, W = 0.95,
M2 L = 1.38, W = 0.85,
M3 L = 1.05, W = 0.63
2: I_1 L = 3.88, H = 1.00,
A1 L = 1.10, H = 0.98,
A_2 L = 1.28, H = 0.98,
M_1 L = 1.73, W = 0.93,
M_2 L = 1.38, W = 0.88,
M_3 L = 1.05, W = 0.65
left mandible
I_1 L = 3.94, H = 1.03
A_1 L = 0.89, H = 0.70
A_2 L = 1.25, H = 0.98
M_1 L = 1.78, W = 0.98
M_2 L = 1.40, W = 0.90
left mandible
I_1 L = 3.75, H = 0.98
A_2 L = 1.28, H = 0.68
M_1 L = 1.63, W = 0.88
M_2 L = 1.38, W = 0.80
M_3 L = 1.00, W = 0.60
left mandible fragment
I_1 L = 3.94, H = 1.00
A_1 L = 1.03, H = 0.78
A_2 L = 1.25, H = 0.80
M_1 L = 1.63, W = 0.65
M_2 L = 1.38, W = 0.85
right mandible fragment
I_1 L = 3.84, H = 1.06

A_1 L = 1.03, H = 0.65
A_2 L = 1.38, H = 0.88
M_1 L = 1.75, W = 0.95
M_2 L = 1.35, W = 0.88

Inv. Nr. V.10147
complete left mandible
I_1 L = 4.00, H = 1.04
A_1 L = 1.32, H = 0.78
A_2 L = 1.30, H = 0.80
M_1 L = 1.78, W = 1.00
M_2 L = 1.50, W = 0.90
M_3 L = 1.23, W = 0.73

Bivak Cave

Material and measurements – from the yellow-grey layer:
left mandible fragment
A_2 L = 1.36, H = 0.88
M_2 L = 1.45, W = 0.85

Pilisszántó Shelter

(GM) material and measurements – "Magdalenien I layer", Inv. Nr. V.13885: complete left mandible
A_1 L = 1.25, H = 1.00
A_2 L = 1.38, H = 1.08
M_1 L = 1.88, W = 1.00
M_2 L = 1.60, W = 0.88
M_3 L = 0.75, W = 0.68
(HNHM) material and measurements – from the brown clay layer: right mandible fragment without ramus mandibulae
I_1 L = 3.65, H = 0.95
A_1 L = 1.03, H = 0.53
A_2 L = 1.10, H = 0.83
M_1 L = 1.50, W = 0.88
right mandible fragment
M_2 L = 1.29, W = 0.78
2 right mandible fragments without teeth.

Peskő Cave

Material and measurements – Inv. Nr. V.14400:
skull fragment
left P^4 BL = 1.53, LL = 1.13, W = 1,63
M^1 BL = 1,45, LL = 1,38, AW = 1.53, PW = 1.63
M^2 BL = 1.30, LL = 1.29, AW = 1.67, PW = 1.50
right P^4 BL = 4.50, LL = 1.10, W = 1.63
M^1 BL = 1.50, LL = 1.45, AW = 1.50, PW = 1.55
M^2 BL = 1.25, LL = 1.30, AW = 1.53, PW = 1.46

Petényi Cave

Material and measurements – from P1 layer: Inv. Nr: V. 62.654:
left mandible fragment
A_2 L = 1.29, H = 0.95
M_1 L = 1.73, W = 0.90
M_2 L = 1.43, W = 0.79
M_3 L = 1.15, W = 0.68
Inv. Nr: V. 62.655: left mandible
I_1 L = 1.64, H = 1.09
A_2 L = 1.35, H = 0.94
M_1 L = 1.63, W = 0.90
M_2 L = 1.40, W = 0.88
M_3 L = 1.05, W = 0.63
right mandible fragment without ramus mandibulae
I_1 L = 4.06, H = 1.05
A_1 L = 1.20, H = 0.75
A_2 L = 1.48, H = 0.98
M_1 L = 1.63, W = 0.93
M_2 L = 1.33, W = 0.80
M_3 L = 1.05, W = 0.66
right mandible fragment with fragmentary A_2,
M_1 L = 1.63, W = 0.95
M_2 L = 1.38, W = 0.85
M_3 L = 1.05, W = 0.68)
right mandible fragment with fragmentary M_1;
right mandible fragment
M_1 W = 0.95
M_2 L = 1.35, W = 0.85
M_3 L = 1.05, W = 0.63
left mandible fragment
A_1 L = 0.93, H = 0.66
A_2 L = 1.03, H = 0.89
M_1 L = 1.50, W = 0.85
M_2 L = 1.30, W = 0.75
right mandible fragment without the back part
I_1 L = 3.71, H = 1.14
A_1 L = 1.13, H = 0.70
A_2 L = 1.28, H = 0.78
M_1 L = 1.63, W = 0.98
left mandible fragment without the back part
I_1 L = 4.00, H = 0.85
A_1 L = 1.00, H = 0.75
A_2 L = 1.18, H = 0.86
left mandible fragment without teeth;
from H3 layer: Inv. Nr: V. 62.797:
right mandible fragment with
M_3 L = 1.00, W = 0.55

Description

The internal temporal fossa is deep and wide. The upper condylar facet is cylinder-shaped, mesially not protruding. Its length is less than the width of the interarticular area. The tiny mental foramen is situated under the M_1 re-entrant valley or protocone. I_1 is long and tricuspulate. There is a wide cingulum in the lower antemolars and molars. There is only one cusp on the A_1, but A_2 is bicuspulate. Entoconid is separate from entostylid in M_1 and M_2. Hypoconid and entoconid are present in M_3.

Sorex alpinus SHINZ, 1837
Pl. 1, Figs 6-8

Ecology

S. alpinus is limited to European high mountains and in the lower, but wet-climated hills in the surroundings of them.

Balla Cave

Material and measurements – Inv. Nr. V.10146:
complete right mandible
I_1 L = 3.80, H = 1.00
A_1 L = 1.13, H = 0.68
A_2 L = 1.23, H = 0.69
M_1 L = 1.50, W = 0.88
M_2 L = 1.25, W = 0.78
M_3 L = 1.03, W =0.58
left mandible
I_1 L = 3.52, H = 1.00
A_2 L = 1.20, H = 0.70
M_1 L = 1.75, W = 0.95
M_2 L = 1.45, W = 0.88
M_3 L = 1.05, W = 0.75
left mandible fragment
A_2 L = 1.10, H = 0.75
M_1 L = 1.68, W = 0.93
M_2 L = 1.50, W = 0.85
left mandible fragment with eroded I_1,
A_2 L = 1.20, H = 0.85
M_1 L = 1.75, W = 1.10
right mandible
I_1 L = 4.06, H = 1.05
A_2 L = 1.33, H = 0.85
M_1 L = 1.63, W = 0.95
M_2 L = 1.25, W = 0.85
M_3 L = 1.03, W = 0.78
right mandible
I_1 L = 4.00, H = 0.98

A_2 L = 1.20, H = 0.80
M_1 L = 1.55, W = 0.90
M_2 L = 1.35, W = 0.86
right mandible
I_1 L = 4.22, H = 1.13
A_2 L = 1.38, H = 0.88
M_1 L = 1.75, W = 0.95
M_3 L = 1.10, W = 0.63
right mandible fragment
I_1 L = 3.94, H = 1.04
A_2 L = 1.35, H = 0.83
M_1 L = 1.43, W = 0.93
M_2 L = 1.00, W = 0.63
with right mandible fragment
A_1 L = 1.18, H = 0.88
A_2 L = 1.30, H = 0.80
M_1 L = 1.60, W = 0.90
M_2 L = 1.28, W = 0.84
right mandible fragment
M_1 L = 1.75, W = 0.95
M_2 L = 1.35, W = 0.83
edentulous right mandible fragment,
Inv. nr. V.10146, in a separate vial: complete right mandible
I_1 L = 4.00, H = 1.03
A_1 L = 1.28, H = 0.68
A_2 L = 1.40, H = 0.85
M_1 L = 1.80, W = 0.98
M_2 L = 1.35, W = 0.88
M_3 L = 1.15, W = 0.65
left mandible
I_1 L = 4.19, H = 1.00
A_2 L = 1.25, H = 0.78
M_1 L = 1.68, W = 0,95
M_2 L = 1.55, W = 0.83
M_3 L = 1.05, W = 0.65

Petényi Cave

Material and measurements - from P1 layer: Inv. Nr: V. 62.10: left mandible fragment without teeth;
Inv. Nr: V. 62.655: right mandible fragment
A_2 L = 1.13, H = 0.75
M_1 L = 1.50, W = 0.88
M_2 L = 1.28, W = 0.80
M_3 L = 1.03, W = 0.58
right mandible fragment
A_2 L = 1.20, H = 0.83
M_1 L = 1.45, W = 0.95
M_2 L = 1.35, W = 0.85
M_3 L = 1.05, W = 0.68

right mandible fragment
A_2 L = 1.11, H = 0.75
M_1 L = 1.50, W = 0.90
M_2 L = 1.30, W = 0.86
right mandible fragment
A_2 L = 1.15, H = 0.93
M_1 L = 1.50
M_2 L = 1.30, W = 0.83

Description

The morphology of *S. alpinus* is very similar to that of the previous species, but the upper condyloid facet of processus condyloideus is mesially projecting, the lower one laterally widening. The interarticular facet is quite narrow. A_2 is bicuspid.

Sorex sp. indet. (*araneus* or *alpinus*)
Pl. 1, Fig. 9.

Balla Cave

Material and measurements – Inv. Nr. V.10146:
left maxillary fragment
P^4 BL = 1.69, LL = 1.34, W = 1.90
left mandible
I_1 L = 3.64, H = 0.96
A_2 L = 1.28, H = 0.85
M_1 L = 1.63, W = 0.95
M_2 L = 1.45, W = 0.86
M_3 L = 1.05, W = 0.73
right mandible
I_1 L = 4.19, H = 1.00
A_2 L = 1.35, H = 0.90
M_1 L = 1.68, W = 0.90
M_2 L = 1.25, W = 1.00
M_3 L = 1.03, W = 0.75

Pilisszántó Shelter

Material and measurements - from the brown clay layer:
right mandible fragment
A_2 L = 1.50, H = 0.94
M_1 L = 1.75, W = 1.00
right mandible fragment
M_2 L = 1.20, W = 0.76

Petényi Cave

Material and measurements - from P1 layer: Inv. Nr: V. 62.655:
back part of the left mandible, without condyle;

left mandible fragment
A_2 L = 1.25, H = 0.88
M_1 L = 1.58, W = 0.90
left mandible fragment
A_2 L = 1.29
M_1 L = 1.63, W = 0.95
right mandible fragment
A_2 L = 1.08, H = 0.80
M_1 L = 1.45, W = 0.90
M_2 L = 1.30, W = 0.89
right mandible fragment
A_2 L = 1.41, H = 1.13
from H1-H2 layer: Inv. Nr: V. 62.725:
right mandible fragment without ramus mandibulae
I_1 L = 4.17, H = 0.99
A_2 L = 1.33, H = 0.86
M_1 L = 1.63, W = 0.90
M_2 L = 1.38, W = 0.85
M_3 L = 1.13, W = 0.63
from H5 layer: Inv. Nr: V. 62.31:
left mandible fragment
A_2 L = 1.05, H = 0.95
M_1 W = 0.90
M_2 L = 1.35, W = 0.80
right mandible fragment
M_1 L = 1.58, W = 0.85
M_2 L = 1.38, W = 0.80
M_3 L = 1.08, W = 0.64

Remarks

Because *S. alpinus* and *S. araneus* are very similar form in most of the morphological characters and the measurements, the detailed taxonomical determination was not possible in the case of some fragmentary remains. These specimens belong to *S. araneus* or *S. alpinus*, but without the differential characters, so we determined them as *Sorex* sp. indet.

Discussion

Taxonomy

Measurements of *S. alpinus* considerably overlap those of *S. araneus* (Fig. 1). The two forms can be distinguished by the shorter I^1 talon, the bicuspid A_1, the more posteriorly situated foramen lacrimale and the mesially projecting upper condyloid facet of the Alpine species (UJHELYI 1994). Mainly the processus condyloideus and the number of the cusps of A_1 were useful among the differential characters in the separation of the mandibles of *S. alpinus* and *S. araneus* from the studied assemblages (Fig. 2). Bicuspulate A_1 was well-identifiable mainly in some Balla Cave mandibles.

Well-preserved upper teeth and maxillae were present only in the Balla Cave material. Except for one *S. alpinus* specimen we determined these maxillary fragments as *S. araneus* on the basis of the anterior position of the foramen lacrimale

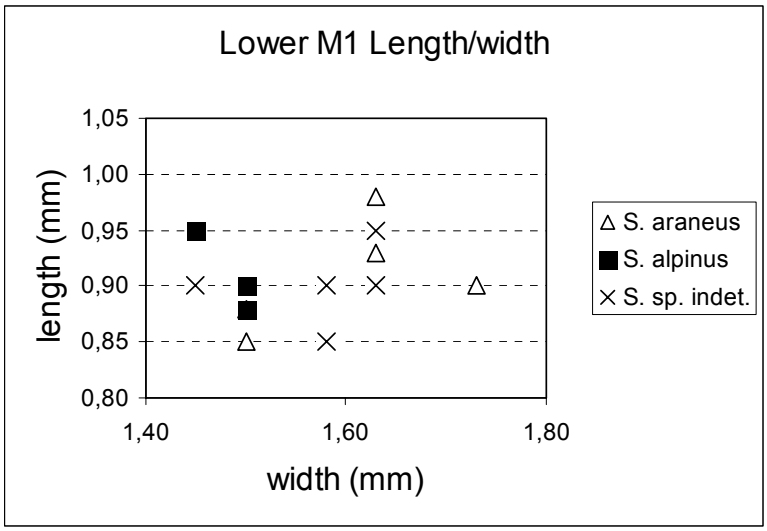

Fig. 1. Scatter diagram of M_1 size of *S. araneus* and *S. alpinus*

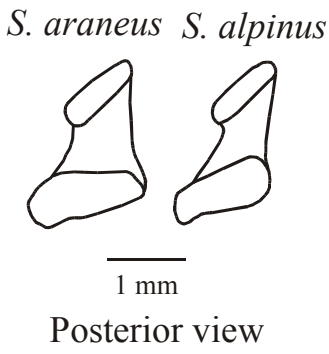

Fig. 2. Differences between the processus condyloideus of *S. araneus* and *S. alpinus* (Petényi Cave, HNHM, Inv. Nr. V.62.655).

Climate

According to REUMER (1984) fossil *Sorex* is indicative for a moist environment with well-developed vegetation. The species recently have a preference for wooded or bushy areas. We therefore assume a humid environment with a good vegetation cover in the time of the deposition of the Balla Cave, Bivak Cave, Peskő Cave, Petényi Cave and Pilisszántó Shelter sediments.

According to JÁNOSSY (1979) Pilisszántó Horizon was the last cold period of the Pleistocene. This is supported by generic composition of the studied samples. During the cold episodes of the Pleistocene the shrew fauna of Europe was dominated by the genus *Sorex* (RZEBIK-KOWALSKA 1975). All of the studied faunae include other indicator species of cold climate (JÁNOSSY 1979). According to JÁNOSSY (1979) this cold period in Hungary was characterized by a fauna reflecting the climate of the boundary zone between tundra and taiga of today.

Ecotype

Sorex alpinus was present in Balla Cave and Petényi Cave samples, but in Bivak Cave, Peskő Cave and Pilisszántó Shelter material it could not be found by the present studies. This Alpine shrew recently lives mainly in the mountain forests of the high mountains of Europe: Pyrenees, Alps, Balkans, Harz, Carpathians, Sudetenland. Its ecotype today is situated also at higher altitude than 1500 m above see level in the Alps.

Few specimens of *S. alpinus* have been also recently reported in the western frontier of Hungary (UJHELYI 1994). However, considering the reports of VÉRTES (1965) and MÉSZÁROS (1999, 2003) on the Late Würm presence of the Alpine shrew in Peskő Cave and Vaskapu Cave, we know four sure occurrences from the Bükk Mountains. These data suggest that the Pilisszántóian occurrence of *S. alpinus* in the Bükk Mountains was not so sporadic as today in Western Hungary.

By the occurrence of *Sorex alpinus* we can suppose that in the named sites, which are only about in 400-800 m above see level, the mountainous relief and the periglacial climate caused the occurrence of open mountain vegetation. This zone would be very similar to the recent mountain ecotype, which situated in the Carpathians and the Alps above the pine forests. This view is supported by the fact that not even arctic but also typical Alpine species were extremely abundant in the studied faunae.

VÖRÖS (1986 and 1987) gives a finer subdivision for Pilisszántó Horizon (22 000 - 12 000 BP). He names the end of the period (16 000 - 12 000 BP) as Bajót climato-fauna phase. According to his studies occasionally the July mean temperature was not above 12.2 ^{o}C in this time. Peskő Cave and Petényi Cave are ranged in this period by VÖRÖS (1987).

Today we can find areas with temperature data like the mentioned ones in the northern side of Europe (at the margin of the Scandinavian Mountain Range) (PÉCZELY 1984). The upper border of the pine forest zone is really in about 500-1000 m above see level in these areas, as we suppose it in the Bükk Mountains during the studied period.

S. alpinus occurrences were found only in the Bükk Mountains, in a relatively small area (its diameter is about 8 km). We suppose, that the hypothetical ecotype was not extensive at the end of the Pilisszántó Horizon.

Acknowledgements

The author is indebted to Prof. László KORDOS, director of the Geological Museum of Hungary and to Dr. János SZABÓ, director of the Geological and Palaeontological Department of the Hungarian Natural History Museum, for the possibility to study the here described material. Special thanks go to Mihály GASPARIK, curator of the Vertebrate Collection of the Museum, for his valuable suggestions and kind help in all the phases of the work. The studies were supported by Bolyai János Research Grant and the OTKA F 038041 project.

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Plate I

Figs 1-5. *Sorex araneus* LINNAEUS 1758

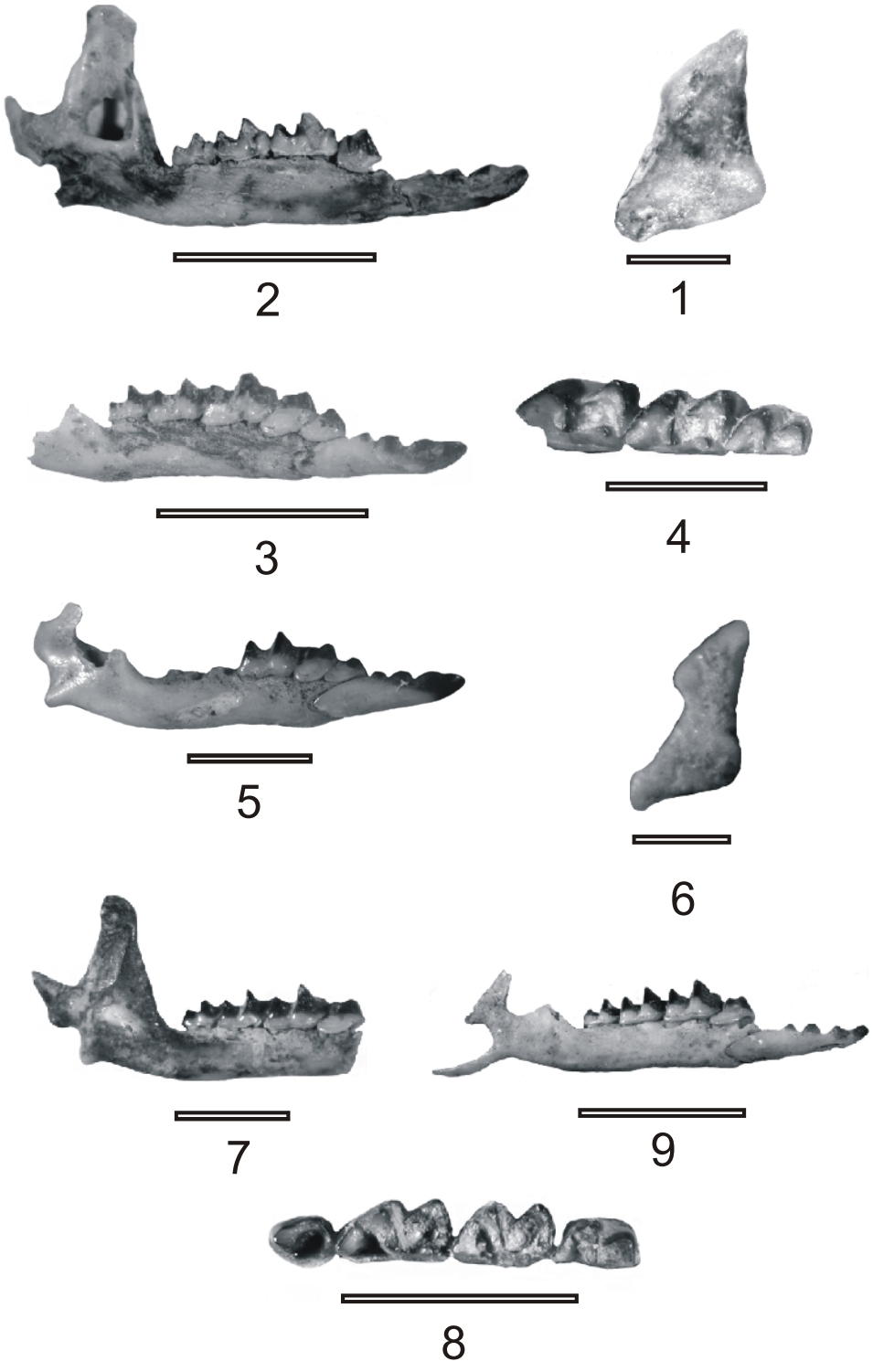
1. Condyloid process of right mandible fragment, posterior view, Petényi Cave, P1 layer, V.62.655. (Scale bar = 1 mm)
2. Left mandible, lingual view, Petényi Cave, P1 layer, V.62.655. (Scale bar = 5 mm)
3. Right mandible fragment without ramus mandibulae, buccal view, Petényi Cave, P1 layer, V.62.655. (Scale bar = 5 mm)
4. M_1-M_3 teeth of right mandible fragment, occlusal view, Petényi Cave, P1 layer, V.62.655. (Scale bar = 2 mm)
5. Right mandible fragment without ramus mandibulae, buccal view, Pilisszántó Shelter, HNHM, brown clay layer. (Scale bar = 3 mm)

Figs 6-8. *Sorex alpinus* SHINZ 1837

6. Condyloid process of right mandible fragment, posterior view, Petényi Cave, P1 layer, V.62.655. (Scale bar = 1 mm)
7. Right mandible fragment, with A_2-M_3, buccal view, Petényi Cave, P1 layer, V.62.655. (Scale bar = 3 mm)
8. A_2-M_3 teeth of right mandible fragment, occlusal view, Petényi Cave, P1 layer, V.62.655. (Scale bar = 3 mm)

Fig. 9. *Sorex* sp. indet. Right mandible fragment without ramus mandibulae, buccal view, Petényi Cave, H1-2 layer, V.62.725. (Scale bar = 5 mm)

Plate 1



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34, 27—141 (2004) Budapest

Lower Oligocene (Kiscellian) ostracods in Hungary – Systematic description

Miklós MONOSTORI[1]

(with 28 plates)

Abstract

This work is the first part of a monograph describing the ostracod fauna of the Oligocene sediments of Hungary. It contains the description of the forms occurring in the Lower Oligocene (Kiscellian stage): *Cytherella compressa* (VON MÜNSTER, 1830), *Cytherella dentifera* (MÉHES, 1941), *Cytherella* ex gr. *beyrichi* (REUSS, 1851), *Cytherella draco* PIETRZENIUK, 1969, *Cytherella hyalina* MÉHES, 1941, *Cytherella mehesi* BRESTENSKÁ, 1975, *Cytherella transversa* SPEYER, 1863, s. l., *Cytherella (Cytherelloidea)* cf. *hieroglyphica* (BOSQUET, 1852), *Cardobairdia boldi* PIETRZENIUK, 1969, *Bairdia rupelica* MONOSTORI, 1982, *Bairdia*? sp. 1, *Cytheromorpha subalpina dorsodepressa* MONOSTORI, 1985, *Schizocythere*? sp., S*chizocythere* ? sp. juv., *Paijenborchella (Eopaijenborchella) sturovensis* BRESTENSKÁ, 1975, *Callistocythere* sp., *Eucytheridea reticulata* GOERLICH, 1953, *Cytheridea* ex gr. *mülleri* (VON MÜNSTER, 1830), *Cytheridea* ex gr. *pernota* OERTLI et KEIJ, 1956, *Miocyprideis rara* (GOERLICH, 1953), *Cyamocytheridea punctatella* (BOSQUET, 1852), *Hemicyprideis anterocostata* MONOSTORI, 1982, *Hemicyprideis helvetica* (LIENENKLAUS, 1895), *Hemicyprideis parvula* MALZ & TRIEBEL, 1970, *Schuleridea rauracica* OERTLI, 1956, *Schuleridea rauraciformis* MONOSTORI, 1985, *Cuneocythere (Cuneocythere) marginata anterodepressa* MONOSTORI, 1982, *Cuneocythere (Cuneocythere) truncata* LIENENKLAUS, 1894, *Krithe papillosa* (BOSQUET, 1852), *Krithe pernoides* (BORNEMANN, 1855), *Krithe* sp. 1, *Krithe* sp. 2, *Parakrithe costatomarginata* MONOSTORI, 1982, *Parakrithe* sp. 1, *Trachyleberis* cf. *spinosa* (LIENENKLAUS, 1900), *Costa hermi* WITT, 1967, *Agrenocythere ordinata* (DELTEL, 1961), *Pterygocythereis* cf. *ceratoptera* (BOSQUET, 1852), *Pterygocythereis* n. sp. ?, *Echinocythereis ligula* LIENENKLAUS, 1896, *Henryhowella asperrima* (REUSS, 1850), *Protobuntonia sublatissima arcuatocosta* (BRESTENSKÁ, 1975), *Leguminocythereis sorneana* OERTLI, 1956, *Leguminocythereis? cellulataformis* n. sp., *Megahemicythere oertlii* WITT, 1967, *Pokornyella*? sp. 1, *Grinioneis* sp., *Hornibrookella* ex gr. *macropora* (BOSQUET, 1852), *Bosquetina brestenskae* n. sp., *Bosquetina zalanyii* BRESTENSKÁ, 1975, *Occultocythereis rupelica* MONOSTORI, 1982, *Occultocythereis* ex gr. *mutabilis* TRIEBEL, 1961, *Cytheretta posticalis* TRIEBEL, 1952, *Cytheretta variabilis* OERTLI, 1956, *Loxoconcha carinata tardense* MONOSTORI, 1985, *Loxoconcha delemontensis hungarica* MONOSTORI, 1982, *Loxoconcha favata* KUIPER, 1918, *Loxoconcha subovata* (VON MÜNSTER, 1830) sensu BRESTENSKÁ, 1975, *Loxoconcha* ex gr. *aequapunctata* DELTEL, 1964, *Loxoconcha* sp. 1, *Eucytherura dentata* LIENENKLAUS, 1905, *Cytheropteron emmeneggeri* SCHERER, 1964, *Cytheropteron* cf. *triangulare* LIENENKLAUS, 1900, *Uroleberis striatopunctata* DUCASSE, 1967, *Protoargilloecia angulata* Deltel, 1961, *Paracypris*? *rupelica* MONOSTORI, 1982, *Paracypris*?

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kisegedensis n. sp., *Paracypris* ex gr. *propinqua* TRIEBEL, 1963, *Paracypris* cf. *bouldnorensis* KEEN, 1978, *Candona fertilis* TRIEBEL, 1963, *Candona*? *recta* LIENENKLAUS, 1905, *Candona*? sp. indet., *Moenocypris bockenheimensis* TRIEBEL, 1963, *Curvopsis curvata* (LIENENKLAUS, 1905), ?*Curvopsis curvata* (LIENENKLAUS, 1905), *Cypridopsinae* gen et sp. indet 3, 1982.

Localities will be figured in a forthcoming paper on palaeoecological results.

All specimens are deposited in the Collection of the Palaeontological Department of Eötvös University. This study was supported by Hungarian OTKA Fundation, Project N^{o} T 032472.

Systematic description

Subclass Ostracoda LATREILLE, 1806
Order Podocopida G. W. MÜLLER, 1894
Suborder Platycopa SARS, 1866
Familia Cytherellidae SARS, 1866
Genus *Cytherella* JONES, 1849

Cytherella compressa (VON MÜNSTER, 1830)
Pl. 1, figs 1–4.

1830. *Cythere compressa* n. sp. – MÜNSTER, p. 64.
1982. *Cytherella compressa* (VON MÜNSTER) – MONOSTORI, pp. 45–47, Pl. II, f. 6–9. (cum syn.)
1985. *Cytherella (Cytherella) compressa* (VON MÜNSTER, 1830) – MONOSTORI, pp. 165–166.

Remarks

In the description from 1982 (p. 46) the right and left valves are changed, in the text of the figs (Pl. II, f. 6–9.) they are correct. There are some variations in the lengthening of the carapace. See: remarks at *C. dentifera*

Dimensions

Carapace L = 0.78–0.86 mm
H = 0.48–0.54 mm
L/H = 1.53–1.69
W = 0.35–0.40 mm

Occurrence

Kiscell–1 borehole 91.5 m; Budapest, Metro H–1 borehole 25.0–60.0 m; Budapest, Metro H–3 borehole 58.6–61.6 m; Budapest, Metro H–5/1 borehole 41.0 m; Budapest, Metro H–7 borehole 24.0–105.5 m; Budapest, Metro H–7/1 borehole 54.5–55.5 m; Budapest, Metro H–8 borehole 36.0–55.0 m; Budapest, Metro H–8/1 borehole 28.0–32.0 m; Budapest, Metro H–9 borehole 19.5–59.8 m; Budapest, Metro H–11 borehole 23.5m; Budafok–2 borehole 357.0–461.4 m; Szentendre–2 borehole 764.0–1020.0 m; Cserépváralja–1 borehole 402.0–407.6 m; Varbó–50 borehole 404.8–546.8 m; Noszvaj, Síkfőkút quarry samples 11, 18; Eger Wind brickyard borehole 52.9–77.1 m; Kiseged,

manganiferous clay sample N°4; Alcsútdoboz–3 borehole 487.1 m.

Material
156 specimens.

Stratigraphical range without Hungary
Belgium: Upper Ypresian–Rupelian; The Netherlands: Bartonian–Rupelian?; Great Britain: Bartonian; Austria: Middle Eocene; Ukraine: Eocene; Czechoslovakia: Lower Oligocene–Upper Oligocene.

Stratigraphical range in Hungary
Priabonian–Upper Oligocene

Cytherella dentifera MÉHES, 1941
Pl. 1, Figs 5–7.

1941. *Cytherella dentifera* n. sp. – MÉHES, pp. 78–90, Pl. VII, figs 12–16, textfigs 20a, 94, 103.
1975. *Cytherella dentifera* MÉHES – BRESTENSKÁ, p. 381, Pl. 3, figs 10–14.
1982. *Cytherella dentifera* MÉHES, 1941 – MONOSTORI, pp. 47–48, Pl. III, figs 1–4.

Remarks
There are some specimens very similar in their form to *C. compressa* and having minor anterior wrinkles and posterior denticles. They were described by MÉHES (1941) as *Cytherella dentifera*. I think, the wrinkles and denticles are not correct species characters but their occurrence may be an occasional individual phenomena. In this case *C. dentifera = C. compressa.*

Dimensions
carapace L = 0.76–0.87 mm
H = 0.48–0.54 mm
L/H = 1.54–1.68.

