

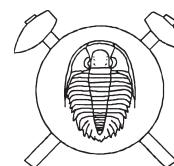


Ordovician ostracodes from Novaya Zemlya

Ordovičtí ostrakodi z Nové Země

(4 plates)

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From the Ordovician of Novaya Zemlya 31 new species and subspecies of ostracodes are described of 28 (10 new) genera and subgenera. Some of the ostracod genera show relations to Baltica, others to Siberia. This fact is a significant expression for the palaeogeographically intermediate position of Novaya Zemlya between these two continents during the Ordovician.

Key words: Ordovician, Ostracodes, Novaya Zemlya, new taxa

Introduction

Presently, Ordovician ostracods from Novaya Zemlya are poorly known. The first record from the Llandeilo of the neighboured Isle of Vajgach dates back to 1949, when Glebovskaja described the three new species *Primitia jusharensis*, *Bolla perincerta*, and *Tetradella variabilis*. However, according to a personal comment from A. F. Abushik (1988) the material is apparently lost. The early report by Glebovskaja followed a description of two egorovellid species from a collection of Ordovician ostracods from Novaya Zemlya by the present authors in 1999: *Debonia micropunctata* and *Fissebonia retuba*. Until now, the family Egorovellidae was known only from Siberia. The same applied for the family Cherskiellidae. Two new species of the latter, *Nosebiria quadrilobata* and *Goniautor kieswiooides* are described in another paper.

The present paper deals with the interposing composition of Novaya Zemlya fauna and the Siberian and Baltoscandian faunal provinces.

The rock material from which the ostracods were prepared by mechanical fracturing is a dark bituminous limestone. The ostracods usually have their shells preserved, but some of them appear more or less distorted.

The material will be housed at the Institute of Geology and Geophysics of the Siberian branch of the Russian Academy of Sciences.

Systematic paleontology

Family Oe p i k e l l i d a e Jaanusson, 1957
Subfamily A m p l e t o c h i l i n i n a e Schallreuter, 1975

Genus *Platybolbina* Henningsmoen, 1953

Platybolbina (Reticulobolbina) Schallreuter, 1969

Platybolbina (Reticulobolbina) temperata petermanni
subsp. nov.

Pl. IV, Fig. 1

E t y m o l o g y : After Cape Petermann, NW coast of Northern Novaya Zemlya.

H o l o t y p e : Female (?) left valve from sample 416-33/14 – Pl. IV, Fig. 1.

O c c u r r e n c e : sample 416-33/14; sample 416-10/5a (*P. cf. petermanni*).

D i a g n o s i s : At least up to 1.22 mm. Large, flat oval muscle spot just in front of center of domicilium. Relatively narrow velar frill. Reticulation very fine, nearly punctate.

R e m a r k s : *P. (R.) temperata temperata* Sarv, 1956 from the Rakverian of Estonia differs by its larger size and relatively broader velar frill.

Genus *Cystomatochilina* Jaanusson, 1957

Cystomatochilina flotowi sp. nov.

Pl. I, Figs 1–2

E t y m o l o g y : After Cape Flotow, E' coast of N' Novaya Zemlya.

H o l o t y p e : Posteriorly incomplete right tecnomorphic valve from sample 416-30/6 – Pl. I, Fig. 1.

D i a g n o s i s : At least up to 0.85 mm. Medium-sized preadductor node in front of center of domicilium. Sulcal depression behind node (S2) without fissum. No plica. Velar frill relatively narrow. Lateral surface more or less distinctly reticulate and with scattered tubercles (pustulae ?).

R e m a r k s : The type species of *Cystomatochilina*, *Primitia umbonata* (Krause, 1892) from upper Ordovician geschiebes of N' Germany and S' Finland and of Nabala to Porkuni stages of Estonia, has a slightly to distinctly larger preadductor node and a short fissum in the S2 (Martinsson 1956, Pl. 1, Figs 3–6, Jaanusson 1957, Fig. 16; Schallreuter 1993, Pl. 61B, Fig. 1, Pl. 62A, Figs 1–3; Meidla 1996, Pl. 2, Figs 4–5).

