

The Triassic of Aghdarband (AqDarband), NE-Iran, and its Pre-Triassic Frame				Editor: Anton W. Ruttner
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Ostracods from the Middle Triassic Sina Formation (Aghdarband Group) in NE-Iran*)

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With 1 Text-Figure and 1 Plate

NE-Iran
Aghdarband
Middle Triassic
Sina Formation
Ostracods

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Zusammenfassung

Eine sehr kleine Ostracoden-Suite aus dem obersten Ladin der Sina-Formation (Aghdarband Group) in NE-Iran setzt sich vor allem aus Larven der Bairdiidae und Healdiidae zusammen. Von den drei artlich bestimmbaren Formen war *Judahella (Costahella) hungarica* KOZUR schon vom obersten Anis aus Ungarn bekannt. Die beiden anderen Arten sind neu: *Ptychobairdia ruttneri* n. sp. und *Polycope aghdarbandensis* n. sp.

Abstract

The very limited assemblage of Ostracoda from the uppermost Ladinian of the Sina Formation (Aghdarband Group) in north-eastern Iran is primarily composed of instars of Bairdiids and Healdiids. Of the three identified taxa, *Judahella (Costahella) hungarica* KOZUR was already known from the uppermost Anisian in Hungary. The two other species, *Ptychobairdia ruttneri* n. sp. and *Polycope aghdarbandensis* n. sp., are new.

1. Introduction

The small faunal assemblage of Ostracoda originates from fossil and marl samples obtained from the area of Aghdarband (NE-Iran), about 100 km east of the town of Mashhad, near the border of the U. S. S. R. They were collected by A. RUTTNER during the years 1956, 1975 and 1976. The material originates entirely from the Faqir Marl Bed (formerly "Fossil Horizon 2") within the Sina Formation (Aghdarband Group), which could be assigned by the ammonites to the *Frankites regoledanus* zone, i. e. topmost Ladinian, uppermost Middle Triassic. Further particulars on the geological situation may be obtained from RUTTNER's paper, this publ.

The very sparse and in part poorly preserved suite of Ostracoda consists primarily of smooth-shelled, largely crushed, not further determinable instars of the Bairdiidae and Healdiidae. Of particular note among the small fauna are the big-grown, reticulated *Ptychobairdia ruttneri* n. sp. (Pl. 1, Figs. 2-4), represented by several specimen, as well as the very small, rounded, but still

characteristic *Polycope aghdarbandensis* n.sp. (Pl. 1, Figs. 10-12). A single example of a *Judahella* could be assigned to *Judahella (Costahella) hungarica* KOZUR, which is already known from the Upper Anisian of Felsőörs, in the Balaton highland of Hungary.

There are strong similarities, but not a species identity in several instars of the healdiidae (Pl. 1, Figs. 7 and 8) with the *Aneisohealdia labiata* KRISTAN-TOLLMANN, first described from the Lower Carnian (Halobia shales) of the "Steiglweg" close to the Vorderer Gosau lake, Upper Austria. Additionally, the singular right valve of a *Triadohealdia* (Pl. 1, Fig. 9) was found to be a new species, but this cannot yet be described in full detail, because of lack of further sufficient material, particularly in left valves.

It's therefore rather pointless to compare and relate this fauna, so sparse in species and number of specimen, with others from the Triassic. Nevertheless, their description is of interest, as ostracod faunas from the Ladinian of the Tethys are as yet practically unknown. In particular, the list consists of the following:

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Bairdia sp. sp.
Acratia sp. (Pl. 1, Fig. 1)
Bairdiacypris sp. (Pl. 1, Fig. 6)
Bythocypris sp.
Fabaliocypris sp.
Ptychobairdia ruttneri n. sp. (Pl. 1, Figs. 2–4)
Judahella (*Costahella*) *hungarica* KOZUR, 1971 (Pl. 1, Fig. 5)
Hungarella sp.
Aneisohealdia aff. *labiata* KRISTAN-TOLLMANN, 1971 (Pl. 1, Figs. 7,8)
Triadohealdia n. sp. (Pl. 1, Fig. 9)
Polycope aghdarbandensis n. sp. (Pl. 1, Figs. 10–12).