Occurrence
Kiscell–1 borehole 89.5 m; Budapest, Metro H–3 borehole 51.0–54.8 m; Budapest, Metro H–7 borehole 55.0–60.0 m; Budapest, Metro H–7/1 borehole, 50.0–52.0 m; Budapest, Metro H–8 borehole 18.0 m; Budapest, Metro H–9 borehole 52.0–55.6 m; Budapest, SzOT–1 borehole 16.0 m; Szentendre–2 borehole 819.0–1031.0 m; Alcsútdoboz–3 borehole 487.1 m.

Material
25 specimens

Stratigraphical range without Hungary
Czechoslovakia: Oligocene.

Stratigraphical range in Hungary
Priabonian–Upper Oligocene

Cytherella ex gr. *beyrichi* (REUSS, 1851)
Pl. 1, fig. 8, Pl. 2, fig.1.

Remarks
Original and most of the other figures show a densely pitted rectangular form with rounded corners. On BRESTENSKÁ's (1975) figure the posterior end is narrower than the anterior one. That is true also for the forms described here. There is a dense pitting on the lateral surface. Characteristic is a wide anterior and a small posteroventral depressed rim.

Dimensions
carapace L = 0.78 mm
H = 0.47 mm
L/H = 1.66

Occurrence
Varbó–50 borehole 433.6–439.5 m; Eger Wind brickyard borehole 69.8–73.1 m.

Material
5 specimens.

Stratigraphical range in Hungary
Oligocene.

Cytherella ex gr. *draco* PIETRZENIUK, 1969
Pl. 2, fig 2.

1982. *Cytherella draco* PIETRZENIUK, 1969 – MONOSTORI, pp. 49–50, Pl. IV, figs 1–3.

Remarks
Characteristical the nearly oval form, another *Cytherella* species of the Hungarian Oligocene have more „quadrate" outline.

Dimensions
carapace L = 0.81–0.86 mm
H = 0.55–0.58 mm
L/H = 1.46–1.48

Occurrence
Budapest, Metro H–1 borehole 25.0–34.8 m; Budafok–2 borehole 378.4–384.1 m; Varbó–50 borehole 445.0–460.0 m; Eger Wind brickyard borehole 53.8–71.5 m.

Material
22 specimens.

Stratigraphical range in Hungary
Priabonian–Upper Oligocene.

Cytherella hyalina MÉHES, 1941
Pl. 2, figs. 3–5.

1941. *Cytherella hyalina* n. sp. – MÉHES, p. 78, Pl. VII, figs 7–9.
1975. *Cytherella hyalina* MÉHES, 1941 – BRESTENSKÁ, pp. 381–382, Pl. 1, figs 12–14, Pl. 2, figs 1–3.
1982. *Cytherella* aff. *méhesi* BRESTENSKÁ, 1975 – MONOSTORI, pp. 50–51, Pl. IV, figs 4–7. (pars)
1985. *Cytherella* aff. *méhesi* BRESTENSKÁ, 1975 – MONOSTORI, p. 166, Pl. 1, figs 3–4. (pars)

Remarks
Many specimens have shape similar to *Cytherella mehesi* and have anterior wrinkles and posterior denticles. Similarly to the *C. dentifera*, the denticles and wrinkles q54 maybe not specific characters, in this case *C. hyalina* = *C. mehesi* (see also remarks at *C. dentifera*).

Dimensions
carapaces L = 0.76–0.88 mm
H = 0.49–0.56 mm
L/H = 1.52–1.63

Occurrence
Kiscell–1 borehole 83.4 m; Budapest, Metro H–3 borehole 50.3–53.3 m; Budapest, Metro H–7/1 borehole 26.0–47.7 m; Budapest, Metro H–9 borehole 24.0–28.0 m; Budapest, Metro H–11 borehole 23.5 m; Budapest, Ibolya u. quarry 7.0 m; Budapest, SzOT–1 borehole 5.5 m; Budapest, SzOT–2 borehole 46.0–58.0 m; Budafok–2 borehole 393.0–454.6 m; Szentendre–2 borehole 626.0–817.0 m; Varbó–50 borehole 416.1–420.0 m; Cserépváralja–1 borehole 407.4–407.6 m; Eger Wind brickyard borehole 50.3–77.1 m; Alcsútdoboz–3 borehole 455.5–487.1 m.

Material
70 specimens

Stratigraphical range without Hungary
Czechoslovakia: Oligocene.

Stratigraphical range in Hungary
Priabonian–Upper Oligocene.

Cytherella mehesi BRESTENSKÁ, 1975
Pl. 2, figs 6–8.

1975. *Cytherella mehesi* n. sp. – BRESTENSKÁ, pp. 234–235, Pl. 2, figs 4–8.
1982. *Cytherella* aff. *mehesi* BRESTENSKÁ, 1975 – MONOSTORI, pp. 50–51, Pl. 4, figs 4–7. (pars)
1985. *Cytherella* aff. *méhesi* BRESTENSKÁ, 1975 – MONOSTORI, p. 166, Pl. 1, figs 3–4. (pars)

Remarks

The form is rather variable (MONOSTORI, 1982, 1985) After investigation of the Eger material belonging to this species is obvious. See: remarks at *C. hyalina.*

Dimensions

carapaces L = 0.78–0.86 mm
H = 0.46–0.54 mm
L/H = 1.54–1.77

Occurrence

Kiscell–1 borehole 83.4 m; Budapest, Metro H–1 borehole 25.0–60.0 m; Budapest, Metro H–3 borehole 41.8–120.5 m; Budapest, Metro H–7 borehole 19.8–84.0 m; Budapest, Metro H–8 borehole 36.0 m; Budapest, Metro H–9 borehole 19.5–55.6 m; Budapest, Ibolya u. quarry 7.0 m; Budapest, SzOT–1 borehole 5.5 m; Budapest, SzOT–2 borehole 46.0–58.0; Budafok–2 borehole 362.3–447.1 m; Szentendre–2 borehole 746.0–1020.0 m; Varbó–50 borehole 423.7–530.3 m; Noszvaj, Síkfőkút quarry, sample 18; Eger Wind brickyard borehole 50.3–77.1 m; Alcsútdoboz–3 borehole 455.5–487.1 m.

Material

90 specimens.

Stratigraphical range without Hungary

Czechoslovakia: Oligocene

Stratigraphical range in Hungary

Priabonian–Upper Oligocene.

Cytherella transversa SPEYER, 1863 s. l.
Pl. 3, figs 1–4.

1863. *Cytherella transversa* n. sp. – SPEYER, p. 56, Pl. I. fig.2.
1941. *Cytherelloidea pestiensis* n. sp. – MÉHES, pp. 81–82, Pl. VII, figs 21–22, textfigs 18, 95, 105.
1957. *Cytherella transversa* SPEYER, 1863 – KEIJ, p. 47, Pl. I, fig. 2.
1961. *Cytherella transversa* SPEYER, 1863 – DELTEL, p. 17, Pl. II, figs 22–23.
1963. *Cytherella transversa* SPEYER, 1863 – STCHÉPINSKY, p. **XXX,** Pl. I, figs 1–3.
1969. *Cytherella transversa* SPEYER, 1863 – PIETRZENIUK, p. 13, Pl. I, figs 11–12.

1969. *Cytherella transversa* SPEYER, 1863 – SCHEREMETA, 1969, p. 45, Pl. I, figs 8–89.
1969. *Cytherella transversa* SPEYER, 1863 – DUCASSE, p. 12, Pl. I, figs 11.
1975. *Cytherella pestiensis* (MÉHES) – BRESTENSKÁ, pp. 382–383, Pl. 1, figs 1–9.
1975. *Cytherella transversa* SPEYER, 1863 – FAUPEL, p. 64, Pl. 10, figs 5–6.
1981. *Cytherella transversa* SPEYER, 1863 – DUCASSE, p. 175–176, Pl. II, figs 4–9 (forme „ovoide"), figs 10–11 (forme „pentagonale"), figs 12–14 (forme „infléchie"), fig. 15 (forme „hastée").
1982. *Cytherella pestiensis* (MÉHES, 1941) – MONOSTORI, pp. 48–49, Pl. III, figs 5–8.
1985. *Cytherella (Cytherella) pestiensis* (MÉHES, 1941) – MONOSTORI, pp. 166–167, Pl. 1, figs 5–7.
1985. *Cytherella transversa* SPEYER, 1863 – DUCASSE et al., Pl. 71, fig. 16.
1988. *Cytherella* gr. *transversa* SPEYER, 1863 – BARBIN & GUERNET, pp. 215–216, Pl. 1, figs 4–5.
1989. *Cytherella transversa* SPEYER, 1863 – KEEN, Pl. 2, fig. 7.

Remarks

This species has a large variability in shape, in the fine ornamentation and in the development of the posterior „ear" of the left valve (see MONOSTORI, 1982, 1985) The investigated materials is so close to *Cytherella transversa* SPEYER, 1863 (including the variable forms figured in the literature as *transversa*) that the species *pestiensis* is obviously a synonym of the *C. transversa* SPEYER, 1863 s. l.

We can see in the literature two group of specimens: the type form of *transversa* at SPEYER (1863) and specimens on scanning photos FAUPEL (1975) having flat and angular valves, and other forms having an asymmetric-lenticular form, similarly to materials of Hungary.

Dimensions

right valve	L = 0.74–0.78 mm
	H = 0.45–0.51 mm
	L/H = 1.53–1.66
left valve	L = 0.72–0.79 mm
	H = 0.38–0.42 mm
	L/H = 1.79–1.94
carapaces:	L = 0.79–0.83 mm
	H = 0.47–0.51 mm
	L/H = 1.63–1.65
	W = 0.34–0.35 mm

Occurrence

Budapest, Metro H–7 borehole 29.0–94.0 m; Budapest, Metro H–7/1 borehole 37.4–69.5 m; Budapest, Metro H–8 borehole 18.0–36.0 m; Budapest, Metro H–9 borehole, 19.5–49.9 m; Budapest, Rókahegy sample; Budapest, Ibolya u. quarry 6.0 m; Budapest, SzOT–2 borehole 46.0 m; Budapest, SzOT–6 borehole 10.8–11.0 m; Budafok–2 borehole 362.3–429.2 m; Szentendre–2 borehole 1025.0–1026.0 m; Cserépváralja–1 borehole 382.5–407.6 m; Varbó–50 borehole 433.6–439.5 m; Noszvaj, Síkfőkút quarry sample 18; Eger Wind brickyard borehole 50.3–73.1 m.

Material
133 specimens.

Stratigraphical range without Hungary
Germany: Upper Eocene–Oligocene, France: Eocene–Oligocene, The Netherlands: Oligocene, Belgium: Rupelian, Czechoslovakia: Oligocene.

Stratigraphical range in Hungary
Upper Eocene–Oligocene.

Cytherella (Cytherelloidea) cf. *hieroglyphica* (BOSQUET, 1852)

Remarks
Only 3 specimens, poorly preserved resembling this species

Occurrence
Budapest, Zugliget outcrop sample 3; Budapest, SzOT–4 borehole 54.0 m.

Materials
3 specimens.

Suborder Metacopa SYLVESTER-BRADLEY, 1967
Superfamily Healdiacea HARLTON, 1933
Family Saipanettidae MCKENZIE, 1968
Genus *Cardobairdia* VAN DEN BOLD, 1960

Cardobairdia boldi PIETRZENIUK, 1969
Pl. 3, fig. 5.

1969. *Cardobairdia boldi* n. sp. – PIETRZENIUK, p. 16, Pl. VII, figs 1–3, Pl. XVII, figs 7–8.
1982. *Cardobairdia hungarica* n. sp. – MONOSTORI, pp. 5–152, Pl. IV, f. 8–9.
1985. *Cardobairdia hungarica* MONOSTORI, 1982 – MONOSTORI, p. 168, Pl. 2, f. 1.

Remarks
Rare specimens are known from the Lower Oligocene Kiscell Clay Formation. After the revision of all material from the Eocene/Oligocene boundary sections of Hungary it appeared that this is a rather common species in the Upper Eocene Buda Marl Formation and its variability coincide with that of the *Cardobairdia boldi* PIETRZENIUK, 1969.

Dimensions

carapaces L = 0.41–0.50 mm
H = 0.44–0.27 mm
L/H = 0.71–2.05

Occurrence

Budapest, Metro H–2 borehole 17.9–19.3 m; Budapest, Metro H–3 borehole 59.6–61.6 m; Budapest, Metro H–7/1 borehole 50.5–75.0 m; Budapest, Metro H–9 borehole 53.5–55.6 m; Budapest, Ibolya u. quarry, 7.0 m; Cserépváralja–1 borehole 407.4–407.6 m.

Material

7 specimens

Stratigraphical range without Hungary

Germany: Eocene.

Stratigraphical range in Hungary

Priabonian–Lower Oligocene.

Suborder Podocopa SARS, 1866
Superfamily Bairdiacea SARS, 1866
Family Bairdidae SARS, 1888
Genus *Bairdia* MCCOY, 1844
Bairdia rupelica MONOSTORI, 1982
Pl. 3, fig. 6.

1982. *Bairdia rupelica* n. sp. – MONOSTORI, pp. 52–53, pl. V, f. 1–2.
1985. *Bairdia rupelica* MONOSTORI, 1982 – MONOSTORI, p. 170, Pl. 2, f. 6.

Remarks

This species was described after sporadical specimens from Lower Oligocene (Kiscell Clay Formation). The subsequent investigations demonstrated its presence in the Upper Eocene (Priabonian) beds of Buda Marl Formation.

Dimensions

carapaces L = 1.00–1.09 mm
H = 0.63–0.72 mm
L/H = 1.51–1.60

Occurrence

Budapest, Metro H–1 borehole 19.8–18.0 m; Budapest, Metro H–3 borehole 41.8–68.3 m; Budapest, Ibolya u. quarry 7.9 m; Budapest, SzOT–1 borehole 7.0 m; Budapest, SzOT–6 borehole 6.0–10.8 m; Cserépváralja–1 borehole 407.4–407.6 m.

Material
10 specimens.

Stratigraphical range in Hungary
Priabonian–Lower Oligocene.

Bairdia? sp 1.
Pl. 3, fig. 7.

Remarks
Low form with „bairdoid" outlines. The anterior outline is asymmetrical, the dorsal one first slight depressed than convex and continuously turns to the blunt posterior outline bending over at the lower 1/3 of the height. The ventral outline is slightly concave at about the half of the lenght. The surface is smooth.

Dimensions
carapace L = 0.81 mm
H = 0.42 m
L/H = 1.93

Occurrence
Kiscell–1 borehole 83.4 m; Budapest, Ibolya u. quary 7.9 m; Budapest, SzOT–1 borehole 7.0 m; Budapest, SzOT–6 borehole 10.8 m; Cserépváralja–1 borehole 407.4–407.6 m; Budapest, SzOT–2 borehole 58.0 m; Budapest, SzOT–4 borehole 54.0 m.

Material
12 specimens.

Stratigraphical range in Hungary
Priabonian–Lower Oligocene.

Genus *Cytheromorpha* HIRSCHMANN, 1909

Cytheromorpha subalpina dorsodepressa MONOSTORI, 1985
Pl. 4, figs 1–5.

1985. *Cytheromorpha subalpina dorsodepressa* n. ssp. – MONOSTORI, pp. 171–172.

Remarks
Specimens of the Hungarian material are wider and sometimes inflated posteriorly compared to type of the *subalpina* from Switzerland (SCHERER, 1964).

Dimensions

carapaces L = 0.38–0.41 mm
H = 0.21–0.22 mm
L/H = 1.94–1.98
W = 0.18–0.19 mm

Occurrence

Budapest, Kiscell–1 borehole 55.5–62.5 m; Budapest, Metro–3 borehole 36.0–37.0 m; Budapest; Zugliget outcrop samples 7; Kiseged, 1987 outcrop samples 2 and 3.

Material

42 specimens.

Stratigraphical range in Hungary

Lower Oligocene.

Superfamilia Cytheracea BAIRD, 1850
Famila Cytheridae BAIRD, 1850
Subfamilia Cytherinae BAIRD, 1850
Schizocythere? sp.

1985. *Schizocythere*? sp. – MONOSTORI, p. 173.

Remarks

Poorly preserved specimens, perhaps transported or resedimented.

Occurrence

Kiscell–1 borehole 57.5 m; Budapest, Ibolya u. quarry 1.2–7.9 m; Noszvaj, Síkfőkút quarry sample 18.

Material

5 specimens.

Schizocythere ? sp. juv.

1985. *Schizocythere* sp. juv. – MONOSTORI, p. 173.

Remarks

Juvenile valves and carapaces, perhaps transported (there are no adult specimens).

Occurrence

Kiscell–1 borehole 89.5 m; Cserépváralja–1 borehole 240–265.6 m.

Material

6 specimens.

Genus *Paijenborchella* KINGMA, 1978
Subgenus *Eopaijenborchella* KEIJ, 1966

Paijenborchella (Eopaijenborchella) sturovensis BRESTENSKÁ, 1975
Pl. 4, figs 6–7.

1975. *Paijenborchella (Eopaijenborchella) sturovensis* n. sp. – BRESTENSKÁ, pp. 401–403, Pl. 9, f. 1–9.
1985. *Paijenborchella (Eopaijenborchella) sturovensis* BRESTENSKÁ, 1975 – MONOSTORI, pp. 73–174, Pl. 2, f. 9.

Remarks

2 specimens originate from Eger, Wind brickyard, where it was detected by BRESTENSKÁ (1975).

Dimensions

left valve L = 0.48 mm
H = 0.30 mm
L/H = 1.60

Occurrence

Eger, Wind brickyard borehole 71.5–77.1 m, Alcsútdoboz–3 borehole 455.5 m

Material

3 specimens.

Stratigraphical range without Hungary

Czechoslovakia: Oligocene.

Stratigraphical range in Hungary

Oligocene.

Familia Leptocytheridae HANAI, 1957
Genus *Callistocythere* RUGGIERI, 1953

Callistocythere sp.
Pl. 5, fig. 1.

1982. *Callistocythere* sp. – MONOSTORI, p. 67, Pl. VII, f. 4.
1985. *Callistocythere* sp. – MONOSTORI, pp. 174–175.

Remarks

The sporadical specimens have poor preservation, probably transported material.

Occurrence

Kiscell–1 borehole 57.5 m; Budapest, Metro H–3 borehole 195.0 m; Városmajor–1 borehole 96.7–97.8 m.

Material

3 specimens.

Familia Cytherideidae SARS, 1925
Subfamilia Cytherideinae SARS, 1925
Genus *Eucytheridea* BRONSTEIN, 1930
Eucytheridea reticulata GOERLICH, 1953
Pl. 5, figs 2–7, Pl. 6, figs 1–2.

1953. *Cytheridea (Eucytheridea) reticulata* n. sp. – GOERLICH, pp. 137–138, Pl. 5, figs 40–42.
1982. *Eucytheridea reticulata* GOERLICH, 1953 – MONOSTORI, pp. 67–68, Pl. VII, figs 5–7(cum syn).
1985. *Eucytheridea reticulata* GOERLICH, 1953 – MONOSTORI, pp. 175–176, Pl. 2, fig. 10.

Remarks

The large variation of the shape and ornamentation (the length of the straight dorsal part, the length/height ratio of the valves, the sharpness of the reticulation, the dimension of the pits in the reticulation, the degrees of the convergency of dorsal and ventral outlines) are visible on the SEM photos.

Dimensions

right valves L = 0.67–0.80 mm (adult) 0.53–0.58 mm (juvenile),
H = 0.38–0.39 mm (adult) 0.33–0.34 mm (juvenile),
L/H = 1.78–1.85 (adult), 1.61–1.69 (juvenile)

carapaces L = 0.68–0.74 mm
H = 0.38–0.40 mm
L/H = 1.79–1.85
W = 0.31–0.34 mm

Occurrence

Kiscell–1 borehole 59.5–62.5 m; Budapest, Metro H–3 borehole 195.0 m; Budapest, Metro H–12 borehole 32.0–33.0 m; Budapest, Ibolya u. quarry 4.4 m; Budapest, Zugliget outcrop sample 3; Budapest, Törökvész–6 borehole 4.0–6.5 m; Budapest, Törökvész–8 borehole 3.5–5.5 m; Budapest, Törökvész–13 borehole 2.5 m; Cserépváralja–1 borehole 336.8–337.0 m; Kiseged road cut samples 2a, 3a, 3b, 3, 13; Kiseged, 1987 outcrop samples 1, 2, 3.

Material

333 specimens.

Stratigraphical range without Hungary
Germany: Rupelian, Switzerland: Rupelian.

Stratigraphical range in Hungary
Lower Oligocene.

Genus *Cytheridea* BOSQUET, 1852
Cytheridea ex gr. *mülleri* (VON MÜNSTER, 1830)
Pl. 6, fig. 3.

Remarks
The single carapace are similar to *C. mülleri truncatula* GOERLICH, 1953, the height is shifted backward.

Dimensions
right valve L = 0.67 mm
H = 0.36 mm
L/H = 1.86

Occurrence
Budafok–2 borehole 425.3–449.6 m; Szentendre–2 borehole 1070.0 m.

Material
3 specimens.

Stratigraphical range in Hungary
Oligocene.

Cytheridea ex gr. *pernota* OERTLI et KEIJ, 1956
Pl. 6, fig. 4.

Remarks
The outlines are close to this species. The ornamentation is somewhat reduced.

Dimensions
left valve L = 0.93 mm
H = 0.50 mm
L/H = 1.86

Occurrence
Varbó–50 borehole 541.7–543.2 m.

Material
1 specimen.

Genus *Miocyprideis* KOLLMANN, 1960

Miocyprideis rara (GOERLICH, 1953)
Pl. 6, figs 5–8, Pl. 7, fig. 1.

1953. *Cyprideis? rara* n. sp. – GOERLICH, pp. 130–131, T. 1., f. 1.
1957. *Cyprideis rara* GOERLICH – GOERLICH, p. 78,
1975. *Miocyprideis rara (*GOERLICH*)* – BRESTENSKÁ, p. 398, T. 5, f. 1–6.
1982. *Miocyprideis rara derupta* n. ssp. – MONOSTORI, pp. 36–37, Pl. IX, figs 8–9.
1985. *Miocyprideis rara* (GOERLICH, 1953) – MONOSTORI, pp. 182–183, Pl. 3, f. 9–10, Pl. 4., f. 1.

Remarks

In MONOSTORI (1985) the large variability of the species in several Oligocene sections is described. In Hárshegy Sandstone Formation an ecological variety is present with circummarginal break of valves, named in MONOSTORI (1982) as subspecies *derupta*.

Dimensions

carapaces L = 0.59–0.65 mm
H = 0.31–0.34 mm
L/H = 1.74–1.97

Occurrence

Pilisszentkereszt Sz 1–74 section samples g, h, i, i_2, j.

Material

321 specimens.

Stratigraphical range without Hungary

Germany: Rupelian; Switzerland: Rupelian.

Stratigraphical range in Hungary

Oligocene.

Genus *Cyamocytheridea* OERTLI, 1956

Cyamocytheridea punctatella (BOSQUET, 1852)
Pl. 7, figs 2–3.

1852. *Bairdia punctatella* n. sp. – BOSQUET, p. 26, Pl. 1, fig. 10.
1985. *Cyamocytheridea punctatella* (BOSQUET, 1852) – MONOSTORI, pp. 180–181, Pl. 3, fig. 6. (cum syn)

Remarks

The shape of valves with sporadical pores are caracteristic for this species athough the preservation is poor.

Dimensions

carapace L = 0.62 mm
H = 0.32 mm
L/H = 1.94
W = 0.30 mm

Occurrence

Pilisszentkereszt Sz 1–74 section, samples i, i_2

Material

2 specimens.

Stratigraphical range without Hungary

France: Stampian–Aquitanian; Switzerland: Rupelian–Chattian; Germany: Rupelian; Czechoslovakia: Egerian.

Stratigraphical range in Hungary

Oligocene.

Genus *Hemicyprideis* MALZ et TRIEBEL, 1970

Hemicyprideis anterocostata MONOSTORI, 1982

Pl. 7, figs 4–7.

1982. *Hemicyprideis? anterocostata* n. sp. – MONOSTORI, pp. 32–34., Pl. I., f. 2.

Remarks

Characteristic are the „frame-like" ornamental elements in lateral view and the large dimensions compared to similar *H. helvetica*. Variations are described in MONOSTORI (1982).

Dimensions

carapaces L = 0.90–0.98 mm
H = 0.46–0.54 mm
L/H = 1.81–1.96

Occurrence

Pilisszentkereszt Sz 1–74 section samples h, i, i_2, j.

Material

14 specimens.

Stratigraphical range in Hungary
Lower Oligocene.

Hemicyprideis helvetica (LIENENKLAUS, 1895)
Pl. 7, fig. 8, Pl. 8, figs 1–4.

1895. *Cytheridea mülleri* var. *helvetica* n. var. – LIENENKLAUS, p. 26, Pl. II, fig. 6.
1970. *Hemicyprideis helvetica* (LIENENKLAUS, 1895) – MALZ et TRIEBEL p. 13, pl. 13, figs 102–105.
1972. *Hemicyprideis helvetica* (LIENENKLAUS, 1895) – CARBONNEL, Pl. IV, f. 11–12.
1972. *Hemicyprideis helvetica* (LIENENKLAUS, 1895) – KEEN, Pl. 52, f. 11–12.
1972. *Hemicyprideis helvetica* (LIENENKLAUS, 1895) – DOEBL & SONNE, p. 72, Pl. 14, f. 12 a, c.
1978. *Hemicyprideis helvetica* (LIENENKLAUS, 1895) – MALZ, Pl. 1, f. 1–2.
1982. *Hemicyprideis helvetica* (LIENENKLAUS, 1895) – MONOSTORI, pp. 34–35, Pl. I, figs 3–5. (cum syn.)
1983. *Hemicyprideis helvetica* (LIENENKLAUS, 1895) – JIŘÍČEK, Pl. I, f. 1.
1985. *Hemicyprideis helvetica* (LIENENKLAUS, 1895) – MONOSTORI, pp. 181–182, Pl. 3, figs 7–8.
1985. *Hemicyprideis helvetica* (LIENENKLAUS, 1895) – DUCASSE et al., Pl. 76, f. 15.
1992. *Hemicyprideis helvetica* (LIENENKLAUS, 1895) – APOSTOLESCU, GUERNET, p. 108, Pl. 2, f. 1, 4.
1993. *Hemicyprideis helvetica* (LIENENKLAUS, 1895) – OLLIVIER–PIERRE et al., Pl. IV, f. 3.
1995. *Hemicyprideis helvetica* (LIENENKLAUS, 1895) – DUCASSE, pp. 117–119, Pl. 3, f. 1–7.

Remarks
The ornamental elements are mainly well-distinct knobs and the dimensions are small compared to similar *H. anterocostata*. Variations are described in MONOSTORI (1982).

Dimensions
carapaces L = 0.59–0.68 mm
H = 0.32–0.35 mm
L/H = 1.80–2.06

Occurrence
Pilisszentkereszt Sz 1–74 section samples g, h, i, i_2, j.

Material
372 specimens.

Stratigraphical range without Hungary
France: Oligocene; Belgium: Tongrian–Rupelian; Netherlands: Upper Tongrian; Germany: Chattian; Switzerland: Rupelian–Chattian; Czechoslovakia: Kiscellian–Egerian; Ukraine: Oligocene.

Stratigraphical range in Hungary
Oligocene.

Hemicyprideis parvula MALZ et TRIEBEL, 1970
Pl. 8, figs 5–8.

1970. *Hemicyprideis parvula* n. sp. – MALZ et TRIEBEL, pp. 11–12, Pl. 6, figs 39–44.
1982. Cytherideinae cf. *Hemicyprideis parvula* MALZ et TRIEBEL, 1970 – MONOSTORI, pp. 35–36, Pl. I, f. 6–8. (cum syn.)

Remarks

There are some specimens in Pilisszentkereszt outcrop and in Városmajor–1 borehole having shape characteristic for *Hemicyprideis olmensis* MALZ & TRIEBEL, 1970 (the straight middle part of the dorsal outline slopes moderately rather than breaking abruptly). There is a rather great variation of the outline in our material, so I think *olmensis* only is a morpha of the species *parvula*.

Dimensions

carapaces L = 0.84–0.92 mm
H = 0.40–0.47 mm
L/H = 1.81–2.10

Occurrence

Pilisszentkereszt Sz 1–74 section samples g, h, i, i_2, j; Budapest, Városmajor–1 borehole 97.8–98.5 m.

Material

73 specimens.

Stratigraphical range without Hungary

Germany: Sannoisian.

Stratigraphical range in Hungary

Lower Oligocene.

Subfamila Schulerideinae MANDELSTAM, 1960
Genus *Schuleridea* SWARTZ et SWAIN, 1946

Schuleridea rauracica OERTLI, 1956
Pl. 9, figs 1–2.

1956. *Schuleridea rauracica* n. sp. – OERTLI, pp. 47–50, Pl. 5, figs 110–123.
1982. *Schuleridea rauracica* OERTLI, 1956 – MONOSTORI, pp. 37–38, Pl. I, figs 9–13. (cum syn.)

Remarks

Shape and ornamentation characteristic for this species.

Dimensions
carapaces L = 0.80–0.87 mm
H = 0.51–0.54 mm
L/H = 1.57–1.61

Occurrence
Pilisszentkereszt Sz 1–74 section samples h, i_2, j.

Material
7 specimens.

Stratigraphical range without Hungary
France: Stampian; Germany: Rupelian; Switzerland: Rupelian.

Stratigraphical range in Hungary
Lower Oligocene.

Schuleridea rauraciformis MONOSTORI, 1985
Pl. 9, figs 3–5.

1985. *Schuleridea rauraciformis* n. sp. – MONOSTORI, pp. 184–185., Pl. 4., fig. 3.

Remarks
On some scanning photos very dense and weak minor pits are visible on the surface of valves contrasted with the large, deep pits of *Sch. rauracica.*

Dimensions
carapaces L = 0.98–1.11 mm
H = 0.6 –0.68 mm
L/H = 1.48–1.62
W = 0.47 mm

Occurrence
Budapest, Városmajor–1 borehole 96.7–98.5 m; Budapest, Zugliget outcrop sample N^{o}3, Kiseged road cut section samples 3b, 12; Kiseged, 1987 outcrop sample 1.

Material
19 specimens.

Stratigraphical range in Hungary
Lower Oligocene.

Genus *Cuneocythere* LIENENKLAUS, 1894
Subgenus *Cuneocythere* LIENENKLAUS, 1894

Cuneocythere (Cuneocythere) marginata anterodepressa MONOSTORI, 1982
Pl. 9, figs 6–7, Pl. 10, figs 1–3.

1982. *Cuneocythere (Cuneocythere) marginata anterodepressa* n. sp. – MONOSTORI, pp. 68–70, Pl. VII, figs 8–10.
1985. *Cuneocythere (Cuneocythere) marginata anterodepressa* MONOSTORI, 1982 – MONOSTORI, p. 185, Pl. 4, f. 4–6.
1985. Cuneocythere *(Cuneocythere) marginata marginata* (LIENENKLAUS, 1895) – MONOSTORI, p. 186.

Remarks

A few specimens of Zugliget outcrop show somewhat stronger anterior ornamentation. These rare transitional forms in the material raise the question: subspecies or ecological morpha?

Dimensions

right valve L = 0.57 mm
H = 0.28 mm
L/H = 2.00

left valves L = 0.55–0.61 mm
H = 0.33–0.40 mm
L/H = 1.35–1.71

Occurrence

Kiscell–1 borehole 51.6–62.5 m; Budapest Metro H–3 borehole 193.0–195.0 m; Budapest Metro H–11/a borehole 59.0–61.0 m; Budapest Metro H–13 borehole 36.0–37.0 m; Budapest Törökvész–6 borehole 2.5–4.5 m; Budapest Törökvész–8 borehole 2.5–3.5 m; Budapest Törökvész–13 borehole 2.0–2.5 m; Budapest Városmajor–1 borehole 96.7–98.5 m; Budapest Zugliget outcrop sample 7; Kiseged road cut section samples 2a, 3a, 3b, 4, 12, 13; Kiseged 1987 section samples 1, 2, 3.