Similar to the new species is *Gellensia nodoreticulata* Schallreuter, 1982 from upper Ordovician Öjlemyrflint geschiebes of N Germany which is, however, more elongated.



gate and reticulate only on the preadductor node. The latter is more closely situated to the dorsal margin than in the new species. Furthermore, the velar frill seems to be broader in *G. nodoreticulata*.

Genus *Levisulculus* Jaanusson, 1957

Levisulculus posterovernentrolobatus sp. nov.

Pl. II, Fig. 1

Etymology: After the posteroverentral lobe.

Holotype: Right female valve from sample 416-30/6 – Pl. II, Fig. 1.

Diagnosis: At least up to > 0.63 mm. Sulcal depression with large muscle scar behind distinct preadductor node. Distinct lobe with cone-like top situated posteroverentially to muscle scar. Females with long antrum from anterocentral to posteroverentral region. Lateral surface reticulate.

Remarks: The species is characterized by the posteroverentral lobe with its cone-like top.

Genus *Bulbosulculus* Ivanova, 1979

Bulbosulculus dactylus sp. nov.

Pl. II, Fig. 7

Etymology: dactylo ..., according to the fingerprint-like ornamentation.

Holotype: Posteriorly incomplete right female valve from sample 416-30/6 – Pl. II, Fig. 7.

Diagnosis: At least up to > 0.62 mm. Sulcal depression (S2) weak, most distinct in front of and dorsal to flat and indistinct posteroverentral inflation which is located in the ventral half of the domicilium. Dolon broad and strongly convex, extending from anterocentral to at least posteroverentral region. Lateral surface striated parallel to anterodorsal corner. Dolon weaker striated than lateral surface, running perpendicular to lateral surface with which it forms a flat but distinct laterovellar furrow.

Remarks: The new species differs from *B. fragilis* (Kanygin 1971) by its broader dolon and less distinct S2 (Kanygin 1971, Pl. 4, Figs 6–10; Ivanova 1979, Pl. 8, Figs 3–4).

Genus *Chilobolina* Ulrich – Bassler, 1923

Chilobolina pseudola sp. nov.

Pl. III, Fig. 6

Etymology: According to the similarity with *C. ola* Schallreuter, 1993.

Holotype: Right valve from sample 416-10/5a – Pl. III, Fig. 6.

Diagnosis: At least up to 1.05 mm. Well-developed plica. Lateral surface not distinctly sculptured.

Remarks: The new species is very similar to *C. ola*. In the holotype of *C. ola* the dorsal region is still ob-

scured by rock material, but the presence of a distinct plica is observable in another specimen which was recently discovered from a Rogö sandstone geschiebe of Niedersachsen. The only distinct difference is the surface ornamentation which is reticulate (or spinose ?) in *C. ola* (Schallreuter 1993, Pl. 43A, Fig. 1).

Family Tvaerenellidae Jaanusson, 1957

Subfamily Nodambichilinae Schallreuter, 1967

Genus *Havlicekites* gen. nov.

Etymology: In honour of V. Havlíček.

Included species:

Apatochilina ? *falacata* Sarv, 1962 (type species)

Macronotella porkunica Neckaja in Abushik – Neckaja et al., 1958

Havlicekites fissuratus sp. nov.

Occurrence: Upper Ordovician of the Baltic region, Ordovician of Novaya Zemlya.

Diagnosis: Medium-sized. Outline subcomplete to slightly preplete, rounded-triangular. Nearly nonsulcate with the S2 only as a faint sulcal depression. Dorsal lobes very weak, and converging, forming a broad umbo that projects beyond the hinge-line. Small velar ridge in tecnomorphs, females with a long and broad anteroventral antrum. Surface smooth or reticulate.