The material is stored in the Palaeontological Department of the Geological Survey (Geologische Bundesanstalt) in Vienna and is listed under the reference numbers 1985/5/1–12.

2. Notes on Several Species

Genus: *Acratia* DELO, 1930

Acratia sp.

(Pl. 1, Fig. 1)

Description: The dorsal margin is highly and uniformly arcuate, the maximum height being at or immediately posterior to the center; it shows steep and almost equal arching in front and behind, and it is slightly tapered towards the posterior end, sloping downward only a little less than toward the anterior end. The anterior end is rounded, with only a slight indication of a beak-like extension, showing a ventral, slightly concave bight. The ventral margin is either straight or slightly undulating. The lateral surfaces show a paunch-bulgy outward doming. Interior features are not observable.

Relationship: Our very beautifully regularly developed *Acratia* from Aghdarband has a remote relationship with *Acratia goemoeryi* KOZUR, the closest yet being that with the dorsally similarly higher arching in the specimen from the Scythian of Chios in Greece as shown in Fig. B of Pl. 1 in KOZUR 1971/III. However, normally this species is significantly lower arched and it is more tapered at the posterior than is ours; in addition, that species shows its highest bulging anterior to its center. The same applies to *Acratia triassica* KOZUR from the Upper Anisian of Felsőörs in Hungary.

Genus: *Ptychobairdia* KOLLMANN, 1960

Ptychobairdia ruttneri n. sp.

(Pl. 1, Figs. 2–4)

Derivatio nominis: In honor of Dr. Anton RUTTNER, from whom the material is derived.

Holotypus: Carapace, Pl. 1, Figs. 4a,b; No. 1985/5/4.

Locus typicus: Aghdarband, 100 km east of Mashhad, province Khorassan, Northeast-Iran.

Stratum typicum: Faqir Marl Bed (formerly "Fossil Horizon 2") at the base of the Shale Member of the Sina Formation (Aghdarband Group); Middle Triassic, topmost Ladinian (Upper Langobardian, *Frankites regoledanus* zone).

Material: Five specimen.

Diagnosis: A species of the genus *Ptychobairdia* KOLLMANN, 1960, having the following particular features: On the reticulated median surface there are two short, narrow, horizontal and slightly upward curved ridges. The ventral and dorsal ridges are elongated and curved, following the outer edge of the valve; they are distinct but narrow, convergent at the front and the rear and at least in larves are often joined at the rear.

Description: The shell is robust, with a typical *Ptychobairdia* outline. In this species the ventral ridge is long and thin, extending at least over the entire length of the ventral valve, but mostly extending posteroventrally curved upward to almost the middle of the posterior end, or joining there directly with the downwardly extending dorsal ridge to a closed or only occasionally interrupted ring-like ridge. At least with instars at an early stage of development, the dorsal and ventral ridges are joined in any case in a ring-like form to the rear (cf. Pl. 1, Fig. 2). At the front, the ventral ridge also extends considerably upward; it follows there the outer border of the valve, similar to the equally distinct, but thin and long, dorsal ridge. The latter, too, extends over the entire length of the dorsal valve border; it bends posterodorsally downward to an extent, or joins there with the upward bending edge of the postero-ventral ridge (cf. above).

There are two additional, thin longitudinal ridges on the moderately bulging median surface; they extend on the average over the middle third of the length of the shell. Instars have shorter median ridges; in older specimens the lower ridge can be longer than the upper and can have a more pronounced curvature at the posterior end. Both ridges are concave, curving slightly upward, the lower of these two often slightly more. The area between the two longitudinal ridges is slightly depressed. The shell surface is reticulated.

Relationship: Our species is related with *Ptychobairdia bolzi* (KOZUR, 1971), or else *bolzi bolzi* and the further "subspecies" *bolzi praebolzi*, as well as their synonym "*Triebelina mostleri*", with the "subspecies" "*mostleri mostleri*" and "*mostleri praecursor*", all of which were made known by KOZUR (1971, pp. 8–13), as originating from the Illyrian in Austria and Hungary and which, just as in our species, show four ridges. In contrast to our species, *Ptychobairdia bolzi* (and "*mostleri*") have only a short, straight dorsal rib, in length about equal to the two central ribs, of which, furthermore, the upper is either straight or curved convexly upward; the shell surface is granulated to almost smooth – our species, on the other hand, shows pronounced reticulation.