Material

291 specimens.

Stratigraphical range in Hungary

Lower Oligocene.

Cuneocythere (Cuneocythere) truncata LIENENKLAUS, 1894
Pl. 10, fig 4.

1894. *Cuneocythere truncata* n. sp. – LIENENKLAUS, p. 260, T. XVIII, F. 6.
1985. *Cuneocythere truncata* LIENENKLAUS, 1894 – MONOSTORI, pp. 186–188, Pl. 4, f. 7. (cum syn.)

Remarks
About the species-validity see MONOSTORI (1985).

Dimensions
left valve L = 0.48 mm
H = 0.31 mm
L/H = 1.55

right valve L = 0.51 mm
H = 0.27 mm
L/H = 1.89

Occurrence
Pilisszentkereszt Sz 1–74 section sample H; Szentendre–2 borehole 1071.0 m; Alcsútdoboz–3 borehole 373.0 m.

Material
7 specimens.

Stratigraphical range without Hungary
Germany: Rupelian–Chattian, Czechoslovakia: Kiscellian–Egerian.

Stratigraphical range in Hungary
Oligocene.

Familia Krithidae MANDELSTAM, 1960
Genus *Krithe* BRADY, CROSSKEY & ROBERTSON, 1874

Krithe papillosa (BOSQUET, 1852)
Pl. 10, figs 5–7.

1852. *Cytheridea papillosa* n. sp. – BOSQUET, p. 42, Pl. III, f. 5.
1982. *Krithe papillosa* (BOSQUET, 1852) – MONOSTORI, pp. 138–140, Pl. I, fig. 14. (cum syn.)

Remarks
Description of the materials in MONOSTORI (1982).

Dimensions
carapaces L = 0.71–0.74 mm
H = 0.31–0.39 mm
L/H = 2.24–1.95

Occurrence
Pilisszentkereszt Sz 1–74 section samples h, i, i_2, j.

Material
90 specimens.

Stratigraphical range without Hungary
Germany: Burdigalian; France: Lutetian?, Stampian–Burdigalian; Czechoslovakia: Egerian; Ukraine: Oligocene.

Stratigraphical range in Hungary
Lower Oligocene.

Krithe pernoides (BORNEMANN, 1855)
Pl. 11, figs 1–6.

1855. *Bairdia pernoides* n. sp. – BORNEMANN, Pl. XX., figs 7–8.
1982. *Krithe pernoides* (BORNEMANN, 1855) – MONOSTORI, pp. 55–56, Pl. V, figs 4–10 (cum syn.)
1985. *Krithe pernoides* (BORNEMANN, 1855) – MONOSTORI, pp. 189–190, Pl. 4, f. 9.

Remarks
The frequent change of the L/H is conspicuous.

Dimensions

right valves	L = 0.63–0.72 mm
	H = 0.27–0.34 mm
	L/H = 2.10–2.30
left valves	L = 0.63–0.77 mm
	H = 0.30–0.38 mm
	L/H = 2.03–2.12
carapaces	L = 0.47–0.66 mm
	H = 0.26–0.33 mm
	L/H = 1.82–2.43
	W = 0.20–0.32 mm

Occurrence
Kiscell–1 borehole 83.4 m; Budapest, Metro H–1 borehole 14.8–60.0 m; Budapest, Metro H–3 borehole 56.8–102.1 m; Budapest, Metro H–5/1 borehole 42.0–47.1 m; Budapest, Metro H–7 borehole 22.0–84.0 m; Budapest, Metro H–7/1 borehole 26.0–75.0 m; Budapest, Metro H–8/1 borehole 20–0–32.0 m; Budapest, Metro H–9 borehole 19.5–59.8 m; Budapest, Metro H–11 borehole 23.5 m; Budapest, Ibolya u. quarry 1.2 m; Budapest, SzOT–1 borehole 7.0 m; Budapest, SzOT–2 borehole 46.0 m; Budapest, SzOT–4 borehole 54.0 m; Szentendre–2 borehole 700.0–1200.0 m; Varbó–50 borehole 445.0–451.0 m; Cserépváralja–1 borehole 211.0–286.0 m; Eger Wind brickyard borehole 66.8–73.1 m; Kiseged manganiferous clay samples 1, 4; Szőlőske outcrop sample 13.

Material
217 specimens.

Stratigraphical range without Hungary
Germany: Upper Eocene–Lower Miocene; Belgium, Netherlands: Rupelian; Italy: Miocene; Ukraine: Oligocene.

Stratigraphical range in Hungary
Middle Eocene–Upper Oligocene.

Krithe sp. 1
Pl. 11, fig. 7.

Remarks
Short form with broadly and asymmetrically rounded posterior end. The ventral outline nearly straight, the dorsal one broadly rounded. Similar to *Microcytherura antiqua* n. sp. in MÉHES (1941) with its outlines.

Dimensions
carapace L = 0.57 mm
H = 0.30 mm
L/H = 1.90

Occurrence
Budapest, Metro H–7/1 borehole 54.5–55.5 m; Budapest, Metro H–9 borehole 29.4–31.4 m; Szentendre–2 borehole 1068.0 m.

Material
3 specimens.

Stratigraphical range in Hungary
Lower Oligocene.

Krithe sp. 2
Pl. 12, figs 1–2.

Remarks
Forms, similar to *bartonensis* or *rutoti* with their outlines, but less acuted posteriorly.

Occurrence
Eger, Wind brickyard borehole 50.3–77.1 m.

Material
11 specimens.

Stratigraphical range in Hungary
Lower Oligocene.

Parakrithe costatomarginata MONOSTORI, 1982
Pl. 12, fig. 3.

1982. *Parakrithe costatomarginata* n. sp. – MONOSTORI, pp. 54–55, Pl. V, fig. 3.

Remarks
According to new specimens only the anterior depressed area and the „rib" originated so are constant, the posterior marginal elevation is less characteristic.

Dimensions:
carapace L = 0.59 mm
H = 0.20 mm
L/H = 2.70

Occurrence
Budapest, Metro H–3 borehole 56.8–59.0 m; Kiseged, manganiferous clay sample 4.

Material
5 specimens.

Stratigraphical range in Hungary
Lower Oligocene.

Parakrithe sp. 1
Pl. 12, figs 4–5.

Remarks
This species is characterized by broadly rounded asymmetrical posterior end and deep and asymmetrical ventral embayment at 0.45 of the length.

Dimensions
carapace L = 0.54 mm
H = 0.20 mm
L/H = 2.70

Occurrence
Budapest, Metro H–7 borehole 94.0–99.0 m; Budapest, Metro H–8 borehole 18.0 m; Kiseged manganiferous clay sample 4.

Material
4 specimens.

Stratigraphical range in Hungary
Lower Oligocene.

Familia Trachyleberididae SYLVESTER-BRADLEY, 1948
Subfamilia Trachileberidinae SYLVESTER-BRADLEY, 1948
Genus *Trachyleberis* BRADY, 1898

Trachyleberis cf. *spinosa* (LIENENKLAUS, 1900)
Pl. 12, fig. 6.

1982. *Trachyleberis* cf. *spinosa* (LIENENKLAUS, 1900) – MONOSTORI, p. 56.

Remarks
The single left valve has shape of this species with remains of dense, unregular spines.

Dimensions
carapace L = 0.80 mm
H = 0.42 mm
L/H = 1.90

Occurrence
Budapest, Metro H–3 borehole 99.8–102.1 m; Budapest, Metro H–9 borehole 19.5–20 m; Budapest, SzOT–1 borehole 16.0 m.

Material
2 specimens.

Genus *Costa* NEVIANI, 1928

Costa hermi WITT, 1967
Pl. 12, fig. 7, Pl. 13, figs 1–7, Pl. 14, fig. 1.

1967. *Costa hermi* n. sp. – WITT, p. 30, Pl. 1, figs 21–26.
1982. *Costa hermi* WITT, 1967 – MONOSTORI, pp. 57–58, Pl. V, figs 11–12, Pl. VI, fig. 1. (cum syn.)
1982. *Costa* cf. *hermi* WITT, 1967 – MONOSTORI, pp. 40–41, Pl. II, fig. 1.
1985. *Costa* cf. *hermi* WITT, 1967 – MONOSTORI, p. 192.

Remarks
The large variability is discussed in MONOSTORI (1982) *Costa* cf. *hermi* in MONOSTORI (1982) according to new specimens fits into the variability detected at Oligocene materials of Hungary.

Dimensions
L = 0.81 – 0.94 mm
H = 0.42–0.51 mm
L/H = 1.84–1.96

Occurrence
Budapest, Metro H–1 borehole 11.8–60.0 m; Budapest, Metro H–2 borehole 32.7–34.6 m; Budapest, Metro H–3 borehole 19.5–68.3 m; Budapest, Metro H–7 borehole 24.0–99.0 m; Budapest, Metro H–7/1 borehole 37.4–42.0 m; Budapest, Metro H–8 borehole 18.0 m; Budapest, Metro H–9 borehole 47.4–59.8 m; Budapest, Róka hegy; Budafok–2 borehole 367.5–370.5 m; Solymár–72 borehole 297.4–298.0 m; Solymár brickyard outcrop sample 17; Pilisszentkereszt Sz 1–74 section samples g, i_2; Szentendre–2 borehole 626.0–1100.0 m; Esztergom 123 borehole 199.0–410.0 m; Varbó–50 borehole 394.1–494.6 m; Eger Wind brickyard borehole 50.3–80.3 m; Szőlőske outcrop samples 11, 14; Alcsútdoboz–3 borehole 504.0 m.

Material
88 specimens.

Stratigraphical range without Hungary
Germany: Chattian–Aquitanian; Czechoslovakia: Kiscellian–Egerian.

Stratigraphical range in Hungary
Priabonian–Upper Oligocene.

Genus *Agrenocythere* BENSON, 1972

Agrenocythere ordinata (DELTEL, 1961)
Pl. 14, figs 2–4.

1961. *Bradleya ordinata* n. sp. – DELTEL, pp. 159–161, pl. 15, figs 262–264.
1964. *Bradleya ordinata* n. sp. – DELTEL, pp. 187–189, figs 126–127.
1977. *Agrenocythere bensoni* n. sp. – POKORNÝ, pp. 384–390, text–figs 1–5, Pl. 1, figs 1–3.
1982. *Agrenocythere aculeataformis* n. sp. – MONOSTORI, pp. 58–60, Pl. VI, fig. 2.
1985. *Agrenocythere bensoni* POKORNÝ, 1977 – MONOSTORI, pp. 191–192, Pl. 5, f. 1–2.
1985. *Agrenocythere ordinata* (DELTEL, 1964) – DUCASSE et al., p. 286, Pl. 79, figs 3–5.
1996. *Agrenocythere ordinata* (DELTEL, 1961) – MONOSTORI, p. 49, Pl. 17, figs 7–8, Pl. 18, figs 1–3.

Remarks
Description details in MONOSTORI (1982).

Dimensions (carapace)
L = 0.98 mm
H = 0.53 mm
L/H = 1.85

Occurrence

Budapest, Metro H–7 borehole 22.0–36.0 m; Cserépváralja–1 borehole 407.4–407.6 m; Eger, Wind brickyard borehole 75.4–77.1 m.

Material

5 specimens.

Stratigraphical range without Hungary

France: Eocene–Oligocene; Czechoslovakia: Lower–Middle Eocene, Lower Oligocene?

Stratigraphical range in Hungary

Bartonian–Lower Oligocene.

Genus *Pterygocythereis* BLAKE, 1933

Pterygocythereis cf. *ceratoptera* (BOSQUET, 1852)

Pl. 14, figs 5–7.

Remarks

Poorly preserved specimens. The outlines and the visible ornamental elements are corresponding to that of the most figures in the literature (including BRESTENSKÁ, 1975 from Eger, Hungary).

Dimensions

carapace L = 0.92–0.83 mm
H = 0.41–0.48 mm
L/H = 1.91–2.07
W = 0.42 mm

Occurrence

Pilisszentkereszt Sz 1–74 section samples g, h, i, i_2, j; Szentendre–2 borehole 809.0 m.

Material

26 specimens.

Stratigraphical range in Hungary

Oligocene.

Pterygocythereis n. sp?
Pl. 15, figs 1–2.

Remarks

Poorly preserved specimens. The form has big and blunt anteromarginal spines, two to four, also big and blunt dorsal spines, rare posterior spines (the dorsal and ventral terminal ones are longer), the ventral keel is well developed in the median part of the length, with some – mainly indistinct – spines. The anteromarginal and ventral keels are disconnected, the anteromarginal keel runs somewhat below the ventral keel. The main part of the lateral surface is smooth.

Dimensions

carapace L = 1.17–1.18 mm
H = 0.58 mm
L/H = 2.02–2.03

Occurrence

Budapest, Törökvész–8 borehole 3.0–7.0 m; Kiscell–1 borehole 59.6 m; Kiseged 1987 outcrop, sample 1.

Material

20 specimens.

Stratigraphical range in Hungary

Lower Oligocene.

Genus *Echinocythereis* PURI, 1954

Echinocythereis ligula LIENENKLAUS, 1896
Pl. 15, fig. 3.

1896. *Cythere ligula* n. sp. – LIENENKLAUS, pp. Pl. II, fig. 3.
1956. *Echinocythereis* ? *ligula* (LIENENKLAUS, 1896) – OERTLI, pp. 81–82, Pl. 10, figs 281–284, Pl. 11, figs 285–290.
1969. *Echinocythereis ligula* (LIENENKLAUS, 1896) – SCHEREMETA, pp. 195–196, Pl. XVIII, fig. 12.
1982. *Echinocythereis* aff. *ligula* (LIENENKLAUS, 1896) – MONOSTORI, pp. 41–42, Pl. II, fig. 2.

Remarks

After the new scanning photo the species determination is sure.

Dimensions

carapace L = 0.81 mm
H = 0.41 mm
L/H = 1.98

Occurrence
Pilisszentkereszt Sz1–74 section sample h.

Material
1 specimen.

Stratigraphical range without Hungary
Germany: Rupelian; Switzerland: Rupelian; Ukraine: Oligocene.

Stratigraphical range in Hungary
Lower Oligocene.

Genus *Henryhowella* PURI, 1957

Henryhowella asperrima (REUSS, 1850)
Pl. 15, figs 4–7, Pl. 16, figs 1–3.

1850. *Cypridina asperrima* n. sp. – REUSS, p. 74., pl. X., fig. 5.
1981. *Henryhowella asperrima* (REUSS, 1850) – MONOSTORI, pp. 195–196, Pl. 5, figs 5–6.

Remarks
The variability of the material of Hungary is described in MONOSTORI (1982, 1985).

Dimensions

carapace	L = 0.67–0.72 mm
	H = 0.37–0.39 mm
	L/H = 1.54–1.97
	W = 0.32–0.33 mm
instars	L = 0.42–0.59 mm
	H = 0.37–0.39 mm
	L/H = 1.54–1.97

Occurrence
Kiscell–1 borehole 83.4 m; Budapest, Metro H–1 borehole 56.8–60.0 m; Budapest, Metro H–3 borehole 99.8–102.1 m; Budapest, Metro H–5/1 borehole 28.0–42.0 m; Budapest, Metro H–7 borehole 19.8–108.4 m; Budapest, Metro H–7/1 borehole 33.3–55.5 m; Budapest, Metro H–9 borehole 19.5–59.8 m; Budapest, Metro H–11 borehole 23.5 m; Szentendre–2 borehole 809.0 m; Varbó–50 borehole 396-0–530.0 m; Cserépváralja–1 borehole 265.4–387.7 m; Eger Wind brickyard borehole 50.3–54.2 m; Szőlőske outcrop samples 11, 13, 14.

Material
95 specimens.

Stratigraphical range without Hungary
Germany: Oligocene–Miocene; France: Oligocene–Pliocene; Italy: Miocene; Czechoslovakia: Oligocene–Miocene.

Stratigraphical range in Hungary
Bartonian–Upper Oligocene.

Subfamilia Buntoniinae APOSTOLESCU, 1961
Genus *Protobuntonia* GREKOFF, 1954

Protobuntonia sublatissima arcuatocosta (BRESTENSKÁ, 1975)
Pl. 16, figs 4–5.

1975. *Buntonia sublatissima arcuatocosta* n. ssp – BRESTENSKÁ, pp. 395–396, Pl. 9, figs 1–8.
1982. *Buntonia sublatissima arcuatocosta* BRESTENSKÁ, 1975 – MONOSTORI, pp. 62–63, Pl. VI, figs 6–7.

Remarks
The „sharpness" of the reticulation is variable.

Dimensions
carapaces L = 0.46–0.51 mm
H = 0.31–0.34 mm
L/H = 1.48–1.50

Occurrence
Budapest, Metro H–3 borehole 96.8–99.8 m; Budapest, Metro H–9 borehole 53.5–55.6 m; Eger, Wind brickyard borehole 73.1–73.6 m.

Material
5 specimens.

Stratigraphical range without Hungary
Czechoslovakia: Oligocene.

Stratigraphical range in Hungary
Oligocene.

Subfamilia Campylocytherinae PURI, 1960
Genus *Leguminocythereis* HOWE et LAW, 1936

Leguminocythereis sorneana OERTLI, 1956
Pl. 16, fig. 6.

1956. *Leguminocythereis sorneana* n. sp. – OERTLI, pp. 91–93, Pl. 12, figs 320–337.

1975. *Leguminocythereis sorneana* OERTLI, 1956 – DOEBL, SONNE, pp. 144–145, Pl. 3, figs 18a, c
non 1980. *Leguminocythereis sorneana* OERTLI, 1956 – OLTEANU, pl. VI, fig. 11.
1982. *Leguminocythereis sorneana* OERTLI, 1956 – MONOSTORI, pp. 42–43, Pl. II, fig. 3.

Dimensions
carapace L = 1.12 mm
H = 0.54 mm
L/H = 2.07

Occurrence
Pilisszentkereszt Sz 1–74 section sample i.

Material
1 specimen.

Stratigraphical range without Hungary
Switzerland: Rupelian; Germany: Rupelian.

Stratigraphical range in Hungary
Lower Oligocene.

Leguminocythereis ? *cellulataformis* n. sp.
Pl. 16, fig. 7, Pl. 17, fig. 1.

1982. *Leguminocythereis* ex gr. *sorneana* OERTLI, 1956 – MONOSTORI, 1985, pp. 196–197, Pl. 5, figs 7–8.

Derivatio nominis
After the name of the similar species *L. cellulata* DUCASSE (1963).

Holotypus
Carapace.

Locus typicus
Kiseged road cut.

Stratum typicum
Kiscellian Tard Clay Formation, sample 12.

Diagnosis
The ornamentation is distinct and uniform polygonal network.

Description
The anterior outline of the left valves is asymmetrical, its ventral radius is smaller than the dorsal one. At 0.2 of the length the anterior outline connected with ~120° angle

to the straight dorsal outline abrupted between 0.6 and 0.8 of length by the dorsal swelling. The posterior outline begins after a ~100° break, its upper part is concave, lower part is convex with blunt dentices. The ventral outline nearly straight.

Ornamentation: distinct polygonal network covers the surface. It is obviously ordered only near the anterior and ventral margin. There is a blunt knot at the cardinal angle. There are ventral and posterodorsal swellings. The flat posterior end is nearly smooth. The right valve is very similar.

Dimension (carapaces)
L = 0.60–1.10 mm
H = 0.36–0.64 mm
L/H = 1.66–2.23

Variations
There are some more elongated specimens (perhaps males). Variable is the appearance of the ornamentation on the posterior end of the valves, the position and angle of the anterior-dorsal contact and the cardinal angle may be more or less protruding.

Comparison
The ornamentation and the shape of the carapace is not analogous those of the *L. sorneana*, as was believed in MONOSTORI (1982). Much more similar form is *L. cellulata* DUCASSE (1963), but details of the ornamentation differ.

Occurrence
Budapest, Zugliget outcrop sample 3; Kiseged road cut section, samples 3a, 12.

Material
13 specimens.

Stratigraphial range in Hungary
Lower Oligocene.

Familia Hemicytheridae PURI, 1953
Subfamilia Hemicytherinae PURI, 1953
Genus *Megahemicythere* WITT, 1967

Megahemicythere oertlii WITT, 1967
Pl. 17, figs 2–6.

1967. *Megahemicythere oertlii oertlii* n. sp. et ssp. – WITT, p. 69, Pl. 6, figs 9–12.
1985? *Megahemicythere oertlii* WITT, 1967 – MONOSTORI, p. 199.

Remarks

Most of the specimens have more reduced ornamentation as the type material of WITT (1967): they have practically smooth lateral surface. Characteristic is the sinuous dorsal outline and the blunt ventral swelling.

Dimensions

carapaces L = 1.24–1.42 mm
H = 0.76–0.79 mm
L/H = 1.59–1.82
W = 0.66 mm

Occurrence

Budapest, Városmajor–1 borehole 96.7–97.8 m; Budapet, Törökvész–8 borehole 3.5 m; Kiseged, 1987 outcrop samples 1, 2, 3; Kiseged road cut section samples 2a, 3a, 3d, 12.

Material

112 specimens.

Stratigraphical range without Hungary

Germany: Rupelian.

Stratigraphical range in Hungary

Lower Oligocene.

Pokornyella? sp. 1
Pl. 17, fig. 7.

Remarks

The dorsal and ventral outlines are nearly parallel and nearly straight. The anterior outline is asymmetrical, it turns into the uneven dorsal outline at ¼ of the length. The dorsal part of posterior outline after a perpencidular break at the 0.8 of the length is concave, the lower part is convex. They form a narrow caudal end near the ventral level. The ventral outline is undulate. The lateral surface is covered by a dense and irregular fine reticulation, around the wide depressive anterior-anterolateral parts with hardly visible ribs perpendicular to the margin. The caudal end holds some radial swellings. At the cardinal angle there is an elongated swelling and at the posterodorsal break a more distinct knot. This form is most close to genus *Pokornyella*, but I have not found similarly ornamented forms in the literature.

Dimensions

carapace L = 0.73 mm
H = 0.39 mm
L/H = 1.87

Occurrence
Budapest, Városmajor–1 borehole 97.8–98.5 m.

Material
1 specimen.

Stratigraphical range in Hungary
Lower Oligocene

Subfamilia Thaerocytherinae HAZEL, 1967
Genus *Grinioneis*, LIEBAU, 1975

Grinioneis sp.
Pl. 18, fig. 1.

Remarks
Damaged carapace with characters of this genus.

Occurrence
Budapest, Városmajor–1 borehole 96.7–97.8 m.

Material
1 specimen.

Genus *Hornibrookella* MOOS, 1965
Hornibrookella ex gr. *macropora* (BOSQUET, 1852)
Pl. 18, fig. 2.

Remarks
The ornamentation and outline of the specimen figured in this work obviously points at the *macropora* group.

Dimensions
carapace L = 0.80 mm
H = 0.48 mm
L/H = 1.67

Occurrence
Budapest, Ibolya u. quarry 1,2–9.9 m.

Material
2 carapaces.

Genus *Bosquetina* KEIJ, 1957
Bosquetina kisegedense n. sp.
Pl. 18., figs 3–6.

?1918. *Cythereis dentata* G. W. MÜLLER – KUIPER, pp. 68–69, Pl. III, fig. 29.
1985. *Bosquetina* cf. *reticulata* (SCHEREMETA, 1969) sensu BRESTENSKÁ, 1975 – MONOSTORI, p. 202, Pl. 7, figs 1–2.

Derivatio nominis
After the type locality (Kiseged near town Eger, Hungary)

Holotypus
Left valve.

Locus typicus
Kiseged, road cut section.

Stratum typicum
Kiscellian Tard Clay Formation sample 12.

Diagnosis
The dorsal and ventral outlines run quickly towards each other, the median part of the valves are pitted.

Description
In the lateral view of the left valves the anterior outline is wide and asymmetrically rounded, its dorsal part are nearly straight. It turns at about the ¼ of the length at 120˚ angles into the nearly straight dorsal outline (there is a slight elevation between ~ 0.5–0.8 of the lenght). The posterior outline is very asymmetrical. Its upper part from 0.9 of the length is slightly concave, the lower part is obviously convex and turn into the slightly convex ventral outline which quickly go away from the direction of the dorsal one.

Ornamentation: there is pitting on the middle of the surface from the dorsal outline up to the ventral keels with pits of different sizes. There are no pits in anterior and posterior quarters. There are some arcuated ventral keels (up to five), the first one ends with a knot at about 0.8 of the length. Another knot is posterodorsally before 0.9 of the length. An indistinct, large knot is in the cardinal angle.The anterior and posterior smooth parts are depressive.

The right valve is very similar, the overlap is indistinct.

In dorsal wiew of the carapace the valves are nearly parallel up to 0.18 of the length, then rise from 45˚ to 0˚ up to 0.4 of the length, then run nearly parallel up to the 0.8 of the length. From 0.8–0.9 the outlines are concave (from 90–45˚), and there is a posterior end with parallel valves.

Dimensions

carapace L = 1.09–0.87 mm
H = 0.51–0.70 mm
L/H = 1.56–1.71
W = 0.45 mm

Variations

There is a variation in the degree of the pitting: on some specimens it surface is more limited and the pits are smaller.

Comparison

Scheremeta's *Brachycythere ventriculata* has not distinct ventral keel, it is not related to this form. KUIPER's (1918) *Cythereis dentata* G. W. MÜLLER have similar ornamentation, but the form is much more elongated. Large and regularly aequal pits in BRESTENSKÁ (1975) are different from this form.

Occurrence

Alcsútdoboz–3 borehole 455.5 m; Budapest, Városmajor–1 borehole 96.7–97.8 m; Kiseged road cut section samples 12, 13; Kiseged 1987 outcrop samples 1, 2, 3.

Material

36 specimens.

Stratigraphical range in Hungary

Oligocene.

Bosquetina zalanyii BRESTENSKÁ, 1975
Pl. 18, fig. 7, Pl. 19, figs 1–4.

1929. *Cythereis dentata* G. W. MÜLLER, 1878 – ZALÁNYI, 1929, pp. 111–118, Pl. I, figs 4–7, 12–13, Pl. III., figs 1–18, textfigs 49–50. (Partim)
1975. *Bosquetina zalanyii* n. sp. – BRESTENSKÁ, pp. 390–392, Pl. 8, figs 1–3.
1985. *Bosquetina zalanyii* BRESTENSKÁ, 1975 – MONOSTORI, p. 201, Pl. 6, figs 9–10.

Remarks

The lateral surface (apart from the ventral keel-row) is mainly smooth, on some scanning photos very fine punctation is visible in the median part of the valves from the dorsal outline to the ventral keel-row.

Dimensions

carapaces L = 1.20 – 1.09 mm
H = 0.64–0.69 mm
L/H = 1.65–1.88
W = 0.66 mm

Occurrence

Kiscell-1 borehole 51.6–62.5 m; Budapest, Metro H–7/1 borehole 153.8–156.0 m; Budapest, Metro H–13 borehole 32.0–33.0 m; Budapest, Törökvész–6 borehole 4.5 m; Budapest, Törökvész–8 borehole 3.0–3.5 m; Budapest, Törökvész–13 borehole 2.5 m; Budapest, Városmajor–1 borehole 96.7–97.8 m; Budapest, Diana u; Budapest, Zugliget outcrop samples N°3, 7; Budapest SzOT–4 borehole 54.0 m; Cserépváralja–1 borehole 336.8–337.0 m; Kiseged road cut section, samples 3a, 3b, 12; Kiseged 1987 outcrop samples 1, 2, 3; Alcsútdoboz–3 borehole 455.5–487.1 m.

Material

187 specimens.

Stratigraphical range without Hungary

Czechoslovakia: Kiscellian–Egerian.

Stratigraphical range in Hungary

Oligocene.

Genus *Occultocythereis* HOWE, 1951

Occultocythereis rupelica MONOSTORI, 1982

Pl. 19, fig. 5.

1982. *Occultocythereis rupelica* n. sp. – MONOSTORI, pp. 63–64, Pl. VII, fig. 1.
1985. *Occultocythereis rupelica* MONOSTORI, 1982 – MONOSTORI, 1985, p. 202.

Remarks

The description see in MONOSTORI (1982).

Dimensions

carapaces L = 0.54–0.57 mm
H = 0.30 mm
L/H = 1.80–1.90

Occurrence

Budapest, Metro H–3 borehole 56.8–59.0 m; Budapest, Metro H–9 borehole 29.4–31.4 m; Eger Wind brickyard borehole 50.3–50.9 m.

Material

4 specimens.

Stratigraphical range in Hungary

Upper Priabonian–Lower Oligocene.

Occultocythereis ex gr. *mutabilis* TRIEBEL, 1961

1985. *Occultocythereis* ex gr. *mutabilis* TRIEBEL, 1961 – MONOSTORI, p. 202.

Remarks
The visible ornamental elements point at this species.

Occurrence
Budapest, Ibolya-u. quarry 5.5 m; Noszvaj, Síkfőkút quarry, sample 20.

Material
2 carapaces.

Familia Cytherettidae TRIEBEL, 1952
Genus *Cytheretta* TRIEBEL, 1952

Cytheretta posticalis TRIEBEL, 1952
Pl. 19, fig. 6.

1952. *Cytheretta posticalis* n. sp. – TRIEBEL, p. 23, Pl. 3, f. 18–21.
1985. *Cytheretta posticalis* TRIEBEL, 1952 – MONOSTORI, p. 203. (cum syn.)

Remarks
The description of the just figured specimens is in MONOSTORI (1982).

Dimensions
carapace L = 0.98 mm
H = 0.52 mm
L/H = 1.89
W = 0.46 mm

Occurrence
Budapest, Zugliget outcrop sample 3.

Material
1 carapace.

Stratigraphical range without Hungary
Germany: Oligocene; Switzerland: Oligocene; Czechoslovakia: Oligocene.

Stratigraphical range in Hungary
Lower Oligocene.

Cytheretta variabilis OERTLI, 1956
Pl. 19, figs 7–8.

1956. *Cytheretta variabilis* n. sp. – OERTLI, pp. 62–63, Pl. 7, figs 172, 180–188.
1982. *Cytheretta variabilis* OERTLI, 1956 – MONOSTORI, pp. 43–44, Pl. II, figs 4–5.

Remarks

The description (MONOSTORI, 1982) needs to be corrected based on new SEM photos: the ventral ridge (swelling) begins near the anterior margin and runs nearly parallel with the ventral outline and terminate at 0.8–0.9 of the length expanded upwards. The „subcentral tubercle" is the remain a median ridge, as visible on some specimens. On the middle part of the dorsal outline there are weak traces of a dorsal ridge.

Dimensions

carapaces L = 0.89 mm
H = 0.50–0.51 mm
L/H = 1.75–1.78

Occurrence

Pilisszentkereszt Sz 1–74 section samples g, i.

Material

6 carapaces.

Stratigraphical range without Hungary

Switzerland: Rupelian.

Stratigraphical range in Hungary

Lower Oligocene.

Familia Loxoconchidae SARS, 1925
Genus Loxoconcha SARS, 1866

Loxoconcha carinata tardense MONOSTORI, 1985
Pl. 20, figs 1–6.

1985. *Loxoconcha carinata tardense* n. ssp.–MONOSTORI, pp. 204–205, Pl. 7, figs 3–4.

Remarks

The details of the reticulation are very variable.

Dimensions

carapace L = 0.40–0.45 mm
H = 0.21 mm
L/H = 1.89–2.11
W = 0.22 mm

Occurrence

Kiscell–1 borehole 51.6–62.5 m; Budapest, Metro H–11a borehole 59.0–61.0, Budapest, Metro H–12 borehole 25.0–26.0 m; Budapest, H–13 borehole 36.0–37.0 m; Kiseged, road cut section samples 2a, 4, 12; Kiseged 1987 outcrop samples 1, 3.