Remarks: *Havlicekites* differs from the North American *Nodambichilina* by its less distinct sulcus and the dorsal node-like lobes which converge to a broad umbo. Sarv 1962 (with ?) and Meidla 1996 placed *H. falacatus* in *Apatochilina*. *Apatochilina* (= *Colacchilina* Kesling – Hall – Melik, 1962) differs from *Havlicekites* by the umbo present only in posterior half of valve, a more rectangular outline and the frill-like velum (Ulrich 1890, Pl. 9, Fig. 13).

Havlicekites fissuratus sp. nov.

Pl. I, Fig. 4

Etymology: After the fissum-like furrow in the ventrocentral region.

Holotype: Left tecnomorphic valve from sample 416-30/6 – Pl. I, Fig. 4.

Diagnosis: At least up to 1.85 mm. Outline rounded-triangular. Ventrocentral region with a short fissum-like furrow. Surface smooth.

Remarks: *H. porkunica* (= *H. falacatus*) is finely reticulate and has a less triangular outline. The laterovellar furrow is less distinct in *H. fissuratus* and a fissum-like furrow is not known in *H. porkunica* (Abushik – Neckaja et al. 1958, Pl. 2, Fig. 1; Sarv 1962, Pl. 3, Figs 1–5).

Family Dolborellidae Melnikova, 1976

Genus *Parajonesites* V. A. Ivanova in E. A. Ivanova al., 1955

Parajonesites sawina sp. nov.

Pl. I, Fig. 9



Etymology: After the Sawina Bay, eastern coast of S' Nowaja Zemlya.

Holotype: Right tecnomorphic valve from sample 416-30/6 – Pl. I, Fig. 9.

Diagnosis: At least up to 0.78 mm. Two vertical ridges in front of the S2, another ridge behind the S2. Anterior ridges rather long, dorsally almost reaching the plica. The converge and join ventrally just before reaching the velum. Posterior ridge extending from dorsal plica to a line just below the S2.

Remarks: In *P. notabilis* V. A. Ivanova in E. A. Ivanova et al., 1955 the ridges are more distinctly developed in the ventral half of the valve with only one prominent vertical ridge in front of the S2 (V. A. Ivanova in E. A. Ivanova et al., 1955, Pl. 23, Figs 4–5).

Family *Ctenonotellidae* Schmidt, 1941
Subfamily *Tallinnellinae* Schallreuter, 1976

Genus *Tetra* Neckaja in Abushik et al., 1958

Tetra ? *indistincta* sp. nov.

Pl. I, Fig. 8

Etymology: According to the flat lobation.

Holotype: Left valve from sample 416-30/6 – Pl. I, Fig. 8.

Diagnosis: Length at least up to 0.54 mm. Quadrilobate, lobes flat. S2 is the broadest sulcus and situated in the centrodorsal part; other sulci weak, narrow and fissum-like. Parallel to free margin extends a more or less broad, bulge-like lateroventral ridge. It starts anteriorly in front of the L1 and incorporating the posterior L4. Between this ridge and the free margin there is another bulge-like marginal ridge. Lobes being connected ventrally with the lateroventral ridge.

Remarks: The congeneric *T. fragilis* (Kanygin, 1971) from the Middle Ordovician of Sette-Daban is of about the same size (0.60 mm), but differs in the development of the lobes. Except for L4, they are not connected with the lateroventral ridge (Kanygin 1971, Pl. 4, Figs 11–12). Because of the unknown velar dimorphism the assignment of both species to the genus *Tetra* is questionable.

Subfamily *Ctenentominae* Schmidt, 1941

Genus *Octocristatia* gen. nov.

Etymology: According to the eight vertical ridges (adventral ridges included).

Type species: *Octocristatia ocris* sp. nov.

Diagnosis: Small. Quadrilobate with lobes reaching dorsal border except for L2. Lobes cristate, ventrally connected by a ridge-like lobe. An entire histium-like ridge is present and parallels L1 and L4 together with the connecting ridge as well as the completely devel-

oped ridge-like velum. Velar dimorphism unknown. Surface reticulate.