If the shell is in a good state of preservation, denticles along anterior and posterior borders, typical of the genus *Ptychobairdia*, are invariably to be seen. But they are often completely eroded, as is the case in the material from Aghdarband. *Ptychobairdia kuepperi* in the Rhaetian Zlambach marls of the Eastern Alps,

can for example be found either with or without denticulation at the same locality, dependent on its state of preservation. The presence or absence of these denticles cannot be utilized as a characteristic in subspecies differentiation as for example KOZUR attempted, stating under "relationship" for "*Triebelina bolzi praebolzi*": [transl.] "'*Triebelina bolzi praebolzi*' distinguishes itself [from *Triebelina bolzi bolzi*] particularly through the distinctly denticulate anterior and posterior borders."

Genus: *Judahella* SOHN, 1968
Subgenus: *Costahella* KOZUR, 1971

***Judahella (Costahella) hungarica* KOZUR, 1971**
(Pl. 1, Fig. 5)

*1971 *Judahella (Costahella) hungarica* KOZUR n. sp., p. 28, (Pl. 2, Fig. 6).

Remarks: Our single specimen, a left valve, the dorsal border slightly damaged in the front half, and rather strongly weathered, is entirely identical with the original definition and description of KOZUR. Solely the surface of the shell appears to have been reticulated in our specimen, whereas KOZUR reports this to be smooth. Only material in a better state of preservation will supply us with a definite information on the condition of the shell's surface.

Both, the stratigraphical and the regional distribution of the species have now been extended considerably. The species was first described from the Upper Anisian (Lower Illyrian) of Felsőörs, Balaton highlands in Hungary. In Iran (Aghdarband) it occurs in the uppermost Ladinian of the Sina-Formation (Aghdarband Group).

Genus: *Aneisohealdia* KRISTAN-TOLLMANN, 1971

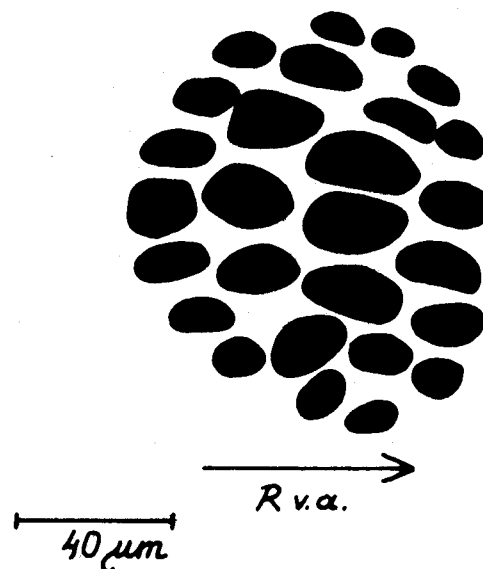
Aneisohealdia* aff. *labiata
KRISTAN-TOLLMANN, 1971
(Pl. 1, Figs. 7,8)

Remarks: The three instars under consideration, of which two are represented, are very similar to *A. labiata*, but cannot be definitely classified. In the one hand I lack topotype material from comparable instars and on the other no adult specimen are available from Aghdarband. Our instars are distinctive by means of a gradually tapering front end, a more tapered, highly arched dorsal rim and a more convex, arched ventral rim. However, the frontal lip and the posteroventral spine on the right valve correspond with *A. labiata*. In case these described differences in characteristics are also found in adult individuals, or occur even more pronounced, there will be full justification in subdividing this species.

Genus: *Triadohealdia* KRISTAN-TOLLMANN, 1971

***Triadohealdia* n. sp.**
(Pl. 1, Fig. 9; Text-Fig. 1)

Remarks: The single available right valve possesses several distinct characteristics, indicating this form



Text-Fig. 1.

Triadohealdia n. sp. from the upper Ladinian of the Sina Formation at Aghdarband, 100 km east of Mashhad in Northeast-Iran.