Material

47 specimens.

Stratigraphical range in Hungary

Lower Oligocene.

Lococoncha delemontensis hungarica MONOSTORI, 1982
Pl. 20, fig. 7, Pl. 21, figs 1–5.

1982. *Loxoconcha delemontensis hungarica* n. ssp – MONOSTORI, pp. 71–72, Pl. VIII, figs 1–6.
1985. *Loxoconcha delemontensis hungarica* MONOSTORI, 1982 – MONOSTORI, pp. 205–206.

Remarks

The details of the reticulation are variable, the units of the ornamentation are mainly large.

Dimensions

carapaces L = 0.40–0.48 mm
H = 0.21–0.25 mm
L/H = 1.75–1.95
W = 0.19–0.25

Occurrence

Kiscell–1 borehole 51.6–59.6 m; Budapest, Metro H–7/1 borehole 156.0–171.0 m; Budapest, Metro H–11/a borehole 59–0–61.0 m; Budapest, Metro H–12 borehole 21.0–22.0 m; Budapest, Metro H–13 borehole 32.0–33.0 m; Budapest, Törökvész–6 borehole 3.5–4.0 m; Budapest, Törökvész–8 borehole 2.5–30.5 m; Budapest, Törökvész–13 borehole 2.0–2.5 m; Budapest, Diana u.; Budapest, Városmajor–1 borehole 97.8–103.7 m; Budapest, Zugliget outcrop samples 7, 11; Kiseged, road cut section samples N^{o}3b, 12; Kiseged 1987 outcrop samples 1, 2, 3.

Material
179 specimens.

Stratigraphical range in Hungary
Lower Oligocene.

Loxoconcha favata KUIPER, 1918
Pl. 21, figs 6–7, Pl. 22, fig. 1.

1982. *Loxoconcha* cf. *favata* KUIPER, 1918 – MONOSTORI, pp. 44–45.
1985. *Loxoconcha favata* KUIPER, 1918 – MONOSTORI, pp. 206–207, Pl. 7, figs 5–6. (cum syn.)

Remarks
The specimens from the Hárshegy Sandston Formation fit with his variation into the forms mentioned in remarks of MONOSTORI (1985).

Dimensions
carapace L = 0.54 – 0.57 mm
H = 0.30–0.32 mm
L/H = 1.69–1.80

Occurrence
Pilisszentkereszt Sz1–74 section samples g, h, i, i_2, j; Szentendre–2 borehole 1078.0–1084 m; Cserépváralja–1 borehole 336.8–337.0 m; Alcsútdoboz–3 borehole 336.0–413.0 m.

Material
39 carapaces.

Stratigraphical range without Hungary
Netherlands: Rupelian–Miocene; Switzerland: Rupelian; ?Ukraina: Oligocene; ?France: Miocene; ?Germany: Oligocene–Lower Miocene; Czechoslovakia: Egerian.

Stratigraphical range in Hungary
Oligocene.

Loxoconcha subovata (VON MÜNSTER, 1830) sensu BRESTENSKÁ, 1975
Pl. 22, fig. 2.

1975. *Loxoconcha subovata* (MÜNSTER) – BRESTENSKÁ, p. 405, Pl. 12, figs 11–12.
1985. *Loxoconcha* ex gr. *subovata* (VON MÜNSTER, 1830) – MONOSTORI, pp. 207–208.

Remarks
Our specimens agree with figured specimens of BRESTENSKÁ (1975). The species – described from Eocene to Miocene – needs revision after the very variable figures. Our

material is not sufficient to establish a revision.

Dimensions
carapace L = 0.40 mm
H = 0.32 mm
L/H = 1.67

Occurrence
Alcsútdoboz–3 borehole 442.0 m.

Material
3 specimens.

Loxoconcha ex gr. *aequapunctata* DELTEL, 1964
Pl. 22, fig. 3.

Remarks
Our form is similarly ornamented (densely pitted, with fine radial and concentrical ribblets on the perifers). Depressed ventral and posterior parts are characteristic. The posterior end is more obtuse then those of the type, but similar to some morphas in BEKAERT et al. (1991).

Dimensions
carapace L = 0.54 mm
H = 0.31 mm
L/H = 1.74

Occurrence
Budapest, Városmajor–1 borehole 96.7–97.8 m.

Material
1 specimen.

Loxoconcha sp. 1
Pl. 22, fig. 4.

Remarks
A stubby form. The anterior outline is moderately asymmetrical, the dorsal outline is slightly arcuate. The posterior outline is asymmetrical, its upper part is slightly concave, then turns in to the convex lower part. The ventral outline is somewhat sinuous. Up to 0.7 of the lenght it runs nearly parallel with dorsal outline or at a small angles to it, then they converge.

The lateral surface anterior and posterior smooth, the median part is finely pitted. The anterior and posteroventral rim is depressed. Near the ventral outline is a swelling

sometimes with a fine rib from ~0.3–0.6 of the length.

There is a slight swelling in the eye-knob area.

There are many similar forms in the Tertiary, but all they differ in the details.

Dimensions

caparaces L = 0.55–0.66 mm
H = 0.31–0.40 mm
L/H = 1.57–1.65

Occurrence

Kiscell–1 borehole 56.5 m; Budapest, Metro H–3 borehole 193.0–195.0 m; Budapest, Metro H–11a borehole 59.0–61.0 m; Kiseged 1987 outcrop sample 1.

Material

4 specimens.

Stratigraphical range in Hungary

Lower Oligocene.

Eucytherura dentata LIENENKLAUS, 1905
Pl. 22, fig. 5.

1905. *Eucytherura dentata* n. sp. – LIENENKLAUS, p. 57, Pl. IV, fig. 31.
1985. *Eucytherura dentata* LIENENKLAUS, 1905 – MONOSTORI, pp. 208–209, Pl. 7, fig. 7. (cum syn.)

Remarks

The spines on the anterior margin are not visible on the single specimen.

Dimensions

carapace L = 0.42 mm
H = 0.24 mm
L/H = 1.75

Occurrence

Kiseged, manganiferous clay sample 4.

Material

1 specimen.

Stratigraphical range without Hungary

Germany: Rupelian; Belgium: Bartonian–Rupelian; Czechoslovakia: Oligocene.

Stratigraphical range in Hungary

Upper Eocene–Oligocene.

Cytheropteron emmeneggeri SCHERER, 1964
Pl. 22, figs 6–8, Pl. 23, figs 1–4.

1964. *Cytheropteron emmeneggeri* n. sp. – SCHERER, pp. 16–17, Pl. 2, figs 10–14.
1982. *Cytheropteron emmeneggeri* SCHERER, 1964 – MONOSTORI, pp. 72–74, Pl. VIII, figs 7–11.
1982. *Cytheropteron emmeneggeri* SCHERER, 1964 – CARBONNEL (in JUNG, 1982)
1985. *Cytheropteron emmeneggeri* SCHERER, 1964 – MONOSTORI, p. 211.

Description
See in MONOSTORI (1982).

Dimensions
carapace L = 0.44–0.55 mm
H = 0.25–0.31 mm
L/H = 1.61–1.83
W = 0.31–0.33 mm

Occurrence
Kiscell–1 borehole 51.6–62.5 m; Budapest, Metro H–3 borehole 193.0–195.0 m; Budapest, Metro h–7/1 borehole 161.0–171.2 m; Budapest, Metro H–11/a borehole 59.0–61.0 m; Budapest, Metro H–12 borehole 21.0–33.0 m; Budapest, Metro H–13 borehole 32.0–52.5 m; Budapest, Törökvész–6 borehole 2.5–3.5 m; Budapest Törökvész–8 borehole 2.5–7.5 m; Budapest, Törökvész–13 borehole 2.0–2.5 m; Városmajor–1 borehole 95.6–103.7 m; Kiseged, road cut section samples 2a, 3a, 3b, 4, 12, 13; Kiseged 1987 outcrop samples 1, 2, 3.

Material
294 specimens.

Stratigraphical range without Hungary
Switzerland: Rupelian.

Stratigraphical range in Hungary
Lower Oligocene.

Cytheropteron cf. *triangulare* LIENENKLAUS, 1900
Pl. 23, fig. 5.

1982. *Cytheropteron* sp. – MONOSTORI, p. 74, Pl. VIII, fig. 12.

Remarks
The single carapace is very similar the specimens figured by MOOS (1973).

Dimensions

carapace L = 0.46 mm
H = 0.36 (from the dorsal outline to the peak of the ventral alar projection)
L/H = 1.28

Occurrence

Budapest, Metro H–13 borehole 36.0–37.0 m.

Material

1 specimen.

Familia Xestoleberididae SARS, 1928
Genus *Uroleberis* TRIEBEL, 1958

Uroleberis striatopunctata DUCASSE, 1967
Pl. 23, fig. 6.

1959. *Eocytheropteron striatopunctatum* n. sp. – DUCASSE, pp. 44–45, Pl. XIX, f. 2a–b.
1961. *Uroleberis striatopunctata* (DUCASSE, 1959) – DELTEL, 1961, p. 137, Pl. 12, f. 209.
1966. *Uroleberis striatopunctata* (DUCASSE, 1959) – MOUSSOU, p. 75, Pl. 21, f. 85a–b.
1967. *Uroleberis striatopunctata* n. sp. – DUCASSE, pp. 61–62, Pl. III, f. 67.
1969. *Uroleberis striatopunctata* DUCASSE – DUCASSE, p. 103, Pl. VII, f. 148.
1971. *Uroleberis striatopunctata* DUCASSE, 1959 – BLONDEAU, p. 97, Pl. X, f. 16.
1973. *Uroleberis striatopunctatum* DUCASSE, 1959 – SÖNMEZ-GÖKÇEN, p. 95, Pl. XII, f. 36–37.
1985. *Uroleberis striatopunctata* DUCASSE, 1967 – DUCASSE et al., Pl. 88, f. 3.
1985. *Uroleberis striatopunctata* DUCASSE, 1967 – MONOSTORI, 1985, pp. 124–125, Pl. XVI, f. 4–5.
1985a. *Uroleberis striatopunctata* DUCASSE, 1967 – MONOSTORI, pp. 213–214.
1993. *Uroleberis striatopunctata* DUCASSE-OLLIVIER-PIERRE et al., P. IV, f. 8.
2000. *Uroleberis striatopunctata* DUCASSE – MONOSTORI, p. 71, Pl. 12, f. 5.

Remarks

DUCASSE gives a description in her thesis (1959), but the valid „naming" is found in her later article (1967) acording to her opinion (DUCASSE et al., 1985). The figured specimen from the Dorog basin is very close to the type figure (1967). The specimen from Síkfőkút figured in this work has somewhat less narrow anterior part and more straight ventral outline. This specimen is wrongly figured as age of Eocene in MONOSTORI (2000)

Dimensions

carapace: L = 0.55 mm
H = 0.39 mm
L/H = 1.41 mm.

Occurrence

Bükk area: Noszvaj, Síkfőkút, quarry sample 21.

Material

1 carapaces.

Stratigraphical distribution without Hungary

France: Lower Eocene–Stampian, Turkey: Bartonian.

Stratigraphical range in Hungary

Middle and Upper Eocene (Upper Bartonian–Priabonian), lowermost Oligocene.

Protoargilloecia angulata DELTEL, 1961
Pl. 23, fig. 7, Pl. 24, figs 1–3.

1961. *Protoargilloecia angulata* n. sp. – DELTEL, pp. 42–44, Pl. 5, figs 66–69.
1963. *Protoargilloecia angulata* n. sp. – DELTEL, pp. 146–148, Pl. II, figs 32–24.
?1969 *Protoargilloecia angulata* DELTEL, 1961 – DUCASSE, p. 28, pl. 2, fig. 34.
1983. *Protoargilloecia angulata* DELTEL, 1961 – DUCASSE, pp. 276–279, Pl. I.
1985. *Protoargilloecia angulata* DELTEL, 1964 – DUCASSE et al., Pl. 88, fig. 14.
1985. *Argilloecia quasiramphasta* n. sp. – MONOSTORI, pp. 216–218, Pl. 8, figs 1–3.

Remarks

The Late Eocene–Early Oligocene material of Hungary (MONOSTORI, 1985) belongs to this species. On the main part of the Oligocene specimens the beak-formed posterior pointing rare, usually the posterior end is blunt-pointed, similarly to DUCASSE, 1983, Pl. I., figs 1–8, 14.

Dimensions

carapace L = 0.50–0.56 mm
H = 0.22–0.28 mm
L/H = 1.96–2.55
W = 0.23 mm

Occurrence

Kiscell–1 borehole 83.4 m; Budapest, Metro H–1 borehole 14.8–34.8 m; Budapest, Metro H–2 borehole 36.4–55.0 m; Budapest, Metro H–3 borehole 50.3–59.0 m; Cserépváralja–1 borehole 240.0–240.2 m; Varbó–50 borehole 409.2–410.4 m; Eger, Wind brickyard borehole 71.5–73.1 m; Noszvaj, Síkfőkút quarry samples 18, 21; Kiseged manganiferous clay sample 4.

Material

21specimen.

Stratigraphical range without Hungary

France: Sparnacian–Chattian.

Stratigraphical range in Hungary
Bartonian–Lower Oligocene.

Superfamilia Cypridacea BAIRD, 1845
Familia Candonidae KAUFMANN, 1900
Subfamilia Paracyprinae SARS, 1923
Genus *Paracypris* SARS, 1866

Paracypris? rupelica MONOSTORI, 1982
Pl. 24, figs 4–6.

1982. *Paracypris? rupelica* n. sp. – MONOSTORI, pp. 65–66, Pl. VII, figs 2–3.
1985. *Paracypris? rupelica* MONOSTORI, 1982 – MONOSTORI, pp. 219–220.

Dimensions
carapaces L = 0.54–0.90 mm
H = 0.34–0.47 mm
L/H = 1.87–1.95

Occurrence
Budapest, Metro H–1 borehole 25.0–47.2 m; Budapest, Metro H–2 borehole 36.4–39.1 m; Budapest, SzOT–1 borehole 5.5–16.0 m; Budapest SzOT–4 borehole 54.0 m; Budapest, SzOT–6 borehole 10.8 m; Cserépváralja–1 borehole 240.0–296.0 m; Kiseged, manganiferous clay samples 1, 3, 4.

Material
52 specimens.

Stratigraphical range in Hungary
Priabonian–Lower Oligocene.

Paracypris? kisegedensis n. sp.
Pl. 24, fig. 7–8, Pl. 25. fig. 1.

Derivatio nominis
After the locality name.

Holotypus
A carapace.

Locus typicus
Kiseged road cut section.

Stratum typicum

Kiscellian, Tard Clay Formation, sample 12.

Diagnosis

Elongated form with nearly symmetrical anterior, hollowed ventral, blunt posterior and asymmetrically arched dorsal outlines.

Description

The anterior outline of the left valves is nearly symmetrically rounded. After a break at about of 0.1 of the length the dorsal outline is broadly arched up to 0.6–0.7 of the lenght, than nearly straight. The posterior outline is blunt, with rather large radius. The ventral outline has a shallow, symmetrical hollowing.

The right valve has a similar outline with a little depression on the anterior part of the dorsal outline and with a more deep ventral hollowing. The surface is unornamented. The left valve overlaps the right one. The inner features are not visible.

Dimensions

carapaces L = 0.83–1.02 mm
H = 0.41–0.48 mm
L/H = 2.02–2.17

Variations

Some minor variations are in the placing and strength of the posterodorsal break.

Comparison

Similar form is the P. *trosliensis* APOSTOLESCU, 1956, which is dorsally more arched.

Occurrence

Kiseged 1987 outcrop samples 1, 2; Kiseged road cut section samples 10, 12.

Material

8 specimens.

Stratigraphical range in Hungary

Lower Oligocene.

Paracypris ex gr. *propinqua* TRIEBEL, 1963
Pl. 25, fig 2.

1985. Cypridacea fam., gen. et sp. indet. 2. – MONOSTORI, p. 223, Pl. 8, figs 7–8.

Remarks

The arc of the anterior outline is more wide and the posterior end is less pointed.

Dimensions

carapaces L = 1.04–1.22 mm
H = 0.38–0.44 mm
L/H = 2.74–2.77

Occurrence

Budapest, Törökvész–6 borehole 6.5 m; Budapest, Törökvész–8 borehole 5.5 m; Kiseged 1987 outcrop sample 1.

Material

5 specimens.

Paracypris cf. *bouldnorensis* KEEN, 1978
Pl. 25, figs 3–5.

Remarks

Poorly preserved specimens. The anterior outline of the left valves is nearly symmetrically rounded, the dorsal outline has a very large arc, the posterior outline is symmetrically rounded, blunt, its terminal point is at lower 1/3 of the maximal height. The ventral outline is moderately hollowed. The outline of the right valve has deeper ventral hollow.

In dorsal wiew the emerging and sinking of the lateral surfaces are first very strong but than minimal (rather flat valves with proportionally dick perpendicular ends). The lateral surface seems to be smooth.

This form is most close to species *Paracypris bouldnorensis* KEEN, 1978. Difference is the more elongated shape, less arched dorsal outline, and the higher placing of the posterior terminal point.

Dimensions

carapaces L = 0.80–0.83 mm
H = 0.35–0.36 mm
L/H = 2.22–2.37
W = 0.28 mm

Occurrence

Pilisszentkereszt Sz 1–74 section samples g, h, i, i_2.

Material

75 specimens.

Stratigraphical range in Hungary

Lower Oligocene.

Subfamilia Candoninae KAUFMANN, 1900
Genus *Candona* BAIRD, 1845

Candona fertilis TRIEBEL, 1963
Pl. 25, fig. 6.

1963. *Candona (Pseudocandona) fertilis fertilis* n. sp. – TRIEBEL, pp. 167–168, Pl. 27. figs 19–22, Pl. IX, fig. 1.
1982. *Candona fertilis* TRIEBEL, 1963 – MONOSTORI, pp. 74–75, Pl. VIII, fig. 14, Pl. 9, fig. 1. (cum syn.)
?1985. *Candona* sp. – MONOSTORI, p. 222.
1985. *Pseudocandona fertilis* TRIEBEL, 1963 – CARBONNEL, WIEDMANN et BERGER, p. 227, Pl. V, figs 10–12.

As has written in MONOSTORI (1982), this form fits well in the variations of this species.

Dimensions
L = 1.00 mm
H = 0.58 mm
L/H = 1.72

Occurrence
Budapest, Törökvész–8 borehole 7.5 m; Budapest, Törökvész–13 borehole 2.0 m; Budapest, SzOT–1 borehole 16.0 m.

Material
7 specimens.

Stratigraphical range without Hungary
Germany: Oligocene; France. Chattian–Aquitanian; Switzerland: Oligocene.

Stratigraphical range in Hungary
Lower Oligocene.

Candona? recta LIENENKLAUS, 1905
Pl. 25, figs 7–8, Pl. 26, figs 1–6.

1905. *Candona recta* n. sp. – LIENENKLAUS, pp. 22–23, Pl. I, fig. 6.
1962. *Candona recta* LIENENKLAUS, 1905 – DOEBL & MALZ, p. 398, Pl.
1982. Candona? aff. *recta* LIENENKLAUS, 1905 – MONOSTORI, pp. 75–76, Pl. IX, figs 2–3.
1985. *Candona? recta* LIENENKLAUS, 1905 – MONOSTORI, pp. 221–222, Pl. 8, fig. 5.

Dimensions
L = 0.98–1.10 mm
H = 0.45–0.53 mm

L/H = 2.07–2.13
W = 0.39 mm

Occurrence

Kiscell–1 borehole 51.6–59.5 m; Budapest, Metro H–12 borehole 21.0–22.0 m; Budapest, Metro H–13 borehole 32.0–37.0 m; Budapest, Törökvész–6 borehole 3.5 m; Budapest, Törökvész–8 borehole 2.5–3.0 m; Budapest, Törökvész–13 borehole 2.0 m; Budapest, Városmajor–1 borehole 96.7–97.8 m; Budapest, Zugliget outcrop samples 3, 7, 9; Kiseged road cut section samples 3a, 3b, 12; Kiseged 1987 outcrop samples 1, 2, 3.

Material

103 specimens.

Stratigraphical range without Hungary

Germany: Miocene.

Stratigraphical range in Hungary

Lower Oligocene.

Candona? sp. indet.
Pl. 27, fig. 1.

1985. Cypridacea fam. gen. et sp. indet. 4 – MONOSTORI, pp. 223–224, Pl. 8, fig. 11.

Remarks

The outlines are principally close to those of different species of *Lineocypris, Pseudocandona* and *Candona*.

Occurrence

Kiseged road cut section, samples N°3a, 3b.

Material

2 carapaces.

Remarks

There are 97 badly preserved carapaces in the Lower Oligocene (Tard Clay Formation) of the Budapest area with shape similar to Candonidae.

Familia Cyprididae BAIRD, 1845
Subfamilia Eucypridinae BRONSTEIN, 1947
Genus *Moenocypris* TRIEBEL, 1959

Moenocypris bockenheimensis TRIEBEL, 1963
Pl. 27, figs 2–4.

1963. *Moenocypris bockenheimensis* n. sp. – TRIEBEL, pp. 179–180, Pl. 34, figs 58–61, Pl. 35, fig. 62.
1963. *Moenocypris bockenheimensis* TRIEBEL, 1963 – TRIEBEL, fig. 35.
1982. *Moenocypris* cf. *bockenheimensis* TRIEBEL, 1963 – MONOSTORI, p. 76–77, Pl. IX, fig. 4.
1985. *Moenocypris bockenheimensis* TRIEBEL, 1963 – CARBONNEL et al., p. 226, Pl. VI, figs 1–4.

Description

The anterior outline of the left valves is asymmetrically rounded, the dorsal outline is trapezoidal. Anterior break (~150˚) on the dorsal outline is at 0.25 of the length, the posterior one (~150˚) at 0.75 of the length. The posterior outline is nearly symmetrically rounded, its radius is larger than that of the anterior outline. The ventral outline is hardly concave. The overlap of the left valve is conspicuous at the ventral outline, which has a long and shallow embayment. The lateral surface is smooth.

Remarks

The shape of the carapaces agree with those of the type, the L/H ratio is somewhat more variable.

Dimensions

carapaces L = 0.75–1.45 mm
H = 0.34–0.74 mm
L/H = 1.96–2.24

Occurrence

Budapest, Törökvész–6 borehole 2.5–6.5 m; Budapest, Törökvész–8 borehole 3.0–10.5 m; Budapest, Törökvész–13 borehole 2.0 m; Kiseged road cut section samples N^{o}3a; Kiseged 1987 outcrop samples 1, 2, 3.

Material

66 specimens.

Stratigraphical range without Hungary

Switzerland: Oligocene; Germany: Aquitanian.

Stratigraphical range in Hungary

Lower Oligocene.

Familia Cypridopsidae KAUFFMANN, 1900
Subfamilia Cypridopsinae BRONSTEIN, 1947
Genus *Curvopsis* MALZ, 1977

Curvopsis curvata (LIENENKLAUS, 1905)
Pl. 27, figs 5–6, Pl. 28, figs 1–2.

1905. *Cypria curvata* n. sp. – LIENENKLAUS, pp. 19–20, Pl. I, Fig. 4.
1921. *Cypria curvata* LIENENKLAUS, 1905 – WENZ, pp. 160, 172, Pl. 25, figs 29–30.
1962. *Cypria? curvata* LIENENKLAUS, 1905 – DOEBL et MALZ, p. 397, Pl. 58, figs 10– 11.
1970. *Cypridopsis? curvata* (LIENENKLAUS, 1905) – WIESNER, p. 10, figs 2. 14.
1973. *Cypridopsis? curvata* (LIENENKLAUS, 1905) – WIESNER, Fig. 2, 3, 17.
1977. *Curvopsis curvata* (LIENENKLAUS, 1905) – MALZ, pp. 237–239, Pl. 1, figs 3–4, Pl. 2, figs 8–16, Pl. 3, fig. 23, Textfig. 4, 5c.
1982. Cypridopsinae gen. et sp. indet. 1 – MONOSTORI, p. 77.
1985. Cypridopsidae gen. et sp. indet. 1 – MONOSTORI, p. 222.

Description

Nearly trigonal form with similar anterior and posterior outline (the radius of the anterior outline is somewhat larger). The break of the dorsal outline is at ~0.5 of the length. The carapace is very high.

The left valve is somewhat larger. The ventral outline is straight on the left valve and obviously hollowing on the right one.

The lateral surface is smooth.

Remarks

The dorsal peak of the „triangle" differently rounded on the specimens, as seen in MALZ (1977), too.

Dimensions

carapaces L = 0.62–0.79 mm
H = 0.50–0.54 mm
L/H = 1.24–1.49

Occurrence

Budapest, Törökvész–8 borehole 2.0–2.5 m; Budapest, Törökvész–13 borehole 3.5–7.5 m; Budapest, Városmajor–1 borehole 96.7–97.8 m; Budapest, Diana u.; Budapest, Zugliget outcrop sample 3; Kiseged road cut samples 3b, 12; Kiseged 1987 outcrop sample 1.

Material

32 specimens.

Stratigraphical range without Hungary

Germany: Lower Miocene.

Stratigraphical range in Hungary

Lower Oligocene.

?*Curvopsis curvata* (LIENENKLAUS, 1905)
Pl. 28, figs 3–4.

Remarks

Shape is very similar to that of the *Curvopsis curvata*, but less triangular, more hemicircular. Similar forms are also in MALZ (1977), so perhaps they fit in the variation of the species, but also similar is the outline of the *Cypria dorsata* n. sp. in MALZ & MOAYEDPOUR, 1973.

Dimensions

carapaces L = 0.61–0.63 mm
H = 0.47–0.48 mm
L/H = 1.29–1.31

Occurrence

Budapest, Törökvész–8 borehole 7.5 m; Budapest, Zugliget outcrop sample N°7; Kiseged 1987 outcrop samples 2, 3.

Material

7 carapaces.

Cypridopsidae gen. et sp. indet. 3, 1982
Pl. 28, fig. 5.

1982. Cypridopsinae gen. et sp. indet. 3 – Monostori, p. 77, Pl. IX, fig. 7.

Remarks

Moderately elongated form with blunt posterior and anterior end (the arc of the posterior end somewhat narrower than that of the anterior one). There is a triangular break at the half of the length. The ventral outline has a symmetrical shallow hollowing on the left and a deeper one on the right valve. The lateral surfaces are smooth. Similar outline have *Curvopsis propinqua* n. sp. and *Cavernopsis angusta* n. sp. in MALZ (1977).

Dimensions

carapaces L = 0.50–1.24 mm
H = 0.28–0.70 mm
L/H = 1.77

Occurrence

Budapest, Törökvész–6 borehole 4.0 m; Kiseged road cut sample 3a.

Material

3 specimens.

Ostracoda gen. et sp. indet.
Pl. 28., fig. 6.

Remarks

Very arcuate and elongated form. The ventral and dorsal outlines are nearly symmetrically arcuate. The posterior and anterior outlines are rounded, the anterior radius somewhat larger. Form of valves and indistinct remains of pitted surface remind of Cushmanidea.

Dimensions

carapaces L = 0.54 mm
H = 0.22–0.26 mm
L/H = 2.07–2.45

Occurrence

Szentendre–2 borehole 1082.4–1084.0 m.

Material

2 specimens.