Remarks: The genus resembles *Tallinnellina* and *Rigidella* but differs by the histium-like ridge (Schallreuter 1993, Pl. 11A, Fig. 1, Pl. 14A, and Pl. 1B, Fig. 2, Pl. 2A, Figs 1–3, Pl. 3, Fig. 1, Pl. 8A, Pl. 9). In this respect, the genus resembles the phylogenetically more advanced *Pseudostrepula* which differs by the noncristate L2, the posteriorly dividing cristae which do not reach the dorsal margin and the restricted velum [Schallreuter 1976, Pl. 39(6), Fig. 4; 1983, Pl. 25(11), Figs 4–5].

Octocristatia oco sp. nov.

Pl. II, Fig. 2

Etymology: Artificially formed.

Holotype: Tecnomorphic left valve from sample 416-10/5a – Pl. II, Fig. 2.

Diagnosis: As for genus.

Genus *Pseudostrepula* Öpik, 1937

Pseudostrepula ? *severa* sp. nov.

Pl. IV, Fig. 2

Etymology: From sever (Russian) North.

Holotype: Posteroventrally incomplete tecnomorphic left valve from sample 416-30/4 – Pl. IV, Fig. 2.

Diagnosis: Length at least up to 0.69 mm. Lateral surface with three ridges parallel to free margin. Dorsal ridge branching anteriorly with the posterior branch crossing preadductor node. Surface reticulated.

Remarks: The type species, *P. kuckersiana* (Bonneema, 1909), is characterized by two posteriorly branching ridges and a preadductor node without ridge (Schallreuter 1966, Pl. 4, Figs 1–2; 1976, Pl. 6, Fig. 4; 1983, Pl. 11, Figs 4–5).

Genus *Strephithis* gen. nov.

Etymology: Formed from the genera names *Strepula* + *Hithis*.

Type species: *Strephithis multicostatus* sp. nov.

Diagnosis: Medium-sized. Unisulcate with moderately long S2. Distinct preadductor node (L2), a more or less distinct bulb-like large node (L3) located posterodorsally to S2 at the dorsal border. Distinct plica. Lateral surface between N2/S2 and velum marked by three subparallel ridges. Median ridge completely developed or only with its ventral part; innermost ridge commences at plica and splits in two or three branches posterily. A short ridge connects the innermost ridge with the ventral end of the N2 or a ridge on the N2, respectively. Dimorphism unknown.

Remarks: *Pseudostrepula* possesses two parallel ridges which both divides in the posterior half.

***Strephithis multicostatus* sp. nov.**

Pl. II, Fig. 3; Pl. III, Fig. 2

Etymology: after the several ridges of the lateral surface.

Holotype: Posterodorsally incomplete right tecnomorphic valve from sample 416-33/14 – Pl. III, Fig. 2.

Diagnosis: As for genus which is presently monotypic.

Remarks: The posterodorsal node is missing in the smaller valve (Pl. II, Fig. 3); in the holotype it is distinct but not as strong as in *S. multicostatus binodus*. The median ridge is present mainly in the ventral half of the valve and might be the strongest of all ridges.***Strephithis multicostatus binodus* subsp. nov.**

Pl. II, Fig. 8

Etymology: after the several ridges of the lateral surface.

Holotype: Right tecnomorphic valve from sample 416-30/6 – Pl. II, Fig. 8.

Diagnosis: Small. Strong posterodorsal bulb-like node. Median ridge completely developed.

Remarks: The subspecies differs from *S. multicostatus multicostatus* in its smaller size, the stronger posterodorsal node and the longer median ridge.**Genus *Cuphithis* gen. nov.**

Etymology: cupa, lat. – tub; according to the tub-like crista.

Type species: *Lennukella hendricksi* Schallreuter, 1985.

Diagnosis: Medium-sized. Unisulcate with distinct, oblique, funnel-like sulcus and pronounced preadductorial node. Large indistinctly delimited posteroventral lobe topped by a longitudinal crista which continues anteriorly. Surface reticulate or granulose and tuberculate.