Muscle-scar pattern of a right valve from outside, drawn from the Scan photo of Plate 1, Fig. 9b.

as a new species. The dorsal border of the elongated shell arches in the center to a high hump; the posterior and anterior end of the right valve are equally high. The shell has a wide, bulging ventral rim which gradually tapers toward both, the rear and front ends, and a posteroventral knob on the right valve. The large adductor muscle scar situated immediately behind the halfway length of the shell could be examined from outside (see Pl. 1, Fig. 9a, particularly 9b and Fig. 1, respectively). It is a typical muscle-scar pattern of *Triadohealdia* consisting of two vertical scar rows, each with five large scars, surrounded by a circle of smaller scars – in this instance seventeen. The whole vertically elongated adductor muscle scar as well as the two individual rows are slightly curved forward, characteristic for this type of muscle-scar pattern.

Genus: *Polycope* SARS, 1866

***Polycope aghdarbandensis* n. sp.**
(Pl. 1, Figs. 10–12)

Derivatio nominis: Named after the locality of the find: Aghdarband.

Holotypus: Pl. 1, Fig. 11; No. 1985/5/11.

Locus typicus: Aghdarband, 100 km east of Mashhad, province Khorassan, Northeast-Iran.

Stratum typicum: Faqir Marl Bed (formerly "Fossil Horizon 2") at the base of the Shale Member of the Sina Formation (Aghdarband Group); Middle Triassic, topmost Ladinian (Upper Langobardian, *Frankites regoledanus* zone).

Material: Three specimens.

Diagnosis: A species of the genus *Polycope* SARS, 1866, having the following special features: The shell surface shows a dense, uniform reticulation which is joined in U-shaped rows of ribs. The six to nine rows of ribs are curved in front and taper off at the rear;

they are subdivided by equally well to somewhat less well developed cross-ribs. No distinctive border ridge is evident.

Description: The small, rounded, slightly vaulted shell shows uniform, small reticulation. This reticulation is joined in numerous arched rows (between six and nine, somewhat less in larvae), which run antero-ventrally parallel with the border of the shell in a U-shaped form and are open posterodorsally. The arrangement to arched ribs is clearly discernible, although the longitudinal ribs never protrude as much as in *P. cincinnata*, because the cross-ribs are almost equally well developed. The individual fields are bounded pentagonally or hexagonally. An internal reticulation of the fields could not be observed. Marginal denticulation is possibly present, but has not been proven with certainty. A specific border ridge is not indicated.

Relationship: *P. aghdarbandensis* n. sp. is related to *Polycope cerasia* BLAKE, 1876, with respect to the small uniform reticulation. Often this latticed relief also exhibits robust ledges (cf. for example O. MICHELSEN, 1975, Pl. 39, Figs. 550, 551, or U. SIVHED, 1980, Pl. 12, Fig. 120), but in *P. cerasia* it is not joined to the many U-shaped parallel rows of ribs, as is the case with our form.

On the other hand, U-shaped rows of ribs do occur in *Polycope cincinnata* APOSTOLESCU, 1959, and in its synonym, *Polycopsis hungarica* KOZUR, 1971a. However, this species has only three to four curved rows of ribs, which moreover protrude considerably as compared with the cross-ribs.

Pokornyopsis tenuireticulata HERRIG, 1981, also has only three curved rows of ribs and, contrary to our species, the internal fields of the reticulation are themselves densely reticulated.

Plate 1

Ostracoda from the uppermost Ladinian of the Sina Formation at Aghdarband, 100 km east of Mashhad in Northeast Iran.

Acratia sp.

Fig. 1: Carapace from the left side.
No. 1985/5/1.

Ptychobairdia ruttneri n. sp.

Instars.

Fig. 2: Shell from the right, instar at an early stage, posterior end is broken off.
No. 1985/5/2.

Fig. 3: Shell from the left, posterior end is broken off.
No. 1985/5/3.

Fig. 4: Holotype.
a) Shell from the left.
b) Shell from the right; posterior end is broken off.
No. 1985/5/4.

Judahella (Costahella) hungarica KOZUR

Fig. 5: Left valve, slight dorsal damage.
No. 1985/5/5.

Bairdiacypris sp..

Fig. 6: Carapace from the right.
No. 1985/5/6.

Aneisohealdia aff. *labiata* KRISTAN-TOLLMANN

Instar carapaces from the right.

Fig. 7: Very early instar, with posterodorsal damage.
No. 1985/5/7.

Fig. 8: No. 1985/5/8.

Triadohealdia n. sp.