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Plate 1

Figs 1–4. *Cytherella compressa* (VON MÜNSTER, 1830)

Fig. 1. Carapace from the left valve. 52x
Budapest, Metro H–7 borehole 24.0–29.0 m
Fig. 2. Carapace from the left valve. 56x
Szentendre–2 borehole 809.0 m
Fig. 3. Carapace from the left valve. 56x
Budapest, Metro H–9 borehole 47.4–94.9 m
Fig. 4. Carapace from the left valve. 54x
Varbó–50 borehole 494.6–503.0 m

Figs 5–7. *Cytherella dentifera* MÉHES, 1941

Fig. 5. Carapace from the left valve. 47x
Budapest, Metro H–6 borehole 37.0–41.0 m
Fig. 6. Carapace from the right valve. 59x
Alcsútdoboz–3 borehole 487.1 m
Fig. 7. Carapace from the left valve. 59x
Budapest, Metro H–7 borehole 94.0–99.0 m

Fig. 8. *Cytherella* ex gr. *beyrichi* (REUSS, 1851)
Carapace from the left valve. 63x
Eger Wind brickyard borehole 71.5–73.4 m

Plate 1

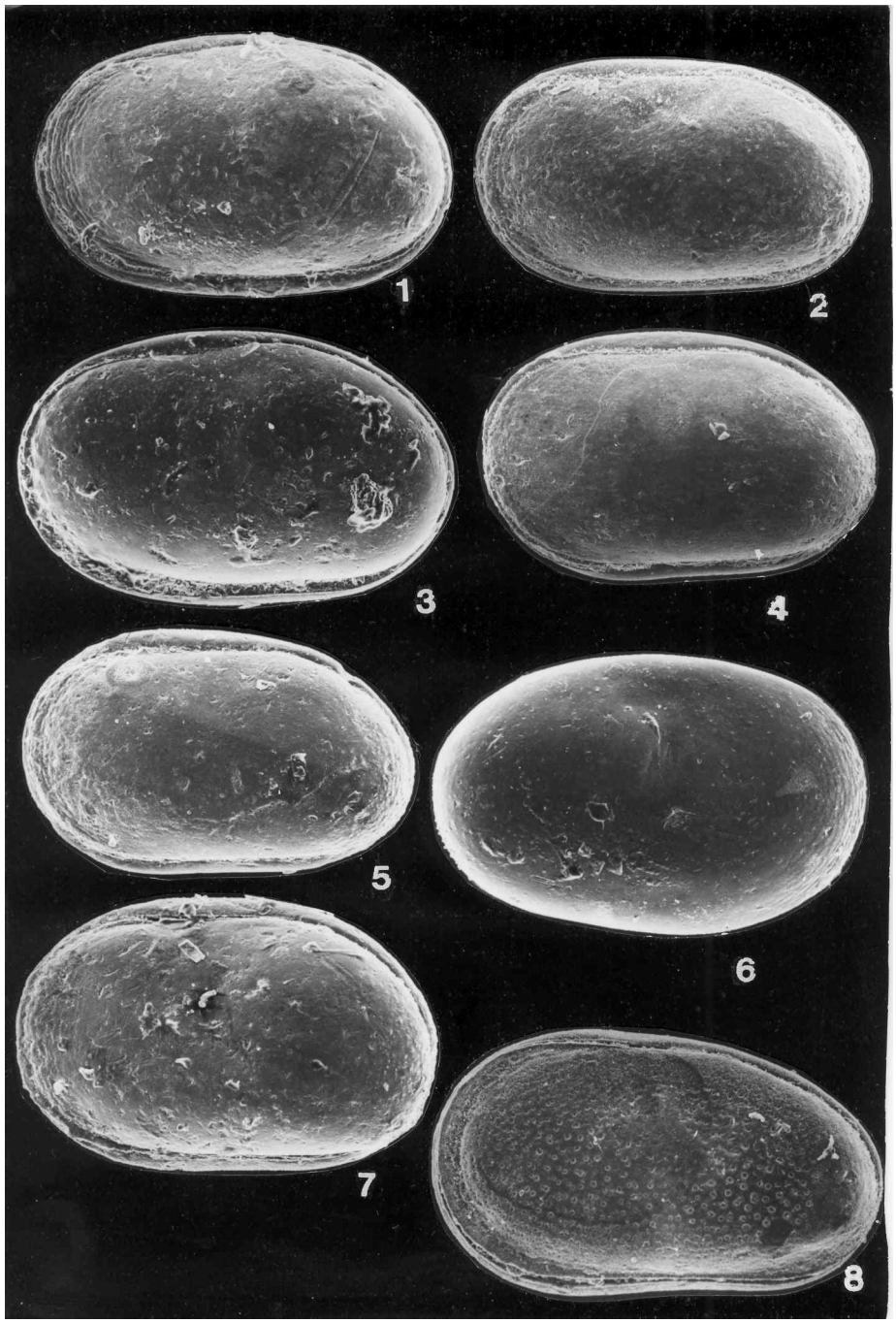


Plate 2

Fig. 1. *Cytherella* ex gr. *beyrichi* (REUSS, 1851)
Left valve. 61x.
Eger Wind brickyard borehole 69.8–70.5 m

Fig. 2. *Cytherella* ex gr. *draco* PIETRZENIUK, 1969.
Carapace from the left valve. 51x.
Budapest, Metro H–1 borehole 25.0–28.0 m

Figs 3–5. *Cytherella hyalina* MÉHES, 1941

Fig. 3. Carapace from the left valve. 56x
Budapest, Metro H–7/1 borehole 33.3–34.3 m
Fig. 4. Carapace from the left valve. 60x
Budapest, Metro H–3 borehole 91.0–94.8 m
Fig. 5. Carapace from the left valve. 54x
Varbó–50 borehole 416.1–420.0 m

Figs 6–8. *Cytherella mehesi* BRESTENSKÁ, 1975

Fig. 6. Right valve. 56x
Varbó–50 borehole 479.6–482.2 m
Fig. 7. Right valve. 50x
Budapest, Metro H–3 borehole 59.6–61.6 m
Fig. 8. Carapace from the left valve. 59x
Budapest, Metro H–1 borehole 32.2–34.8 m

Plate 2

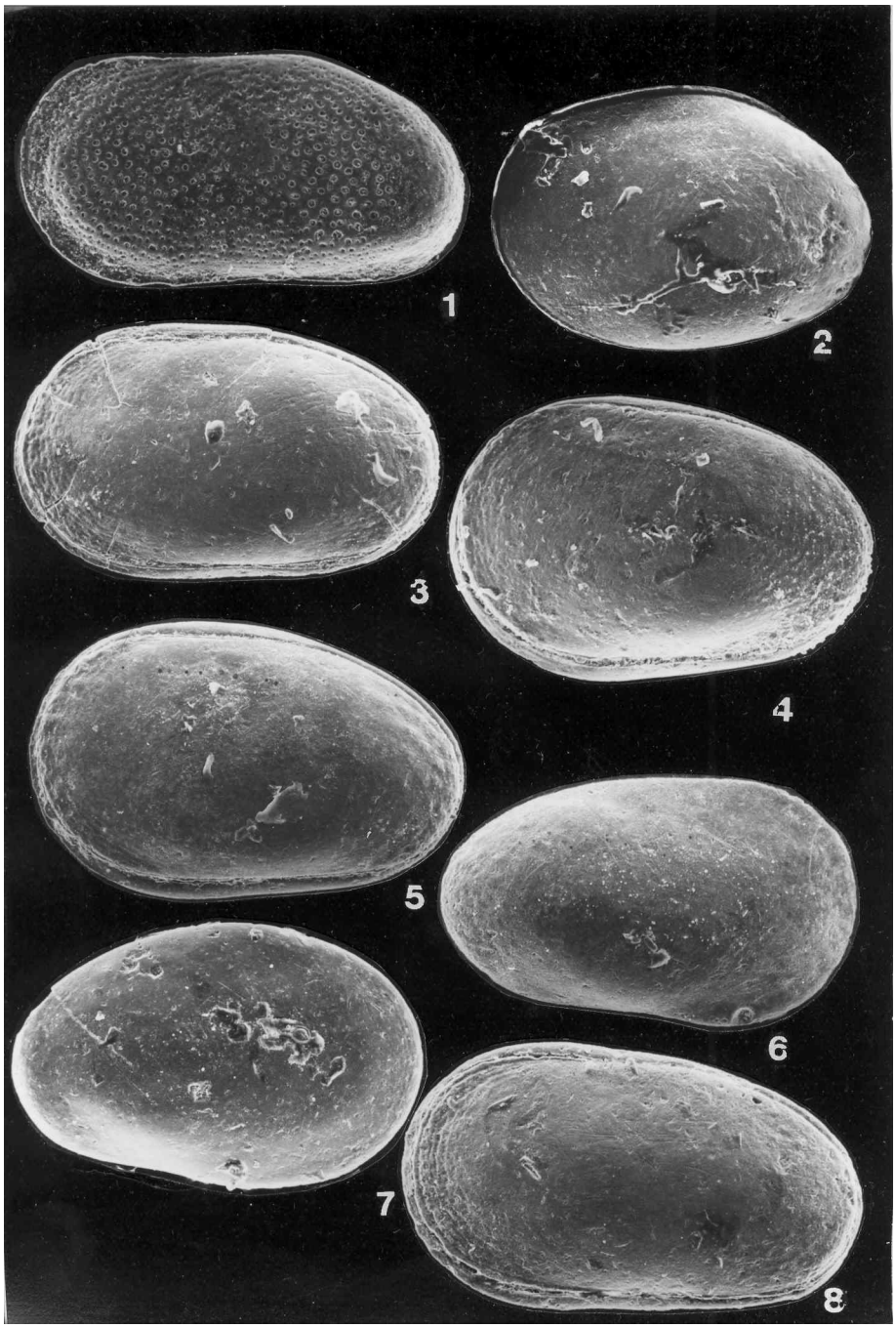


Plate 3

Figs 1–4. *Cytherella transversa* SPEYER, 1863

Fig. 1. Left valve. 74x
Alcsútdoboz–3 borehole 487.1 m
Fig. 2. Carapace from the left valve. 56x
Budapest, Metro H–7 borehole 60.0–63.0 m
Fig. 3. Right valve. 65x
Alcsútdoboz–3 borehole 487.1 m
Fig. 4. Inside of the right valve. 68x
Alcsútdoboz–3 borehole 455.5 m

Fig. 5. *Cardobairdia boldi* PIETRZENIUK, 1969
Carapace from the right valve. 108x
Budapest, Metro H–7/1 borehole 50.0–52.0 m

Fig. 6. *Bairdia rupelica* MONOSTORI, 1982
Carapace from the right valve. 50x
Budapest, Metro H–3 borehole 65.3–68.3 m

Fig. 7. *Bairdia*? sp. 1.
Left valve. 63x
Kiscell–1 borehole 83.4 m

Plate 3

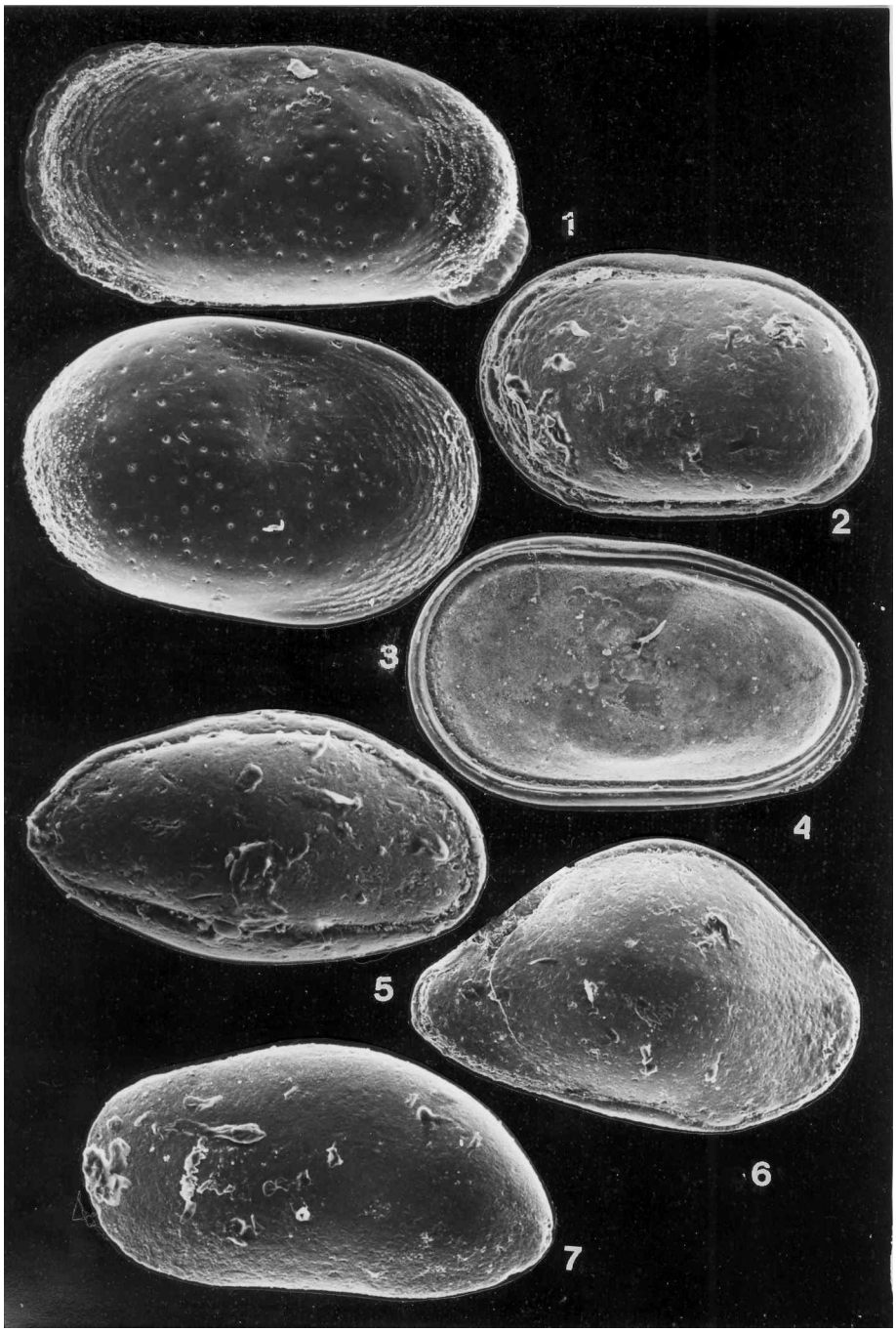


Plate 4

Figs 1–5. *Cytheromorpha subalpina dorsodepressa* MONOSTORI, 1985

Fig. 1. Right valve. 126x
Kiseged 1987 outcrop, sample N°3.
Fig. 2. Right valve. 130x.
Kiscell–1 borehole 55.5 m
Fig. 3. Carapace from the dorsal side. 142x
Budapest, Zugliget outcrop, sample 7
Fig. 4. Carapace from the left valve. 131x
Kiscell–1 borehole 57.5 m
Fig. 5. Inside of the left valve. 137x
Kiscell–1 borehole 57.5 m

Figs 6–7. *Paijenborchella (Eopaijenborchella) sturovensis* BRESTENSKÁ, 1975

Fig. 6. Left valve. 108x
Eger Wind brickyard borehole 71.5–73.1 m
Fig. 7. Right valve.112x
Eger Wind brickyard borehole 76.3–77.1 m

Plate 4

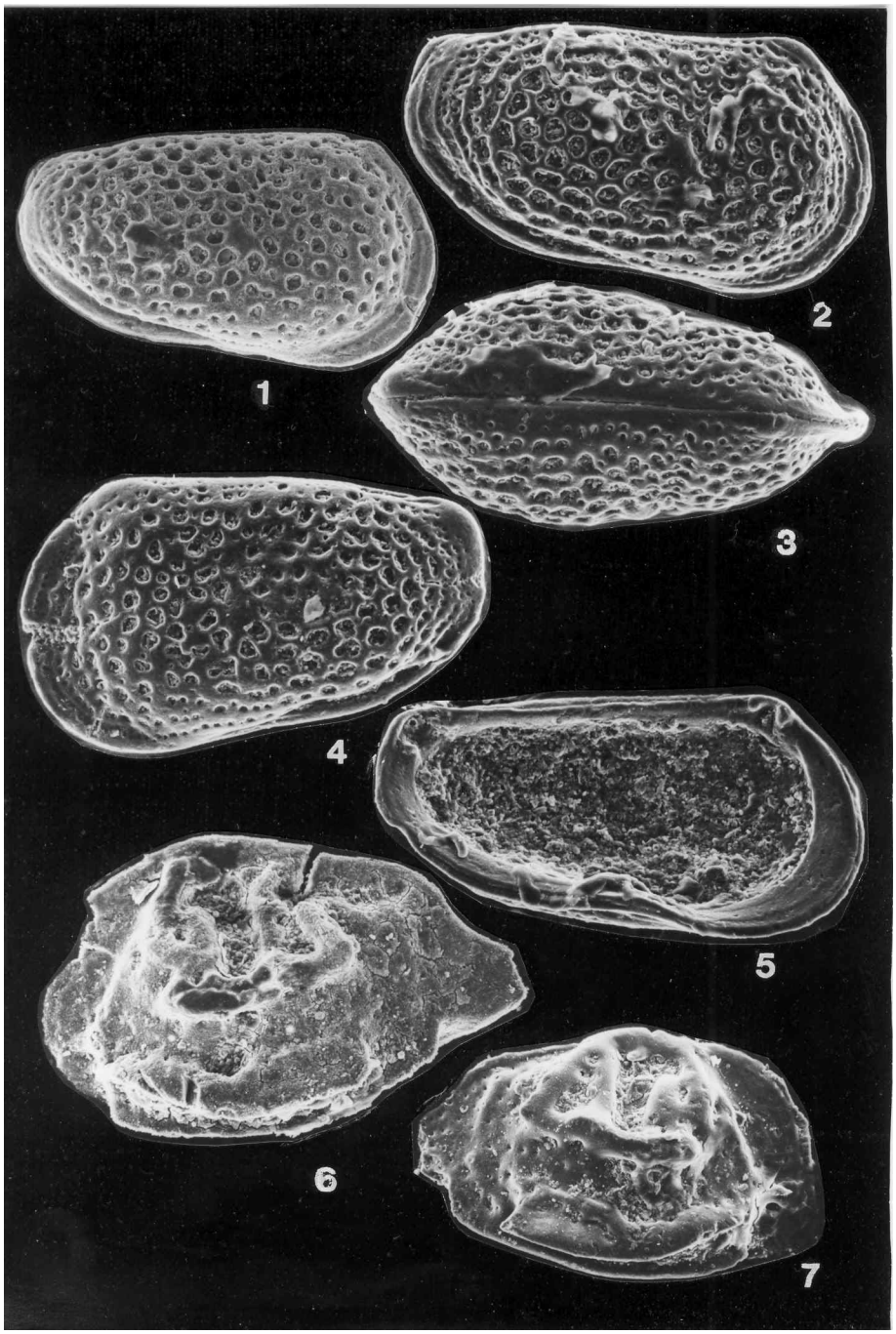


Plate 5

Fig. 1. *Callistocythere* sp.
Right valve. 86x
Budapest, Városmajor–1 borehole 96.7–98.7 m

Figs 2–7. *Eucytheridea reticulata* GOERLICH, 1953

Fig. 2. Left valve. 94x
Kiseged road cut section, sample 4
Fig. 3. Carapace from the right valve. 65x
Kiseged road cut section, sample 3a
Fig. 4. Carapace from the right valve. 77x
Kiseged road cut section, sample 12
Fig. 5. Inside of the right valve.74x
Kiseged road cut section, sample 12
Fig. 6. Left valve. 77x
Kiseged road cut section, sample 12
Fig. 7. Carapace from the dorsal side. 63x
Kiseged 1987 outcrop, sample 1

Plate 5

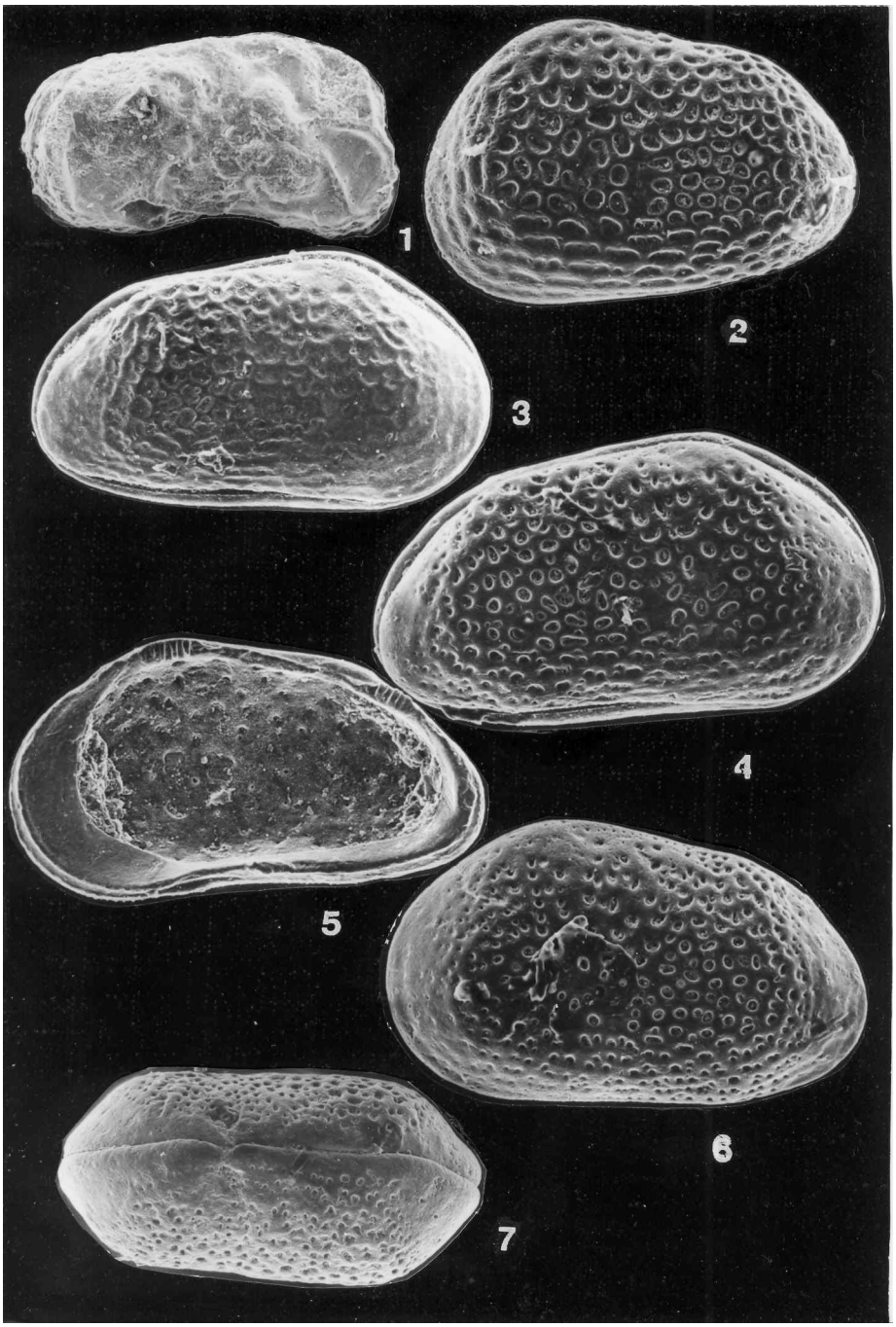


Plate 6

Figs 1–2. *Eucytheridea reticulata* GOERLICH, 1953

Fig. 1. Left valve. 72x
Kiseged road cut section, sample 38
Fig. 2. Carapace from the dorsal side. 63x
Kiseged road cut section, sample 3a

Fig. 3. *Cytheridea* ex gr. *mülleri* (VON MÜNSTER, 1830)
Right valve 74x
Szentendre–2 borehole 1070.0 m

Fig. 4. Cytheridea ex gr. pernota OERTLI and KEY, 1956.
Left valve. 56x
Varbó–50 borehole 541.7–543.2 m

Figs 5–8. *Miocyprideis rara* (GOERLICH, 1953)

Fig. 5. Carapace from the right side. 85x
Pilisszentkereszt Sz 1–74 section, sample h
Fig. 6. Left valve. 77x
Pilisszentkereszt Sz 1–74 section, sample h
Fig. 7. Left valve. 72x
Pilisszentkereszt Sz 1–74 section, sample i_2
Fig. 8. Carapace from the left side. 77x
Pilisszentkereszt Sz 1–74 section, sample i_2

Plate 6

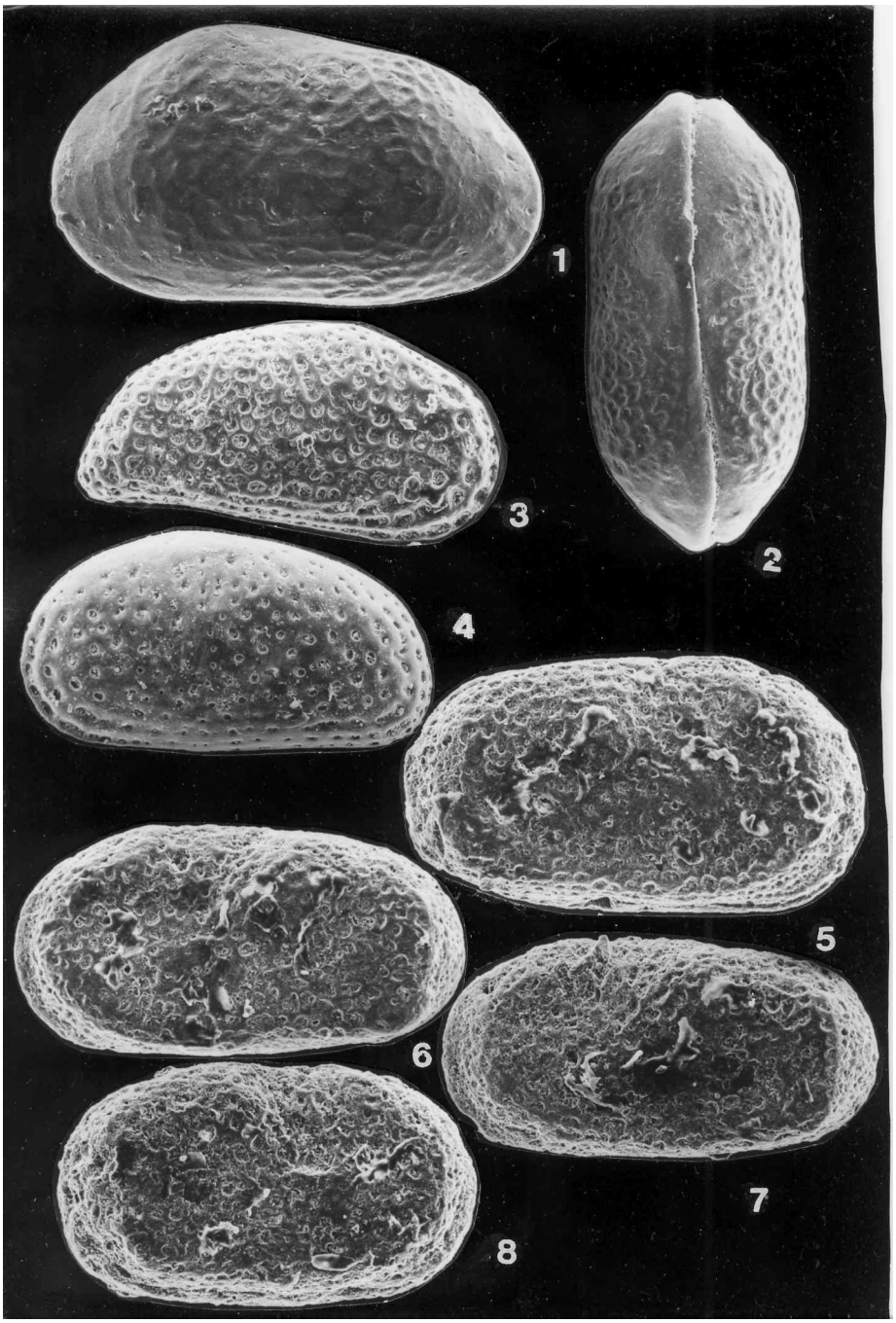


Plate 7

Fig. 1. *Miocyprideis rara* (GOERLICH, 1953).
Carapace from the dorsal side. 74x
Pilisszentkereszt Sz 1–74 section, sample i_2

Figs 2–3. *Cyamocytheridea punctatella* (BOSQUET, 1852)

Fig. 2. Carapace from the right valve. 74x
Pilisszentkereszt Sz 1–74 section, sample i
Fig. 3. Carapace from the dorsal side. 74x
Pilisszentkereszt Sz 1–74 section, sample i_2

Figs 4–7. *Hemicyprideis anterocostata* MONOSTORI, 1982

Fig. 4. Carapace from the dorsal side. 59x
Pilisszentkereszt Sz 1–74 section, sample h
Fig. 5. Carapace from the dorsal side. 56x
Pilisszentkereszt Sz 1–74 section, sample i
Fig. 6. Carapace from the right valve. 56x
Pilisszentkereszt Sz 1–74 section, sample i
Fig. 7. Carapace from the right valve. 50x
Pilisszentkereszt Sz 1–74 section, sample i_2

Fig. 8. *Hemicyprideis helvetica* (LIENENKLAUS, 1895)
Carapace from the dorsal side. 70x
Pilisszentkereszt Sz 1–74 section, sample j

Plate 7

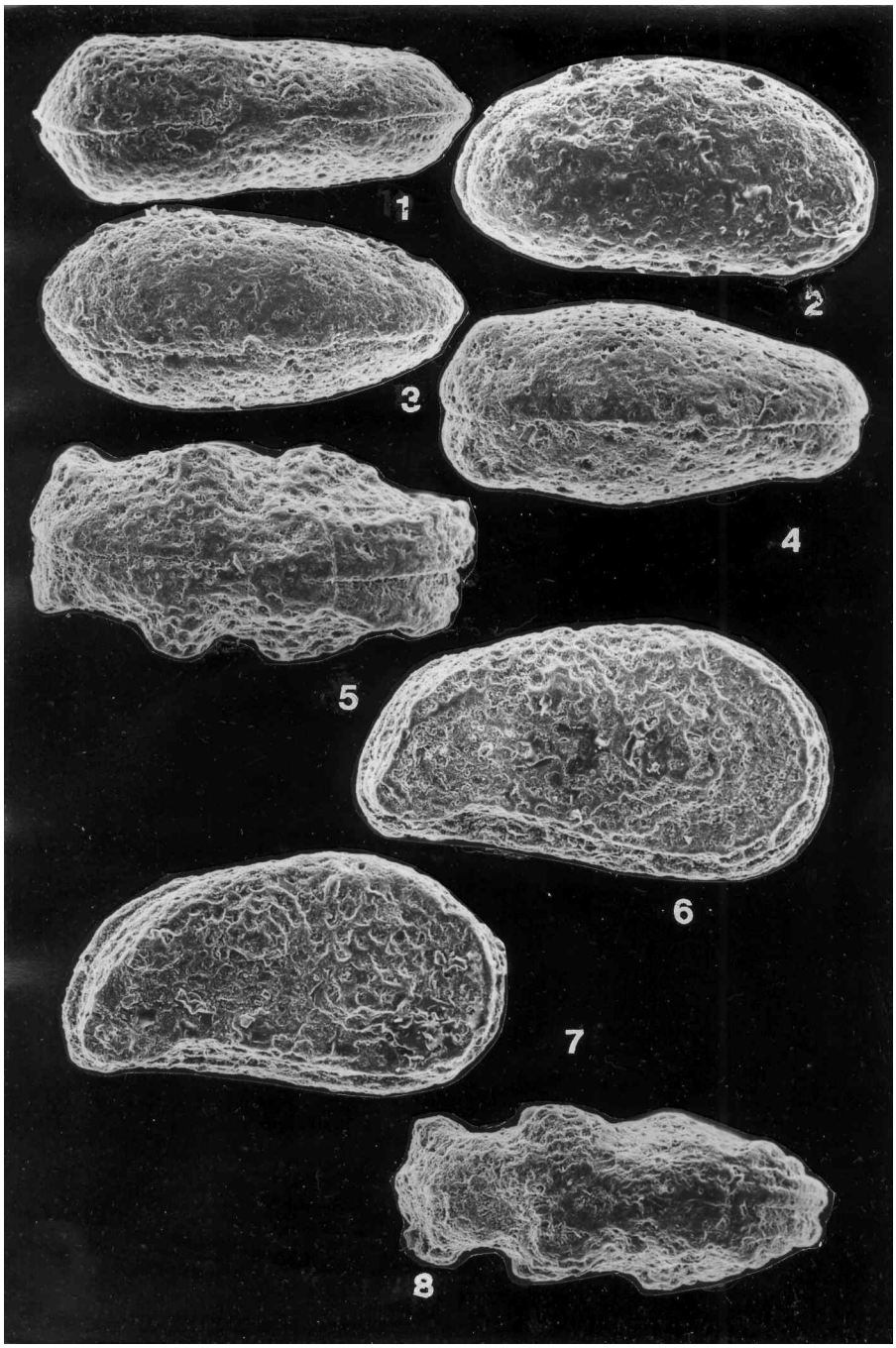


Plate 8

Figs 1–4. *Hemicyprideis helvetica* (LIENENKLAUS, 1895)

Fig. 1. Carapace from the dorsal side. 81x
Pilisszentkereszt Sz 1–74 section, sample i
Fig. 2. Right valve. 65x
Pilisszentkereszt Sz 1–74 section, sample j
Fig. 3. Carapace from the right valve. 72x
Pilisszentkereszt Sz 1–74 section, sample h
Fig. 4. Left valve. 74x
Pilisszentkereszt Sz 1–74 section, sample j

Figs 5–8. *Hemicyprideis parvula* MALZ & TRIEBEL, 1970

Fig. 5. Carapace from the right side. 59x
Pilisszentkereszt Sz 1–74 section, sample i_2
Fig. 6. Carapace from the dorsal side. 54x
Pilisszentkereszt Sz 1–74 section, sample i_2
Fig. 7. Carapace from the left valve. 59x
Pilisszentkereszt Sz 1–74 section, sample i
Fig. 8. Right valve. 56x
Pilisszentkereszt Sz 1–74 section, sample i_2

Plate 8

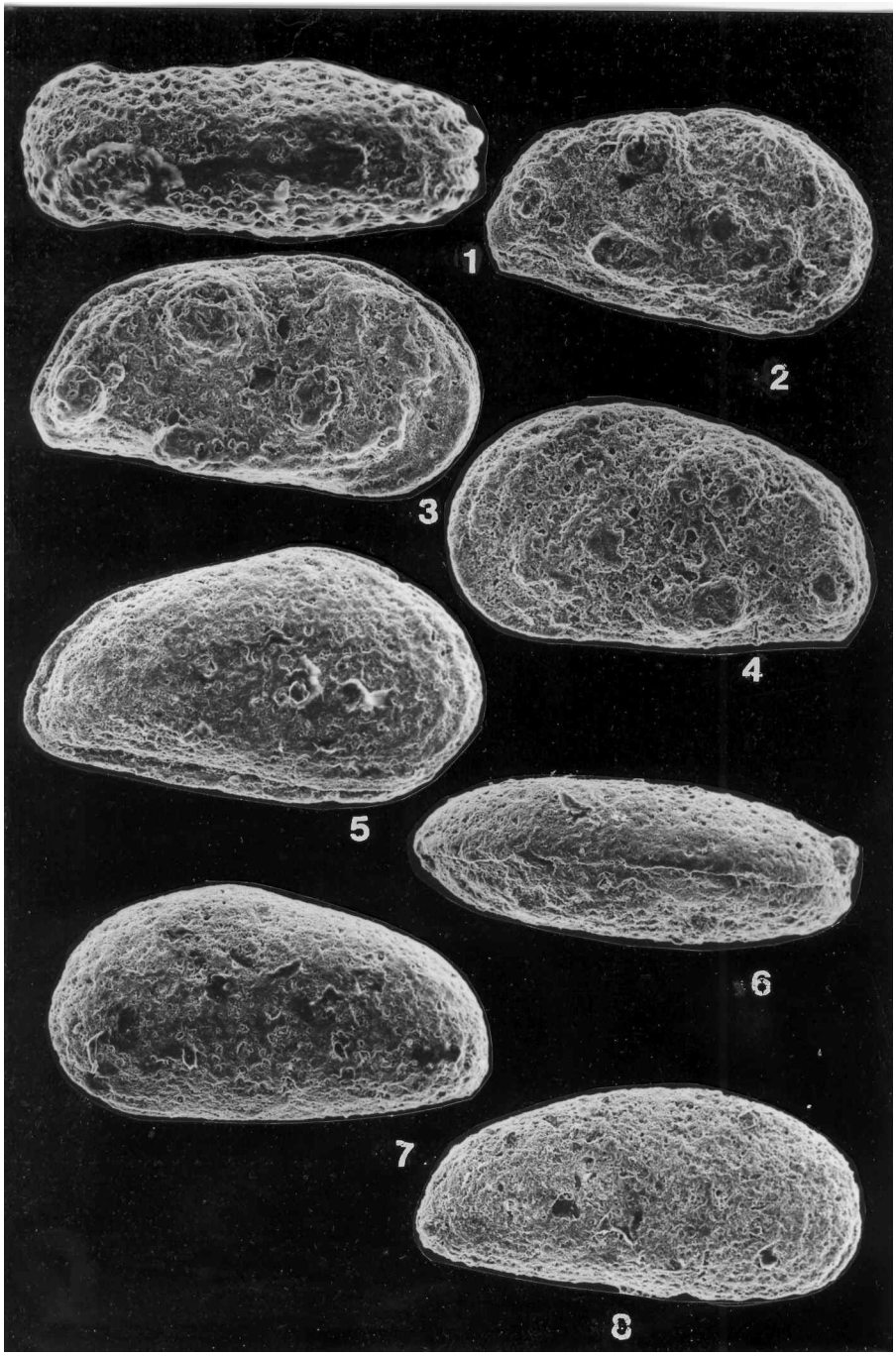


Plate 9

Figs 1–2. *Schuleridea rauracica* OERTLI, 1956

Fig. 1. Carapace from the right valve. 59x
Pilisszentkereszt Sz 1–74 section, sample i_2
Fig. 2. Carapace from the right valve. 54x
Pilisszentkereszt Sz 1–74 section, sample j

Figs 3–5. *Schuleridea rauraciformis* MONOSTORI, 1985

Fig. 3. Carapace from the dorsal side. 54x
Kiseged road cut section, sample 3b
Fig. 4. Carapace from the right valve. 47x
Kiseged road cut section, sample 12
Fig. 5. Carapace from the right valve. 41x
Budapest, Városmajor–1 borehole 97.8–98.5 m

Figs 6–7. *Cuneocythere (Cuneocythere) marginata anterodepressa* MONOSTORI, 1982

Fig. 6. Carapace from the right valve. 81x
Kiseged 1987 outcrop, sample 3
Fig. 7. Left valve. 94x
Kiseged road cut section, sample 12

Plate 9

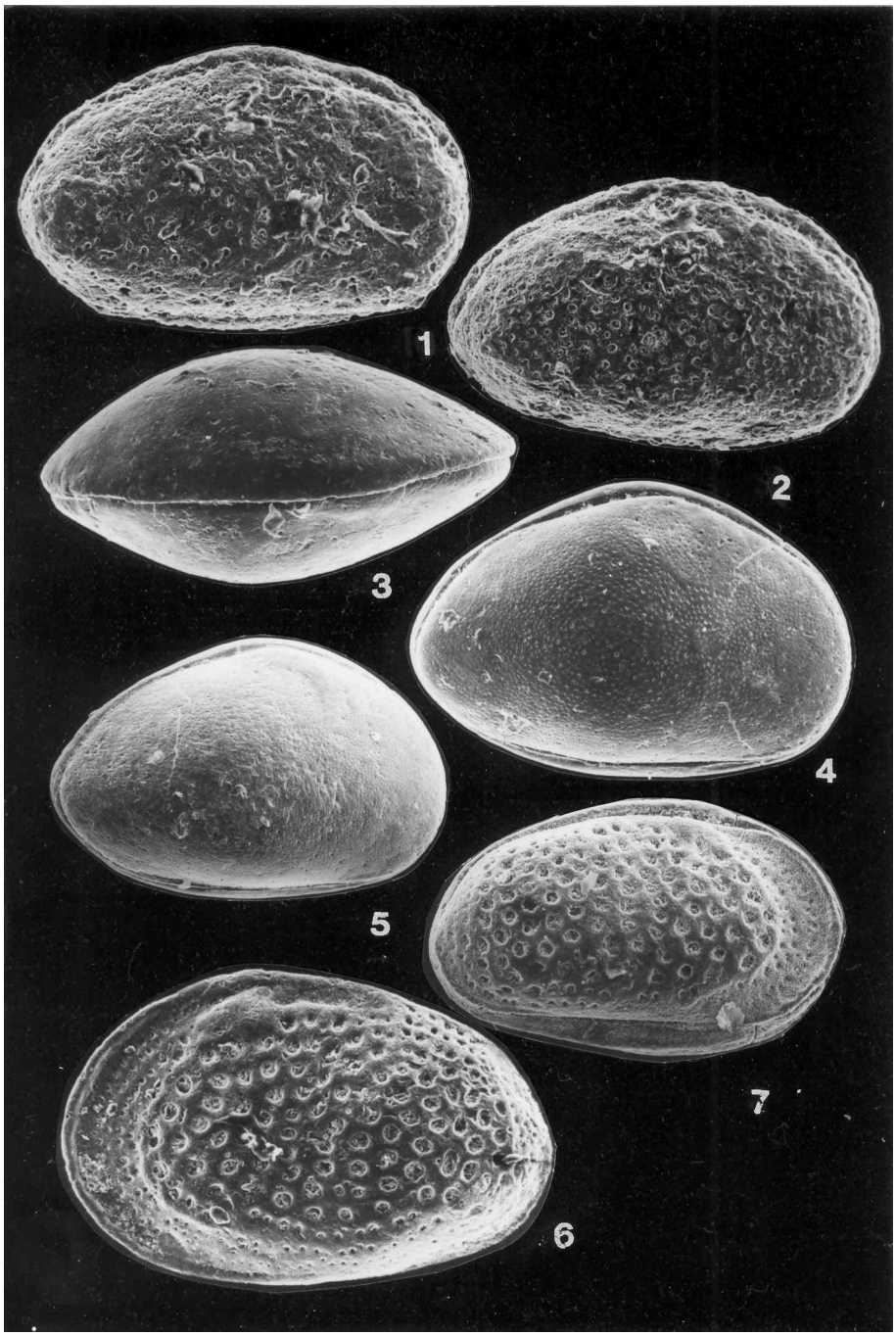


Plate 10

Figs 1–3. *Cuneocythere (Cuneocythere) marginata anterodepressa* MONOSTORI, 1982

Fig. 1. Carapace from the right valve. 96x
Kiseged road cut section, sample 12
Fig. 2. Left valve. 94x
Kiseged road cut section, sample 3a
Fig. 3. Carapace from the dorsal side. 94x
Kiseged road cut section, sample 12

Fig 4. *Cuneocythere (Cuneocythere) truncata* LIENENKLAUS, 1894
Carapace from the right valve. 80x
Szentendre–2 borehole 1070.0 m

Figs 5–7. *Krithe papillosa* (Bosquet, 1852)
Fig. 5. Left valve. 63x
Pilisszentkereszt Sz 1–74 section, sample i_2
Fig. 6. Carapace from the right valve. 62x
Pilisszentkereszt Sz 1–74 section, sample h
Fig. 7. Carapace from the dorsal side. 59x
Pilisszentkereszt Sz 1–74 section, sample j

Plate 10

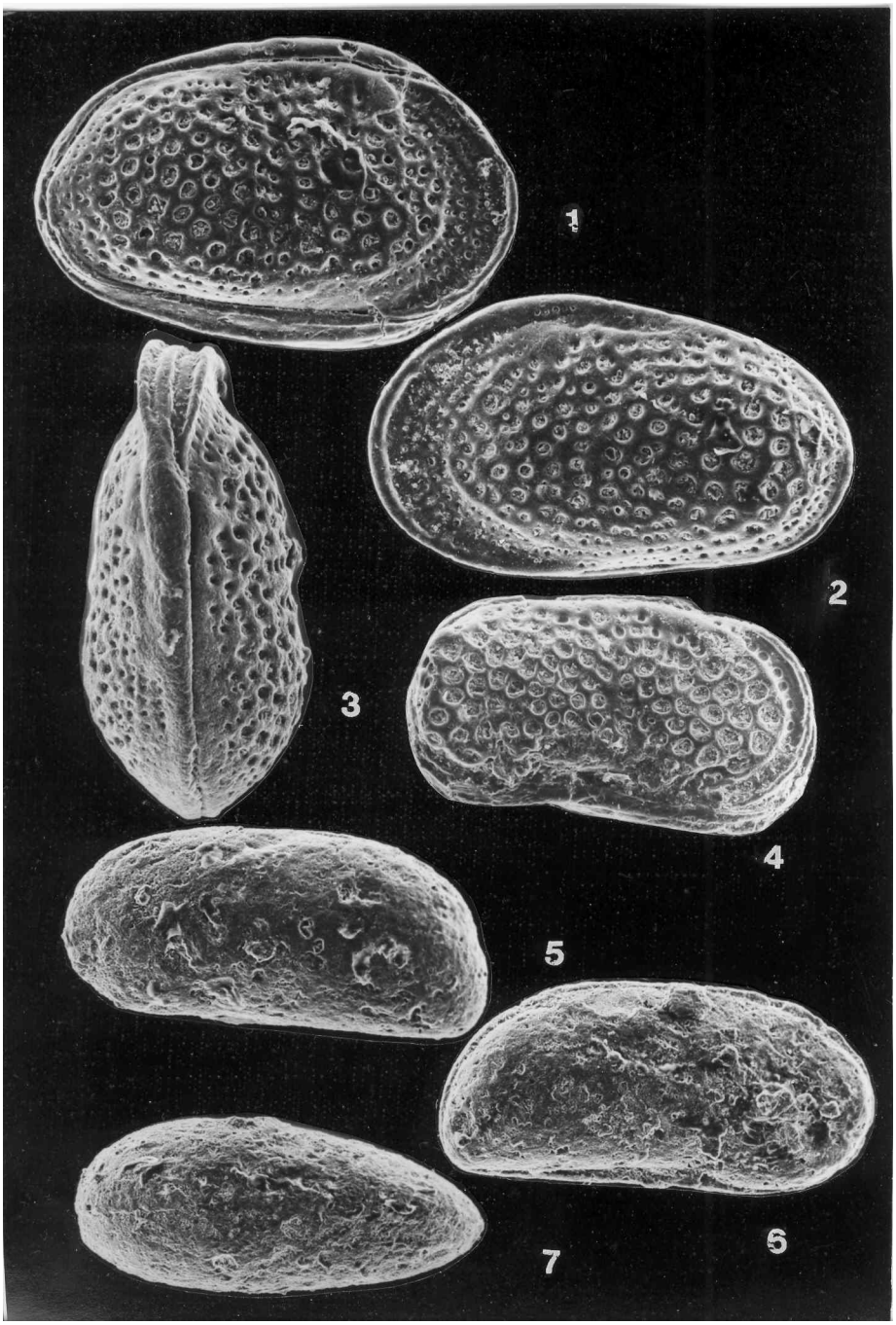


Plate 11

Figs 1–6. *Krithe pernoides* (BORNEMANN, 1855)

Fig. 1. Carapace from the dorsal side. 68x
Budapest, Metro H–3 borehole 91.0–94.8 m
Fig. 2. Left valve. 83x
Cserépváralja–2 borehole 262.0–262.2 m
Fig. 3. Left valve. 65x
Budapest, Metro H–3 borehole 99.8–102.1 m
Fig. 4. Left valve. 77x
Budapest, Metro H–7/1 borehole 54.5–55.5 m
Fig. 5. Right valve. 90x
Szentendre–2 borehole 710.0 m
Fig. 6. Right valve. 70x
Budapest, Metro H–8 borehole 24.0–28.0 m

Fig. 7. *Krithe* sp. 1.
Carapace from the right valve. 90x
Szentendre–2 borehole 1068.0 m

Plate 11

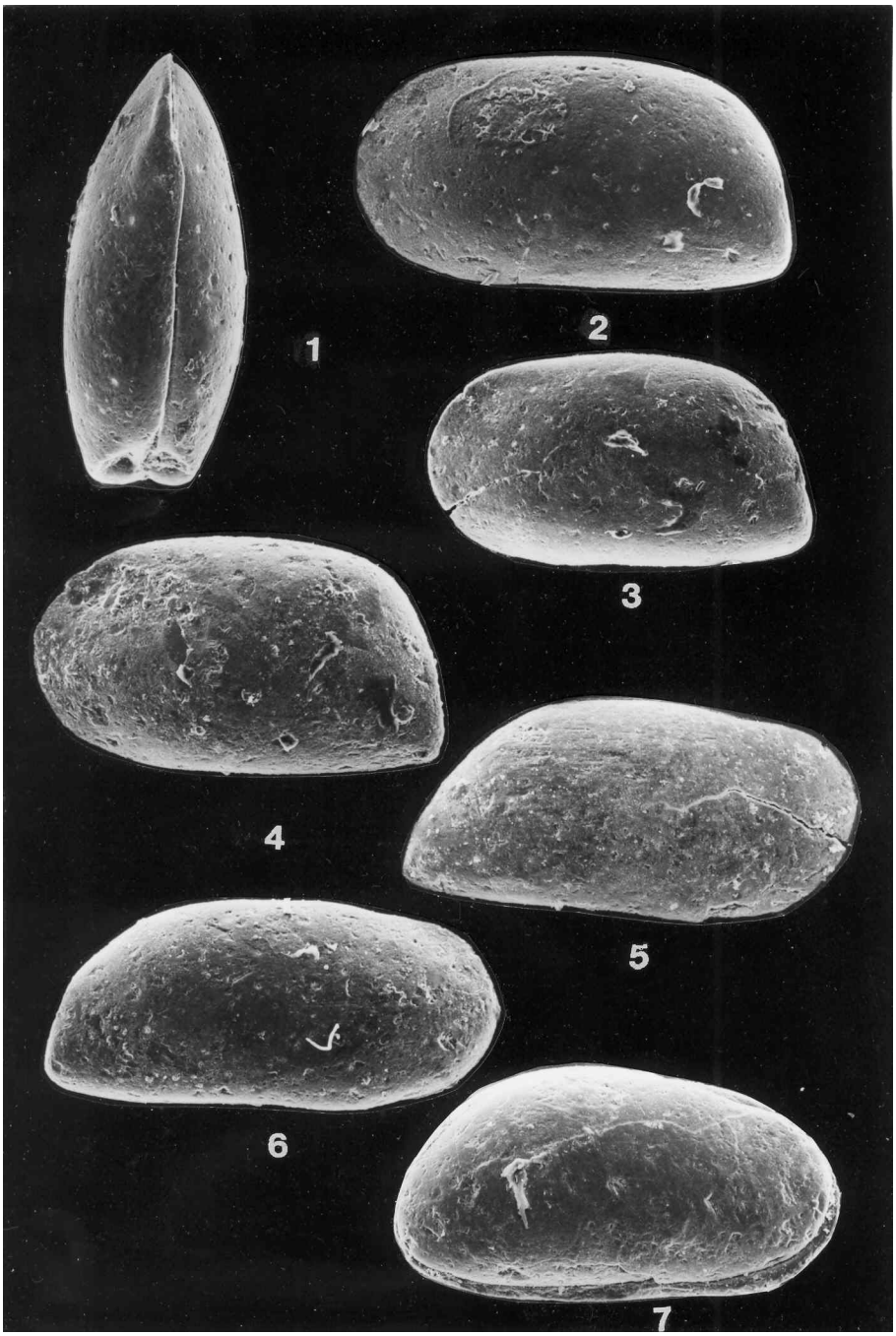


Plate 12

Figs 1–2. *Krithe* sp. 2.

Fig. 1. Inside of the right valve. x
Eger Wind brickyard borehole 73.1–73.6 m
Fig. 2. Right valve. x
Eger Wind brickyard borehole 76.3–77.1 m

Figs 4–5. *Parakrithe* sp. 1.
Fig. 4. Left valve. 94x
Kiseged manganiferous clay, sample 4
Fig. 5. Carapace from the right valve. 90x
Budapest, Metro H–7 borehole 94.0–99.0 m

Fig. 6. *Trachyleberis* cf. *spinosa* (LIENENKLAUS, 1900)
Left valve. 65x
Budapest, Metro H–9 borehole 19.5–20.0 m

Fig. 7. *Costa hermi* Witt, 1967
Left valve. 66x
Budapest, Metro H–9 borehole 57.6–59.8 m

Plate 12

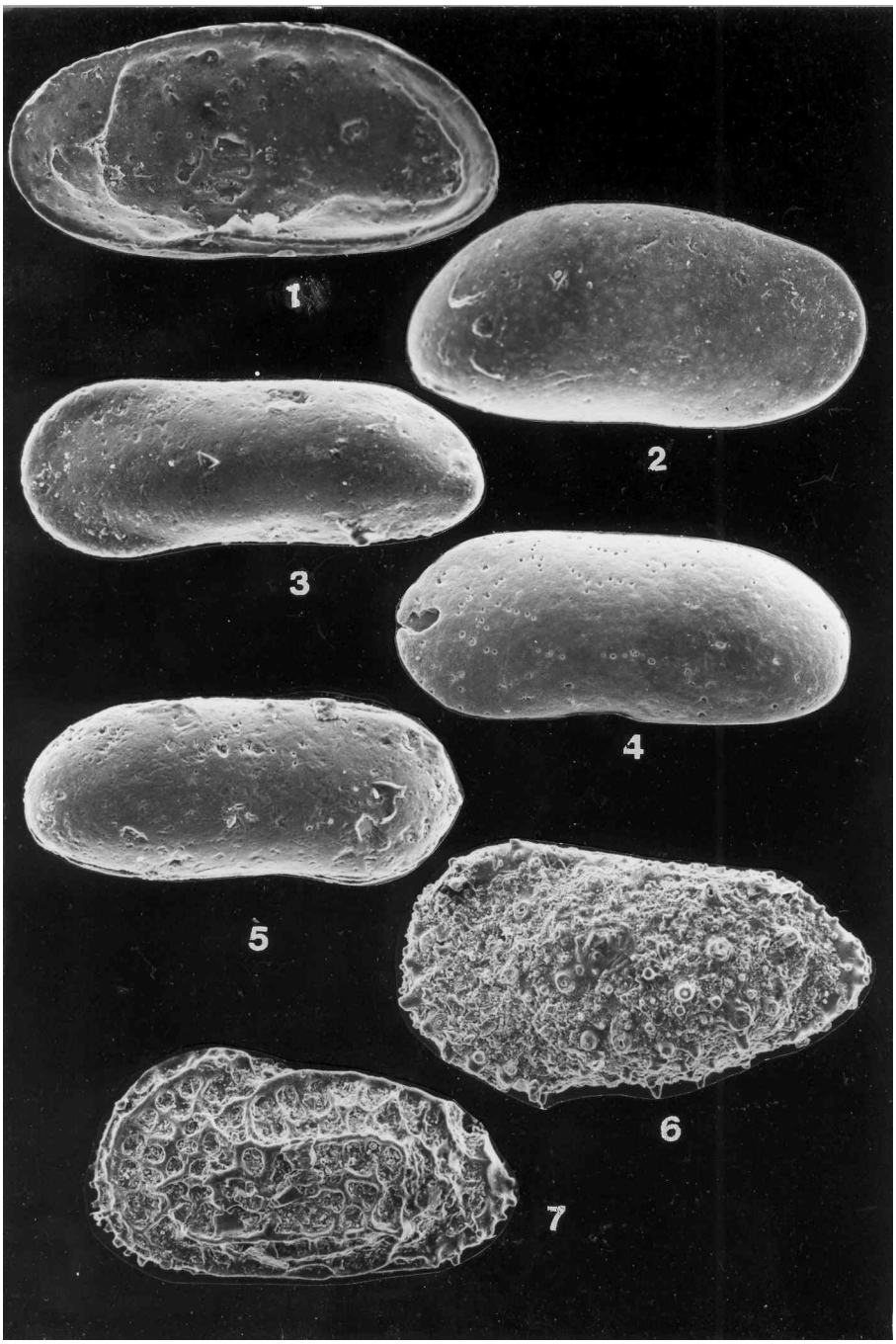


Plate 13

Figs 1–7. *Costa hermi* WITT, 1967

Fig. 1. Left valve. 63x
Budapest, Metro H–2 borehole 32.7–34.6 m
Fig. 2. Left valve. 59x
Szőllőcske outcrop, sample 11
Fig. 3. Right valve. 50x
Budapest, Metro H–1 borehole 56.8–60.0 m
Fig. 4. Right valve. 59x
Szőllőcske outrcop, sample 14
Fig. 5. Right valve. 62x
Eger Wind brickyard borehole 50.3–50.9 m
Fig. 6. Inside of the left valve. 57x
Esztergom–123 borehole 410.0 m
Fig. 7. Carapace from the dorsal side. 59x
Budapest, Metro H–7 borehole 55.0–60.0 m

Plate 13

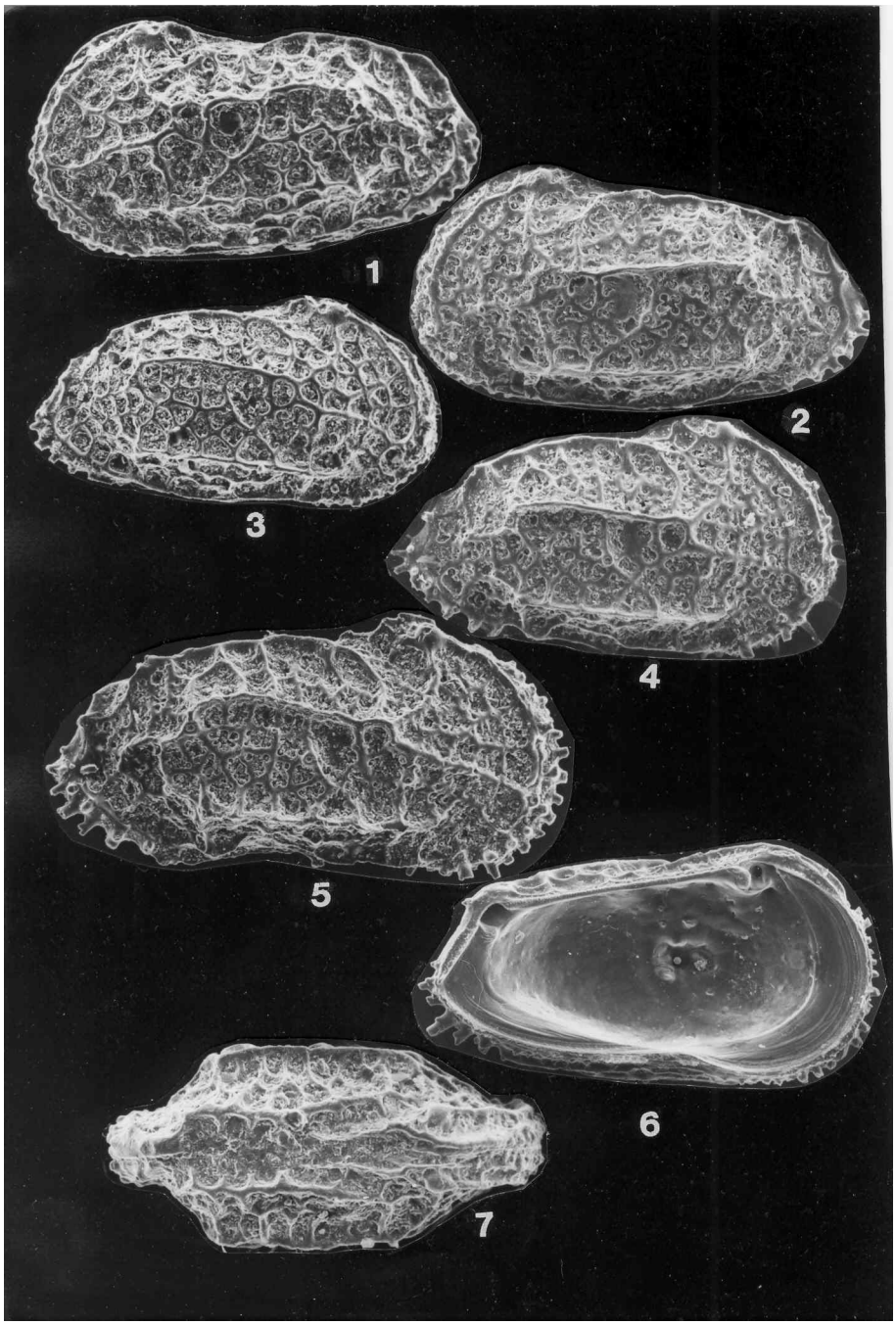


Plate 14

Fig. 1. *Costa hermi* WITT, 1967
Inside of the right valve. 61x
Esztergom–123 borehole 398.5 m

Figs 2–4. *Agrenocythere ordinata* (DELTEL, 1961)

Fig. 2. Carapace from the left valve. 54x
Budapest, Metro H–7 borehole 32.0–36.0 m
Fig. 3. Left valve. 63x
Eger Wind brickyard borehole 76.3–77.1 m
Fig. 4. Right valve. 72x
Eger Wind brickyard borehole 75.4–76.3 m

Figs 5–7. *Pterygocythereis* cf. *ceratoptera* (BOSQUET, 1852)

Fig. 5. Carapace from the dorsal side. 63x
Pilisszentkereszt sz 1–74 section, sample h
Fig. 6. Left valve. 62x
Pilisszentkereszt Sz 1–74 section, sample h
Fig. 7. Carapace from the right side. 63x
Pilisszentkereszt Sz 1–74 section, sample i_2

Plate 14

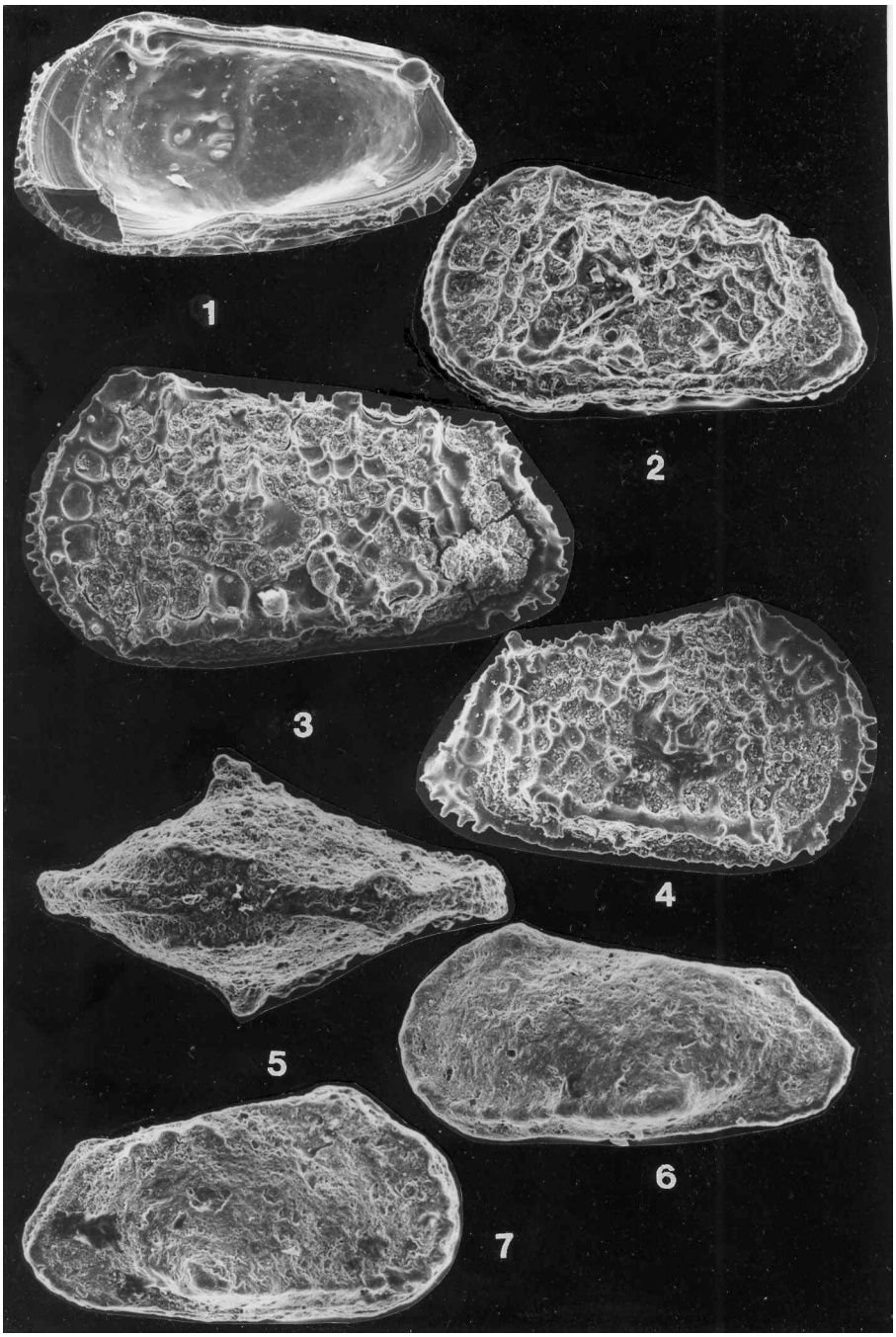


Plate 15

Figs 1–2. *Pterygocythereis* n. sp. ?