Fig. 9: a) Right valve.
No. 1985/5/9.
b) Enlarged muscle-scar pattern, visible from the outside.

Polycope aghdarbandensis n. sp.

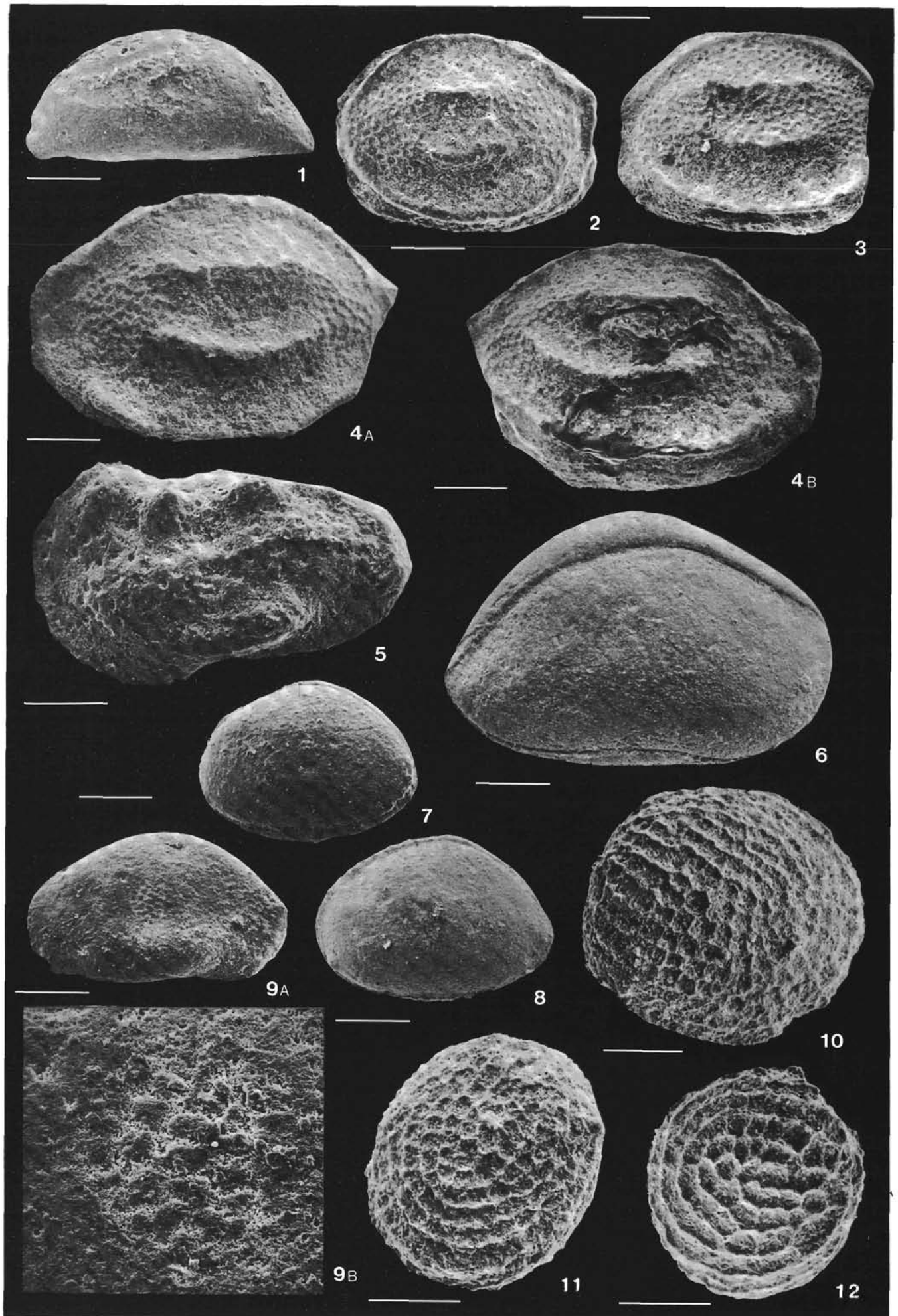
Single valves.

Fig. 10: No. 1985/5/10.

Fig. 11: Holotype.
No. 1985/5/11.

Fig. 12: Instar.
No. 1985/5/12.

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