Fig. 1. Carapace from the right valve. 41x
Kiseged 1987 outcrop, sample N°3
Fig. 2. Carapace from the left valve. 44x
Kiscell–1 borehole 59.6 m

Fig. 3. *Echinocythereis ligula* LIENENKLAUS, 1896
Carapace from the right side. 41x
Pilisszentkereszt Sz 1–74 section, sample h

Figs 4–7. *Henryhowella asperrima* (REUSS, 1850)

Fig. 4. Right valve. 68x
Szőlőske outcrop, sample 11
Fig. 5. Left valve. 81x
Cserépváralja–1 borehole 387.5–387.7 m
Fig. 6. Left valve. 81x
Budapest, Metro H–9 borehole 47.4–49.9 m
Fig. 7. Inside of the left valve. 65x
Szőlőske outcrop, sample 14

Plate 15

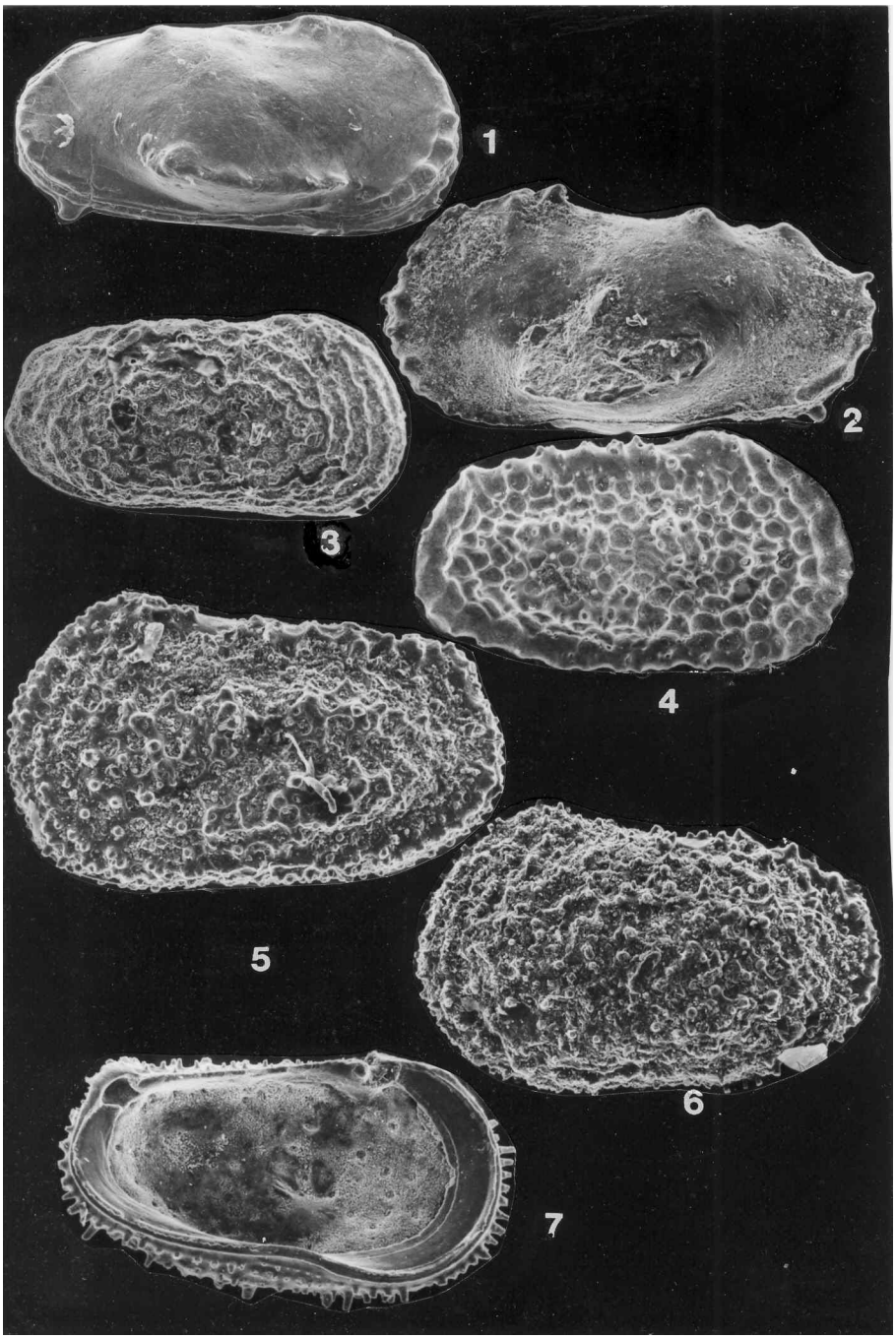


Plate 16

Figs 1–3. *Henryhowella asperrima* (REUSS, 1850)

Fig. 1. Left valve. 74x
Budapest, Metro H–1 borehole 56.8–60.0 m
Fig. 2. Left valve. 59x
Szentendre–2 borehole 809.0 m
Fig. 3. Carapace from the dorsal side. 77x
Budapest, Metro H–9 borehole 19.5–20.0 m

Figs 4–5. *Protobuntonia sublatissima arcuatocosta* (BRESTENSKÁ, 1975)

Fig. 4. Left valve. 94x
Eger Wind brickyard borehole 73.1–73.6 m
Fig. 5. Left valve. 86x
Budapest, Metro H–3 borehole 96.8–99.8 m

Fig. 6. *Leguminocythereis sorneana* Oertli, 1956
Left valve. 43x
Pilisszentkereszt Sz 1–74 section, sample i

Fig. 7. *Leguminocythereis*? *cellulataformis* n. sp.
Carapace from the right valve. 50x
Kiseged road cut section, sample 12

Plate 16

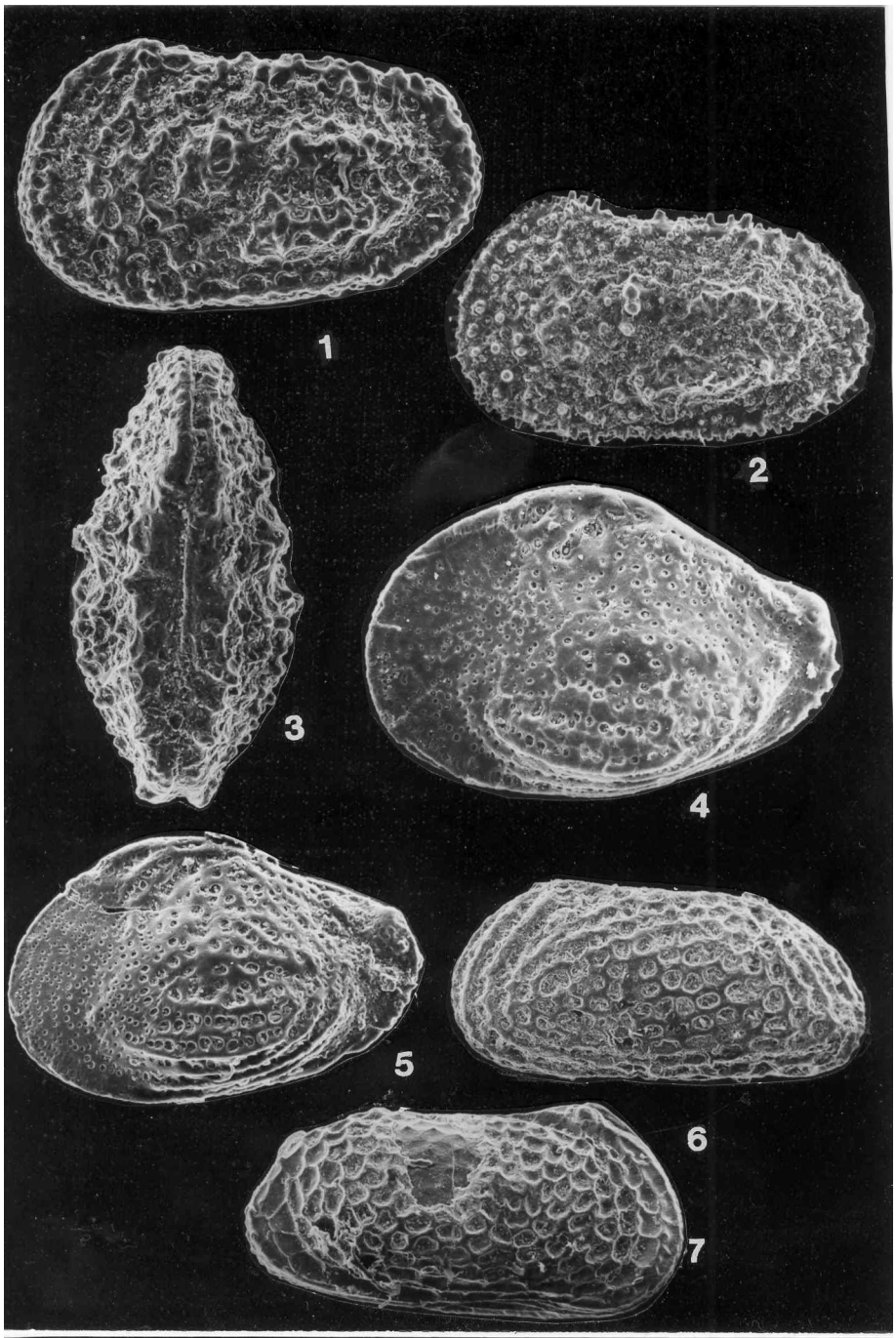


Plate 17

Fig. 1. *Leguminocythereis* ? *cellulataformis* n. sp. Holotypus.
Carapace from the left valve. 81x
Kisged road cut section, sample 12

Figs 2–6. *Megahemicythere oertlii* WITT, 1967

Fig. 2. Carapace from the right side. 33x
Budapest, Városmajor–1 borehole 96.7–97.8 m
Fig. 3. Carapace from the right side. 30x
Kiseged 1987 outcrop, sample 1
Fig. 4. Carapace from the dorsal side. 38x
Kiseged road cut section, sample 12
Fig. 5. Left valve. 36x
Kiseged 1987 outcrop, sample N^{o}1
Fig. 6. Left valve. 36x
Budapest, Törökvész–8 borehole 3.5 m

Fig. 7. *Pokornyella* ? sp. 1.
Carapace from the right valve. 63x
Budapest, Városmajor–1 borehole 97.8–98.5 m

Plate 17

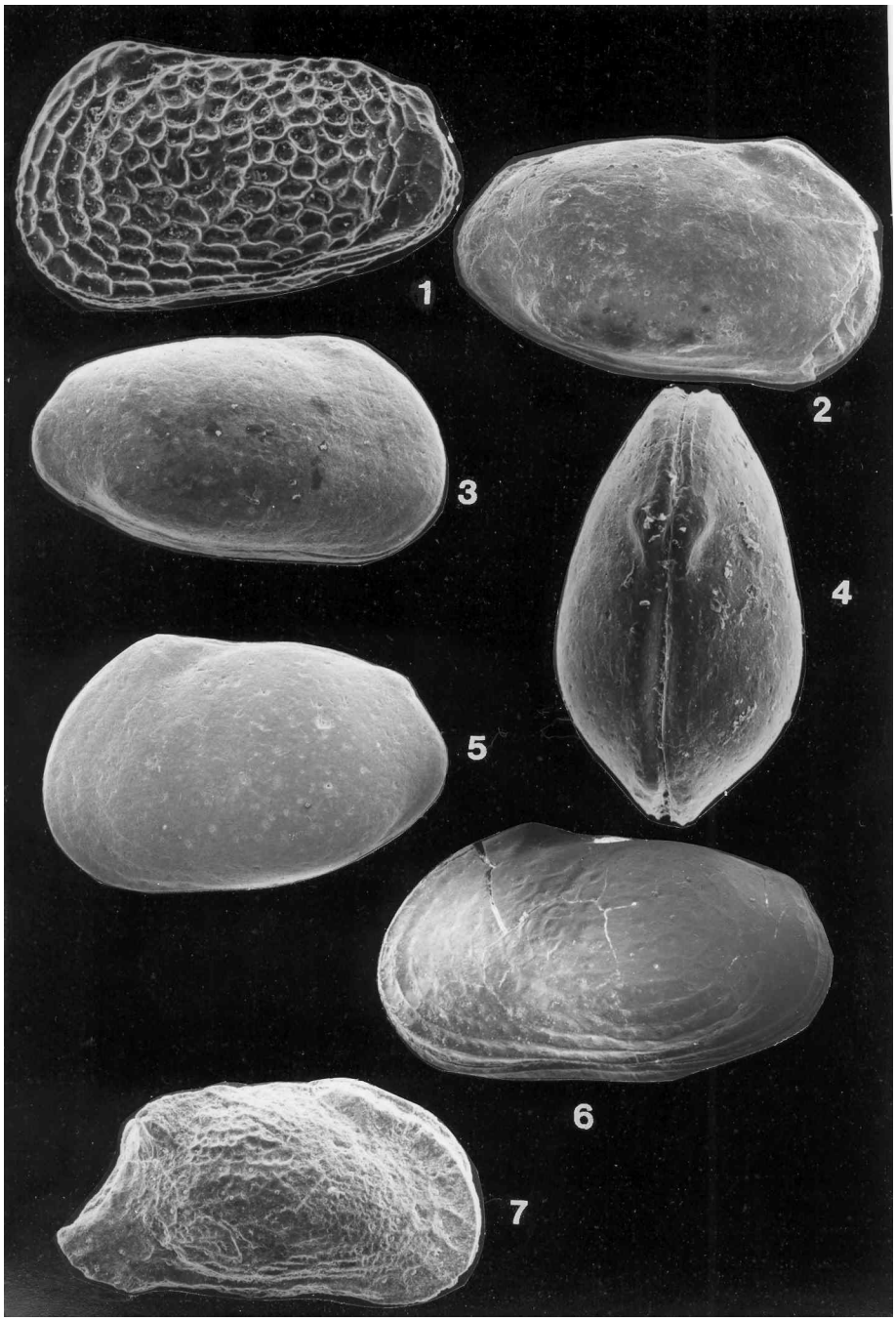


Plate 18

Fig. 1. *Grinioneis* sp.
Carapace from the left valve. 54x
Budapest, Városmajor–1 borehole 97.8–98.5 m

Fig. 2. *Hornibrookella* ex gr. *macropora* (BOSQUET,1852)
Carapace from the left valve. 54x
Budapest, Ibolya u. quarry 1.2 m

Figs 3–6. *Bosquetina brestenskae* n. sp.

Fig. 3. Carapace from the right valve. 44x
Budapest, Városmajor–1 borehole 96.7–97.8 m
Fig. 4. Carapace from the right valve. 50x
Kiseged 1987 outcrop, sample 1
Fig. 5. Carapace from the left valve. 59x Holotypus.
Kiseged road cut section, sample 13
Fig. 6. Carapace from the dorsal side. 53x
Kiseged 1987 outcrop, sample 1

Fig. 7. *Bosquetina zalanyii* BRESTENSKÁ, 1975
Carapace from the dorsal side. 42x
Kiseged 1987 outcrop, sample N°1

Plate 18

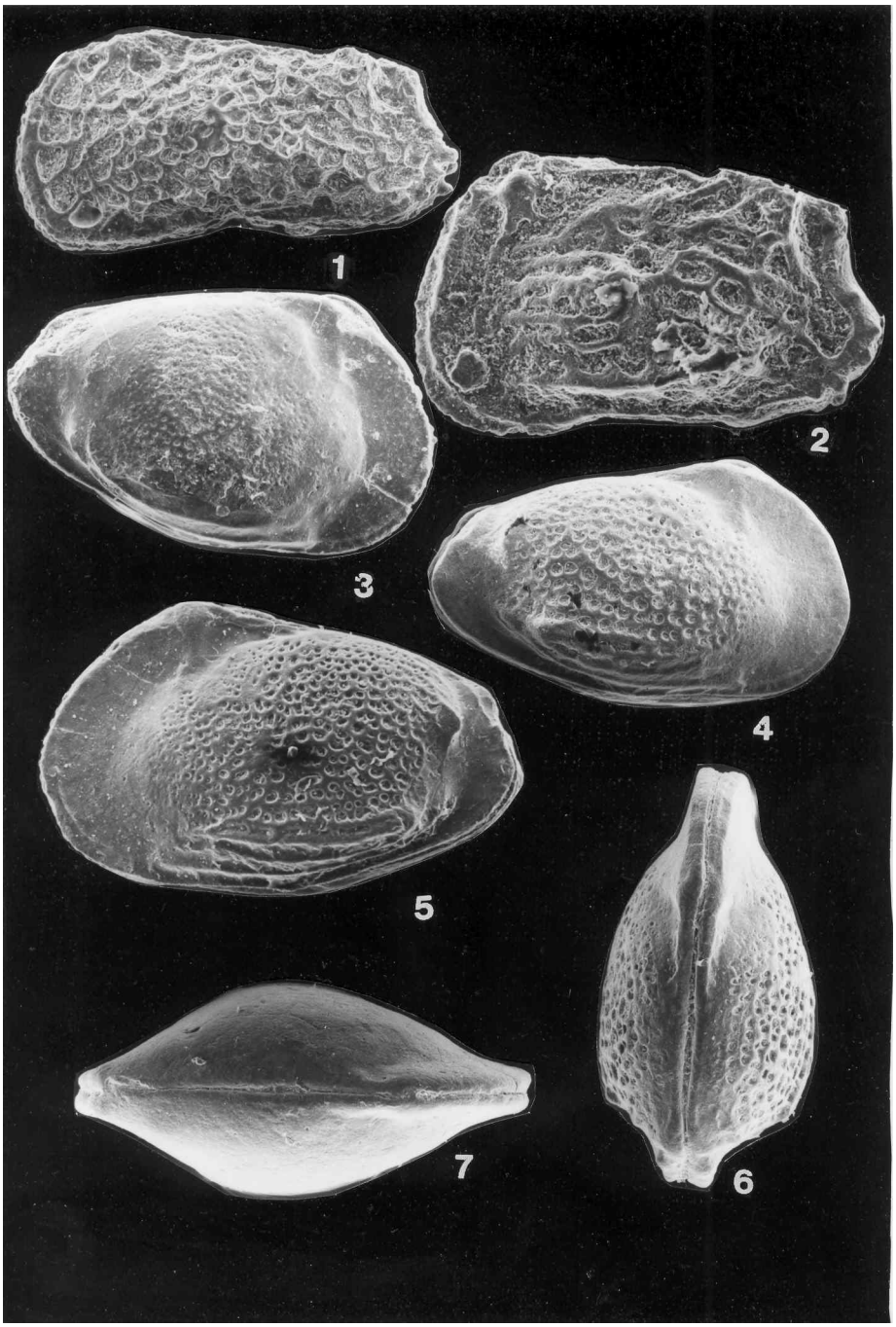


Plate 19

Figs 1–4. *Bosquetina zalanyii* BRESTENSKÁ, 1975

Fig. 1. Carapace from the right valve. 47x
Kiseged road cut section, sample 3a
Fig. 2. Carapace from the right valve. 36x
Budapest, Városmajor–1 borehole 96.7–97.8 m
Fig. 3. Carapace from the left valve. 41x
Budapest, Diana u.
Fig. 4. Carapace from the left valve. 38x
Kiseged 1987 outcrop, sample 1

Fig. 5. *Occultocythereis rupelica* MONOSTORI, 1982
Right valve. 86x
Budapest, Metro H–9 borehole 29.4–31.4 m

Fig. 6. *Cytheretta posticalis* TRIEBEL, 1952
Carapace from the left valve. 52x
Budapest, Zugliget outcrop, sample 3

Figs 7–8. *Cytheretta variabilis* OERTLI, 1956

Fig. 7. Carapace from the right valve. 56x
Pilisszentkereszt Sz 1–74 section, sample i_2
Fig. 8. Carapace from the left valve. 59x
Pilisszentkereszt Sz 1–74 section, sample i

Plate 19

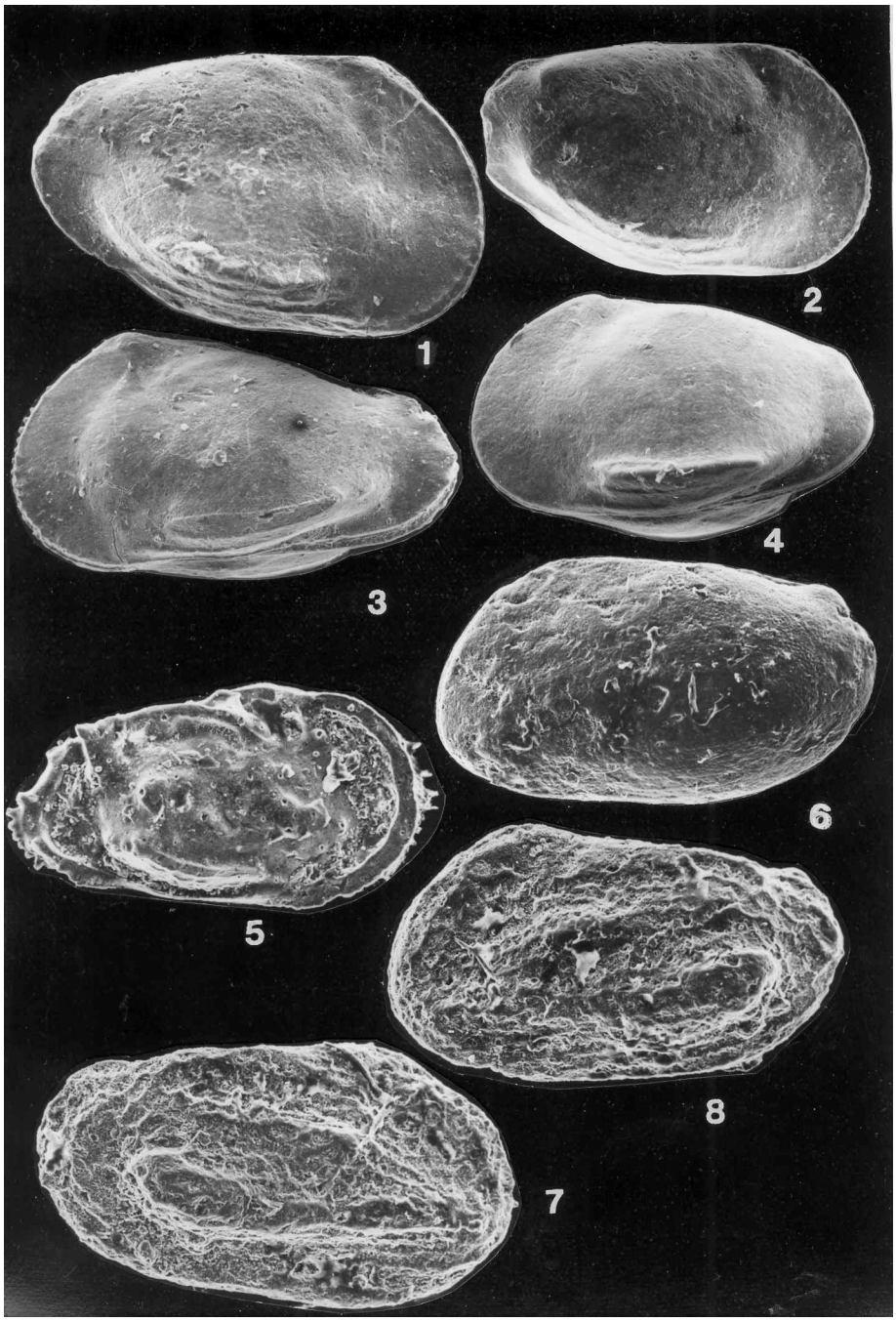


Plate 20

Figs 1–6. *Loxoconcha carinata tardense* MONOSTORI, 1985

Fig. 1. Carapace from the right valve. 110x
Kiseged road cut section, sample 12
Fig. 2. Carapace from the right valve. 108x
Kiscell–1 borehole 56.5 m
Fig. 3. Carapace from the right valve. 110x
Kiscell–1 borehole 51.6 m
Fig. 4. Carapace from the left valve. 117x
Kiseged road cut section, sample 4
Fig. 5. Carapace from the dorsal side. 126x
Kiseged 1987 outcrop, sample 3
Fig. 6. Carapace from the dorsal side. 113x
Kiscell–1 borehole 58.5 m

Fig. 7. *Loxoconcha delemontensis hungarica* MONOSTORI, 1982
Carapace from the left valve. 108x
Budapest, Zugliget outcrop, sample 7

Plate 20

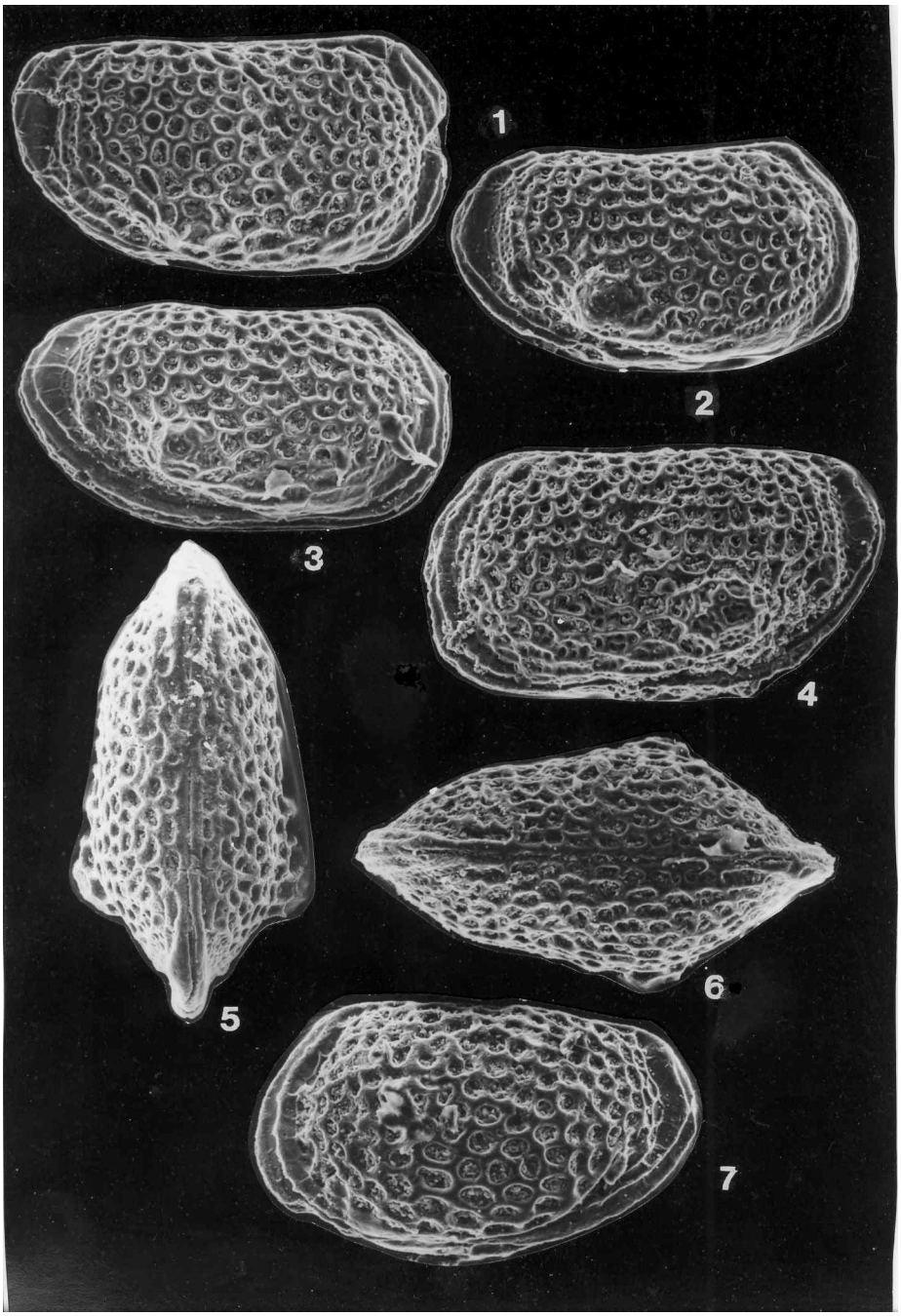


Plate 21

Figs 1–5. *Loxoconcha delemontensis hungarica* MONOSTORI, 1982

Fig. 1. Carapace from the left valve. 104x
Budapest, Zugliget outcrop, sample 7
Fig. 2. Carapace from the left valve. 121x
Kiscell–1 borehole 56.5 m
Fig. 3. Carapace from the right valve. 113x
Budapest, Metro H–12 borehole 21.0–22.0 m
Fig. 4. Carapace from the dorsal side. 122x
Kiscell–1 borehole 56.5 m
Fig. 5. Carapace from the dorsal side. 104x
Kiscell–1 borehole 58.5 m

Figs 6–7. *Loxoconcha favata* Kuiper, 1918

Fig. 6. Carapace from the dorsal side. 90x
Pilisszentkereszt Sz 1–74 section, sample i
Fig. 7. Carapace from the left valve. 90x
Pilisszentkereszt Sz 1–74 section, sample i

Plate 21

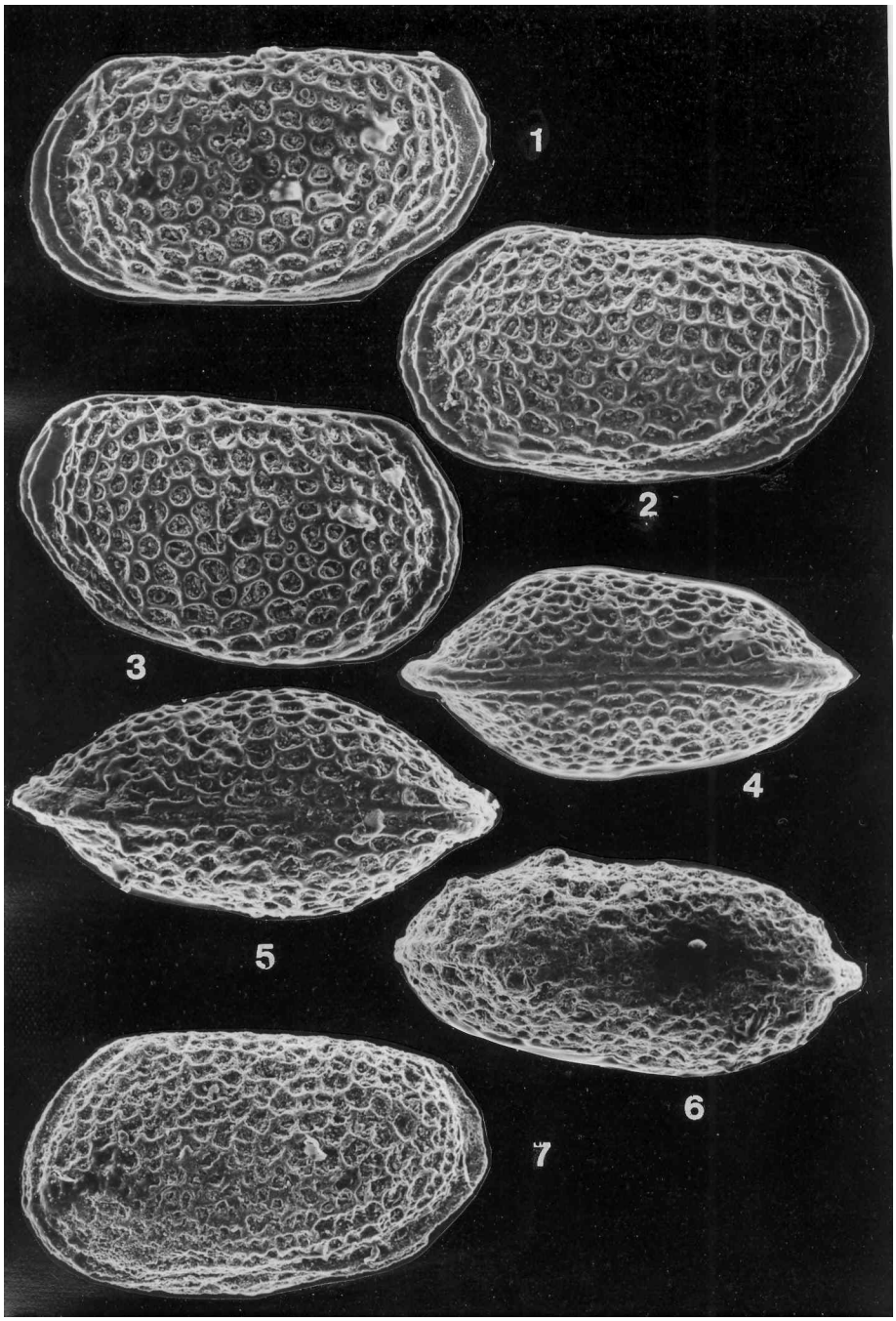


Plate 22

Fig. 1. *Loxoconcha favata* KUIPER, 1918
Carapace from the left valve. 86x
Pilisszentkereszt Sz 1–74 section, sample h

Fig. 2. *Loxoconcha subovata* (VON MÜNSTER, 1830) sensu BRESTENSKÁ, 1975
Carapace from the right valve. 106x
Alcsútdoboz–3 borehole 442.0 m

Fig. 3. *Loxoconcha* ex gr. *aequapunctata* DELTEL, 1964
Carapace from the right valve. 74x
Budapest, Városmajor–1 borehole 96.7–97.8 m

Fig. 4. *Loxoconcha* sp. 1
Carapace from the left valve. 81x
Budapest, Metro H–11/a borehole 59.0–61.0 m

Fig. 5. *Eucytherura dentata* LIENENKLAUS, 1905
Carapace from the left valve. 108x
Kiseged manganiferous clay, sample 4

Figs 6–8. *Cytheropteron emmeneggeri* SCHERER, 1984
Fig. 6. Inside of the right valve. 89x
Kiseged road cut section, sample 3b
Fig. 7. Carapace from the dorsal side. 99x
Kiseged road cut section, sample 2a
Fig. 8. Carapace from the dorsal side. 101x
Kiseged road cut section, sample 12

Plate 22

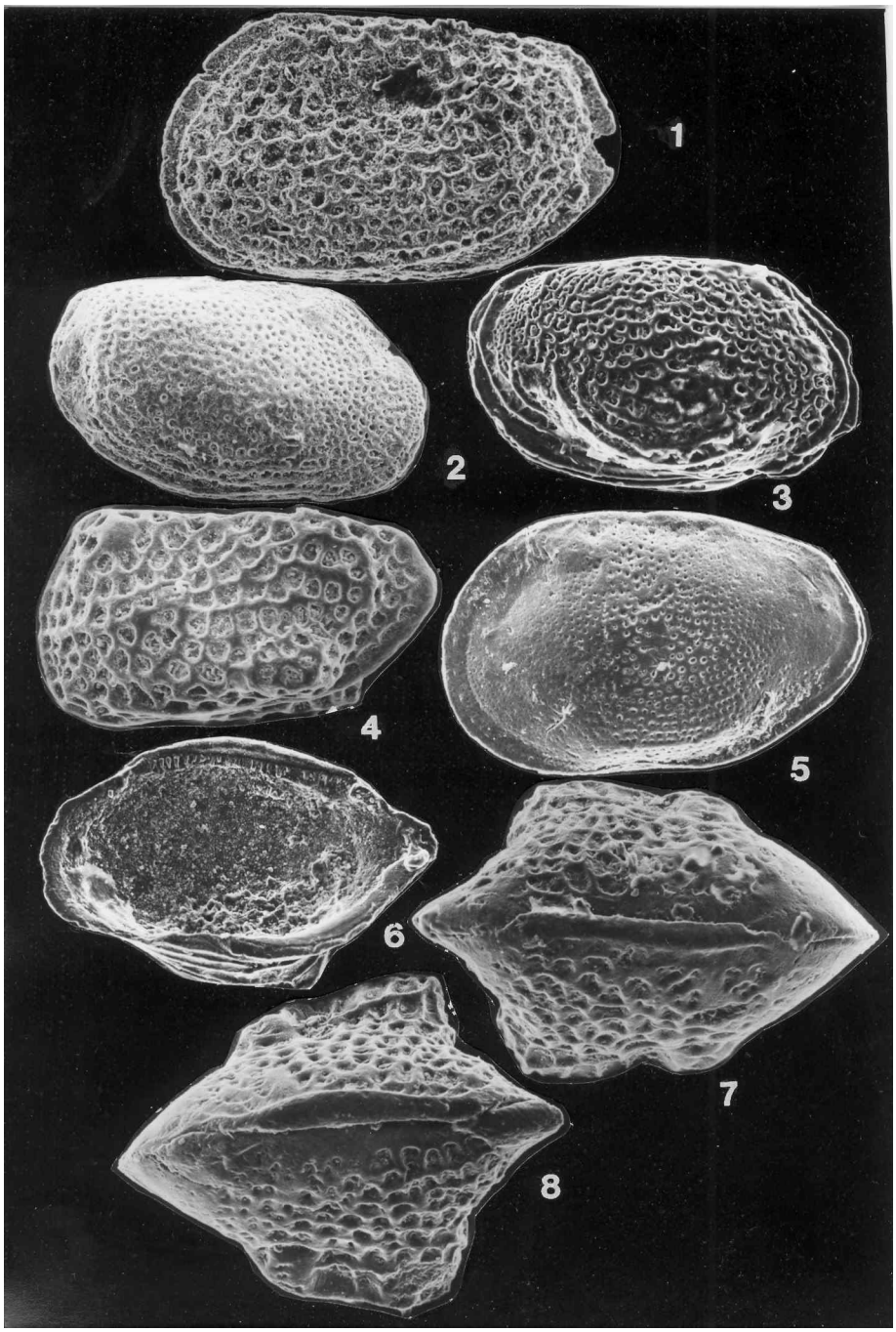


Plate 23

Figs 1–4. *Cytheropteron emmeneggeri* SCHERER, 1964

Fig. 1. Left valve. 99x
Kiscell–1 borehole 59.5 m
Fig. 2. Right valve. 86x
Kiseged road cut section, sample 2a
Fig. 3. Left valve. 99x
Budapest, Metro H–11/a borehole 59.0–61.0 m
Fig. 4. Carapace from the right valve. 95x
Kiscell–1 borehole 58.5 m

Fig. 5. *Cytheropteron* cf. *triangulare* LIENENKLAUS, 1900
Right valve. 99x
Budapest, Metro H–13 borehole 36.0–37.0 m

Fig. 6. *Uroleberis striatopunctata* DUCASSE, 1967
Carapace from the left valve. 81x
Síkfőkút quary, sample 21

Fig. 7. *Protoargilloecia angulata* DELTEL, 1961
Carapace from the left valve. 80x
Kiseged manganiferous clay, sample 4

Plate 23

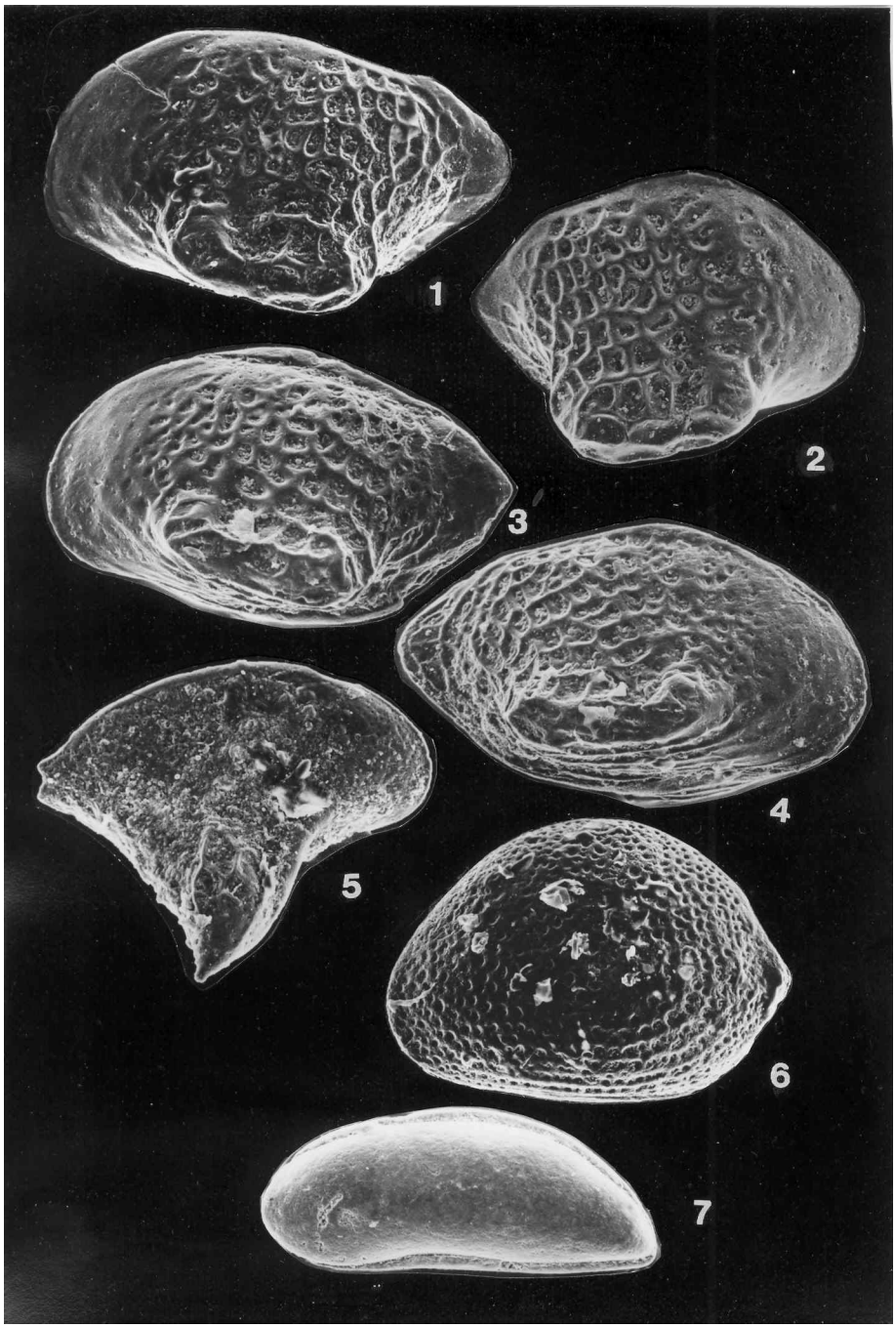


Plate 24

Figs 1–3. *Protoargilloecia angulata* DELTEL, 1961

Fig. 1. Carapace from the dorsal side. 83x
Budapest, Metro H–2 borehole 52.0–55.0 m
Fig. 2. Carapace from the left falve. 99x
Budapest, Metro H–2 borehole 36.4–39.1 m
Fig. 3. Carapace from the left valve. 99x
Budapest, Metro H–2 borehole 56.6–61.6 m

Figs 4–6. *Paracypris? rupelica* MONOSTORI, 1982

Fig. 4. Right valve. 59x
Cserépváralja–1 borehole 285.8–286.8 m
Fig. 5. Carapace from the right valve. 54x
Kiseged manganiferous clay, sample 1
Fig. 6. Left valve. 45x
Budapest, Metro H–1 borehole 43.6–47.6 m

Figs 7–8. *Paracypris? kisegedensis* n. sp.

Fig. 7. Left valve. 68x
Kiseged 1987 outcrop, sample 1
Fig. 8. Carapace from the right valve. 56x Holotypus
Kiseged road cut section, sample 12

Plate 24

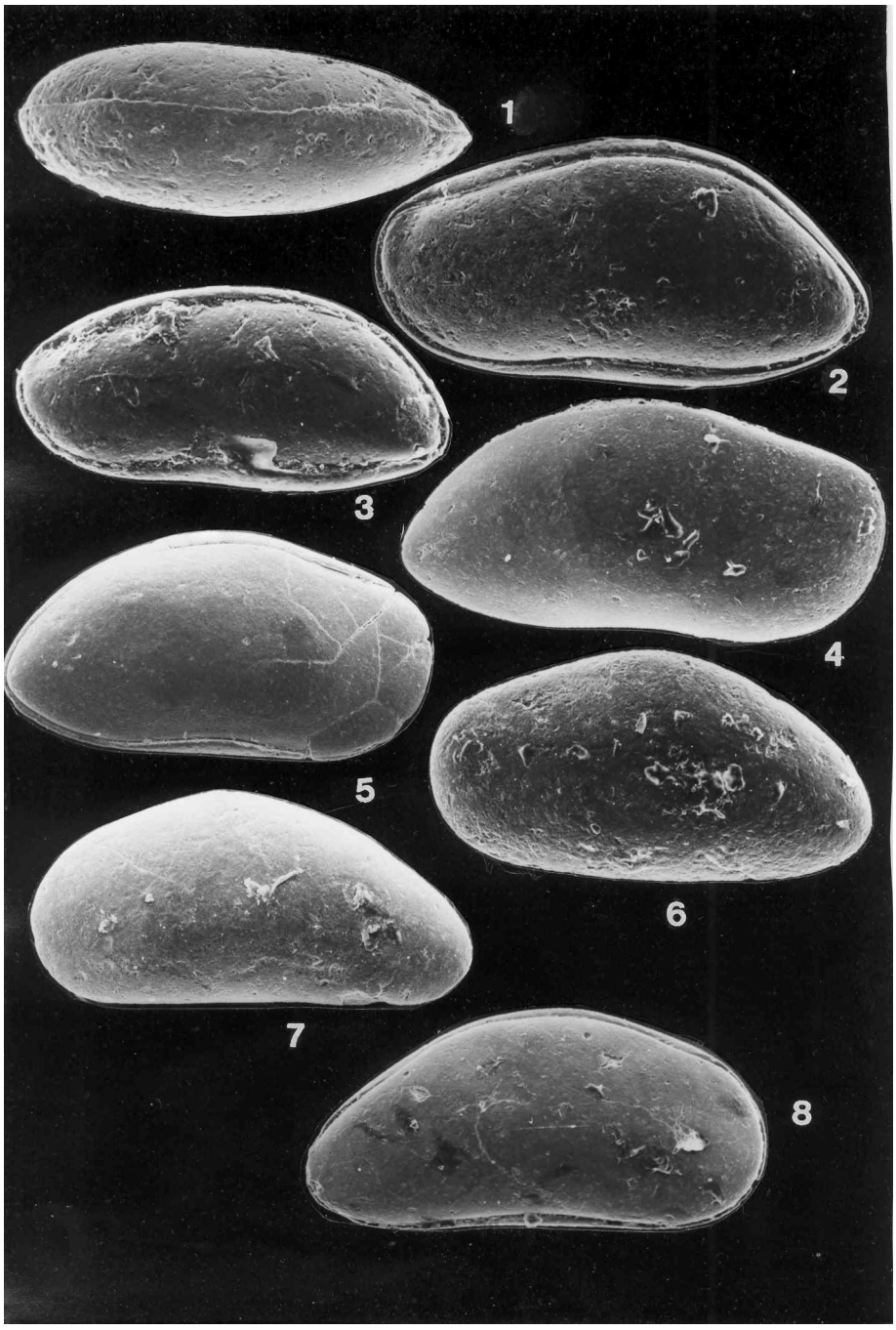


Plate 25

Fig. 1. *Paracypris? kisegedensis* n. sp.
Carapace from the right valve. 47x
Kiseged 1987 outcrop, sample 1

Fig. 2. *Paracypris* ex gr. *propinqua* TRIEBEL, 1963
Carapace from the right valve. 47x
Kiseged 1987 outcrop, sample 1

Figs 3–5. *Paracypris* cf. *bouldnorensis* KEEN, 1978

Fig. 3. Carapace from the dorsal side. 61x
Pilisszentkereszt Sz 1–74 section, sample i_2
Fig. 4. Carapace from the right valve. 67x
Pilisszentkereszt Sz 1–74 section, sample h
Fig. 5. Carapace from the left valve. 61x
Pilisszentkereszt Sz 1–74 section, sample h

Fig. 6. *Candona fertilis* TRIEBEL, 1963
Left valve. 50x
Budapest, Törökvész–8 borehole 7.5 m

Figs 7–8. *Candona? recta* LIENENKLAUS, 1905
Fig. 7. Carapace from the dorsal side. 50x
Kiseged 1987 outcrop, sample 1
Fig. 8. Carapace from the right valve. 54x
Budapest, Törökvész–13 borehole 20.0 m

Plate 25

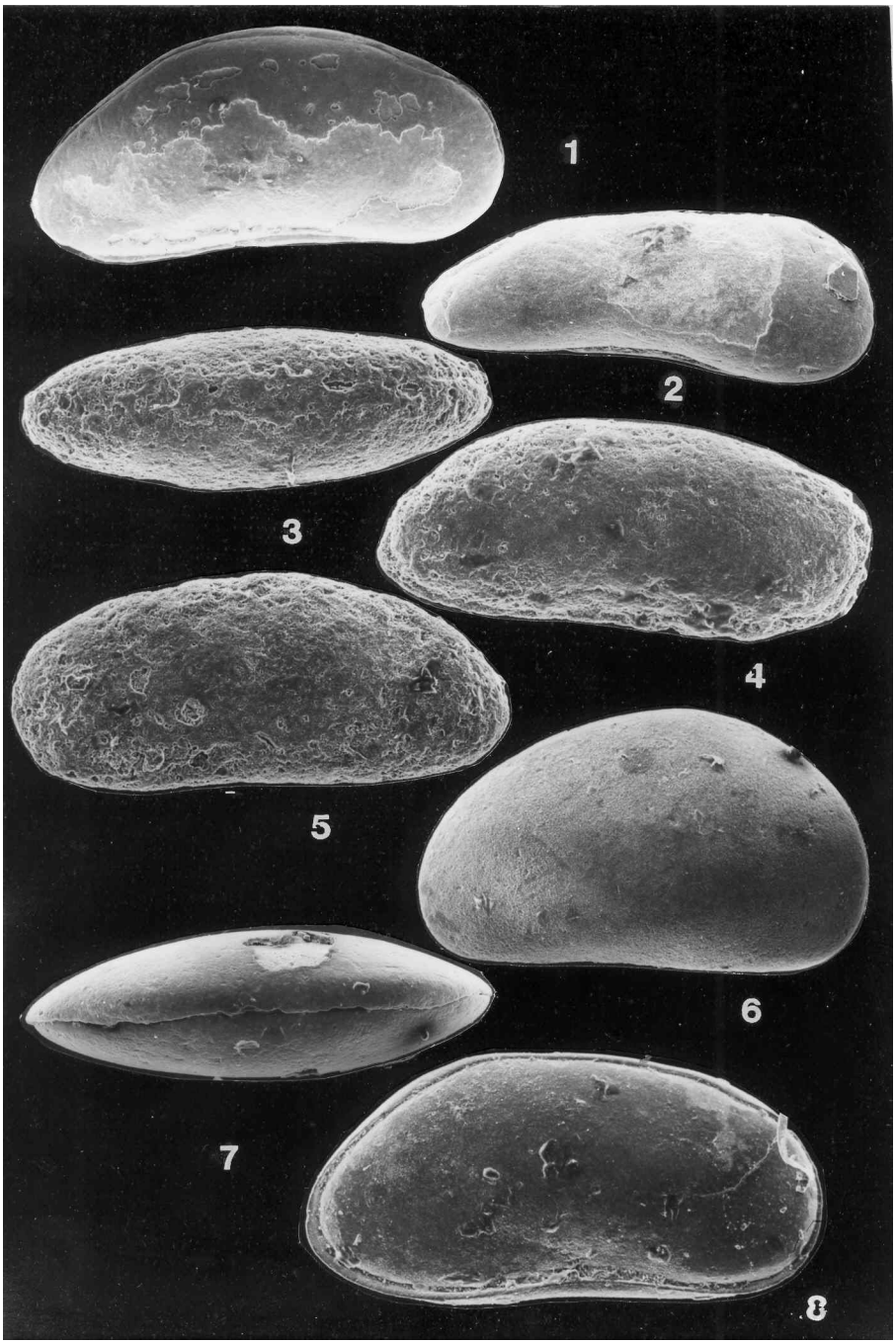


Plate 26

Figs 1–6. *Candona? recta* LIENENKLAUS, 1905

Fig. 1. Inside of the left valve. 61x
Budapest, Törökvész–6 borehole 3.5 m
Fig. 2. Carapace from the right valve. 52x
Kiseged road cut section, sample 3a
Fig. 3. Carapace from the right valve. 52x
Kiseged road cut section, sample 3b
Fig. 4. Inside of the left valve. 56x
Budapest, Zugliget outcrop, sample N°7
Fig. 5. Carapace from the right valve. 45x
Budapest, Városmajor–1 borehole 96.7–97.8 m
Fig. 6. Left valve. 52x
Kiseged 1987 outcrop, sample 2

Plate 26

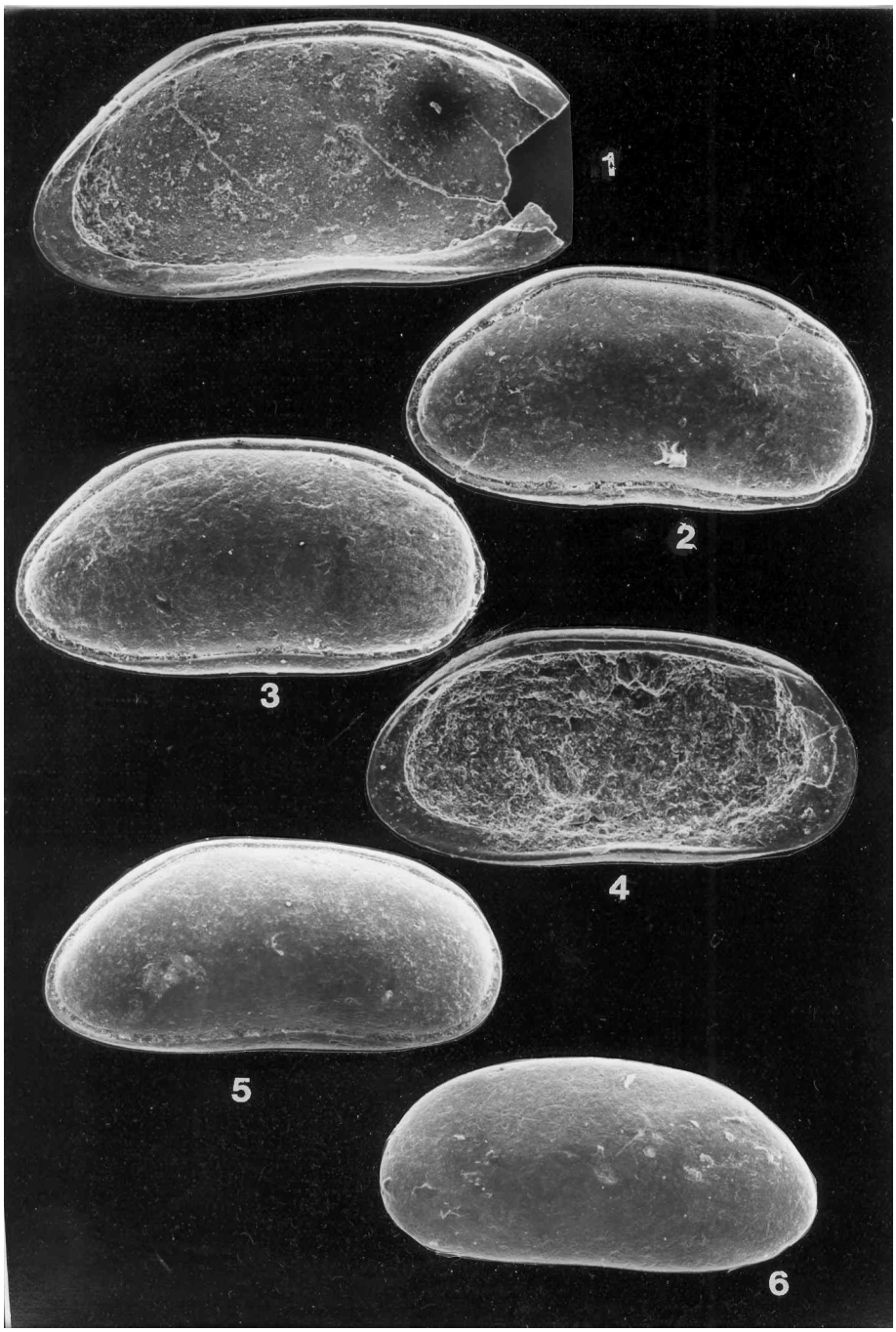


Plate 27

Fig. 1. *Candona*? sp. indet
Carapace from the right valve. 44x
Kiseged road cut section, sample 3b

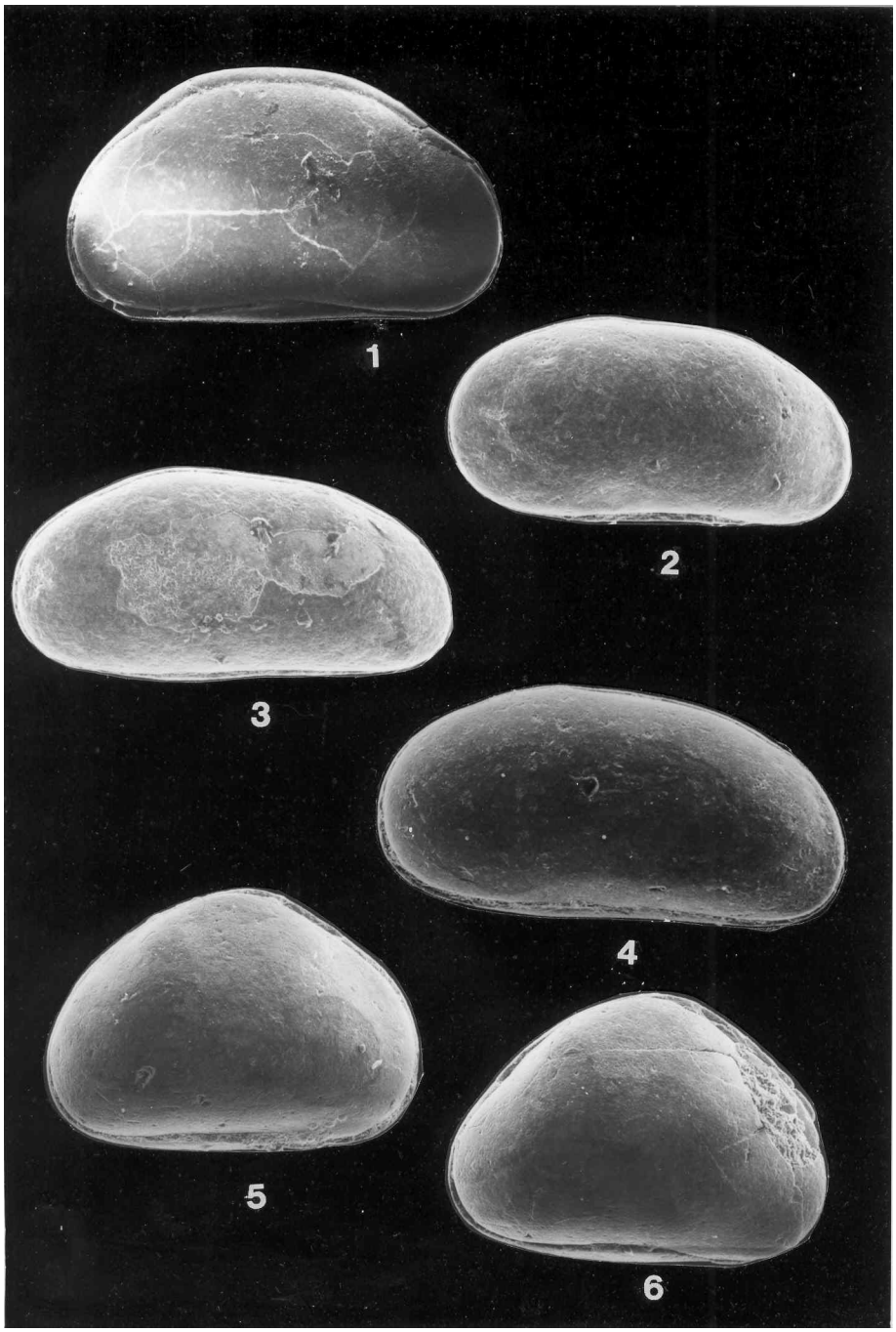
Figs 2–4. *Moenocypris bockenheimensis* TRIEBEL, 1963

Fig. 2. Carapace from the right valve. 56x
Kiseged 1987 outcrop, sample 1
Fig. 3. Carapace from the right valve. 57x
Kiseged, 1987 outcrop, sample 2
Fig. 4. Carapace from the right valve. 65x
Kiseged road cut section, sample 3a

Figs 5–6. *Curvopsis curvata* (LIENENKLAUS, 1905)

Fig. 5. Carapace from the right valve. 56x
Kiseged 1987 outcrop, sample 3
Fig. 6. Carapace from the right valve. 56x
Kiseged 1987 outcrop, sample 1

Plate 27



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Figs 1–2. *Curvopsis curvata* (LIENENKLAUS, 1905)

Fig. 1. Carapace from the right valve. 61x
Kiseged road cut section, sample 3b
Fig. 2. Left valve. 54x
Kiseged 1987 outcrop, sample 2

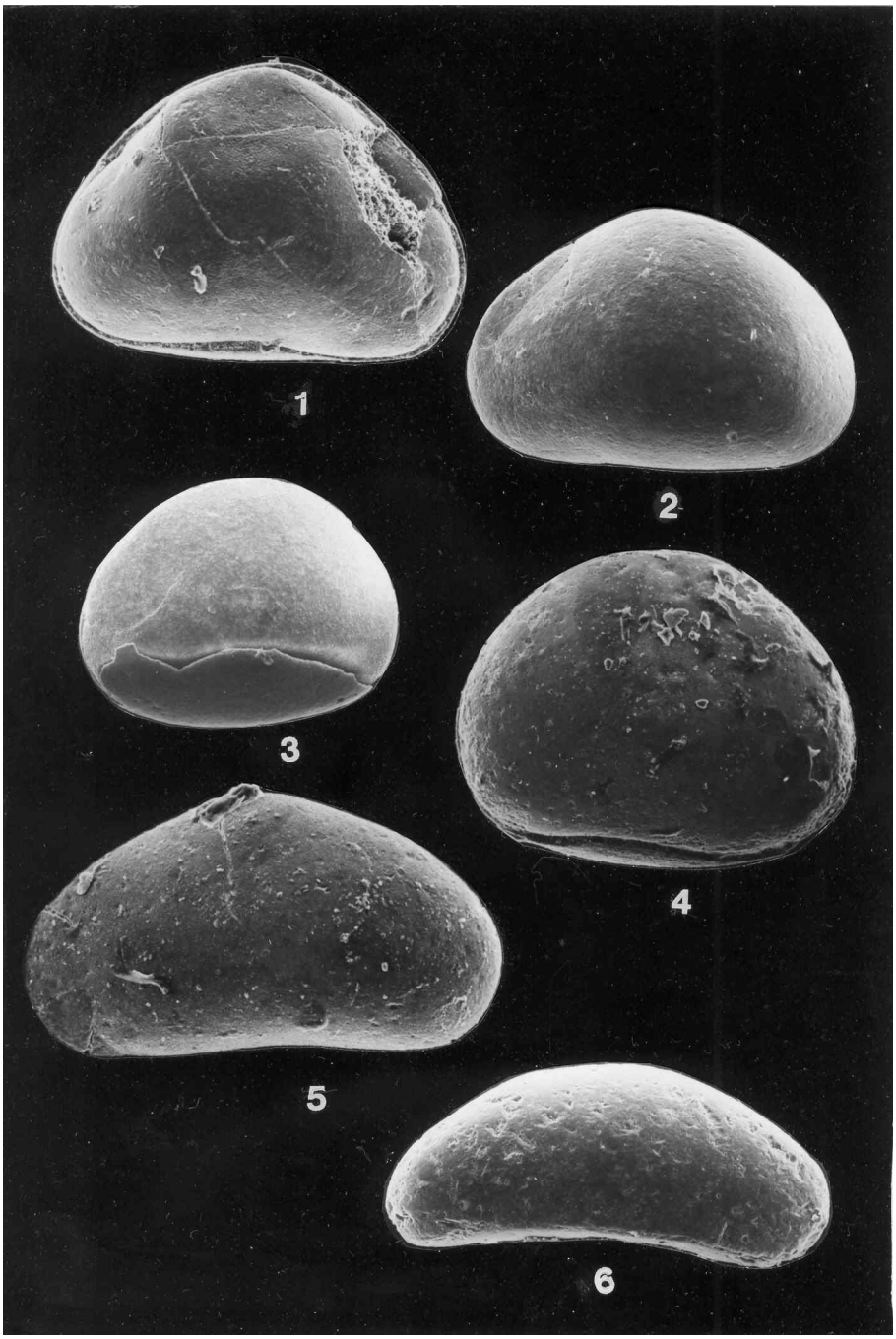
Figs 3–4. ? *Curvopsis curvata* (LIENENKLAUS, 1905)

Fig. 3. Left valve. 56x
Kiseged 1987 outcrop, sample 3
Fig. 4. Carapace from the right valve. 72x
Budapest, Törökvész–8 borehole 7.5 m

Fig. 5. Cypridopsidae gen. et sp. indet. 3, 1982
Left valve. 101x
Budapest, Törökvész–6 borehole 4.0 m

Fig. 6. Ostracoda gen. et sp. indet. 1.
Carapace from the left valve. 86x
Szentendre–2 borehole 1084.0 m

Plate 28



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