Remarks: Similar to *Henningsmoenia* Schallreuter, 1964 with less funnel-like sulcus and less distinct node, a posteroventral lobe is not developed. In both the type species and *H. billingtonensis* the crista is only short and with spine-like posterior ends. *H. ? wenningstedtensis* is very similar to the type species but has a much longer crista (Schallreuter 1984, Figs 1.4–5). This species is considered to be transitional to *Pseudostrepula* ? *acuta* (Bonnema, 1909) in which the crista branches off posteriorly (Schallreuter 1976, Pl. 6, Figs 9–10).***Cuphithis liobqua* sp. nov.**

Pl. II, Figs 9–10

Etymology: Artificially formed from obliqua, lat. – oblique.

Holotype: Posteriorly incomplete right tecnomorphic valve from sample 416-10/5a – Pl. II, Fig. 10.

Diagnosis: Up to 0.73 mm. Crista gently converging towards dorsal margin in posterior direction. Surface reticulate and tuberculate.

Remarks: *C. hendricksi* from a Rogö sandstone geschiebe (upper Lower Ordovician) of Westphalia differs from the new subspecies mainly by its crista which runs more parallel to the dorsal margin (Schallreuter 1985, Pl. 3, Figs 1–2).**Genus *Telegraphia* Olempska, 1994*****Telegraphia novasemljaensis* sp. nov.**

Pl. IV, Fig. 8

Etymology: After Novaya Zemlya.

Holotype: Right tecnomorphic valve from sample 416-5/2 – Pl. IV, Fig. 8.

Diagnosis: Up to 0.74 mm. Outline distinctly preplete. In the ventral half of the valve and posteroventrally to the S2 two ridges converge but do not meet in ventral direction.

Remarks: The type species, *Telegraphia prima* Olempska, 1994 from the Early Ordovician of the Holy Cross Mountains, is characterized by three ridges behind the S2; the two posterior ridges are paralleling each other and are ventrally connected. *Telegraphia neglecta* (Sarv, 1959) from the Late Ordovician of the Baltic area is more similar to *T. novasemljaensis*, but differs by its distinctly preplete outline and by the ridges that almost parallel each other (Sarv 1959, Pl. 15, Figs 5–8; Meidla 1996, Pl. 7, Fig. 1). The shorter ridges may be a juvenile feature.

Subfamily Wehrliinae Schallreuter, 1965

Genus *Platybolbinoides* gen. nov.Etymology: After the similarity with *Platybolbina*.Type species: *Platybolbinoides guttasulcata* sp. nov.

Diagnosis: Medium-sized. Preplete. Unisulcate. Muscle scar located in a weak sulcal depression within the ventral half of the valve. Scar pit-like, ventrally slightly curved in anterior direction. Lateral surface reticulate except for the two cardinal corner fields.

Remarks: The species seems to belong to the Wehrliinae which are characterized by a velum with a peripheral row of spines. The latter forms a rake-like antral sculpture in females. The new genus differs from all other known genera of the subfamily by its weak sulcus and the lacking lobate features. The genus is homeomorphic with *Platybolbina* Henningsmoen, 1953 but it is distinct by the marginal surface with a comparatively high position of the velum and the spinose border of the latter.***Platybolbinoides guttasulcata* sp. nov.**

Pl. III, Fig. 1

Etymology: After the drop-like sulcus.

Holotype: Anterodorsally incomplete right valve from sample 416-10/5a – Pl. III, Fig. 1.



Diagnosis: As for genus which is currently monotypic.

Family Tetradelliidae Swartz, 1936
Subfamily Perspicillinae Schallreuter, 1966

Genus *Sigmobolbina* Henningsmoen, 1953

***Sigmobolbina w-formis* sp. nov.**

Pl. IV, Fig. 9a–b

Etymology: After the lobes and the histiovelum constituting a w.
Holotype: Right female valve from sample 416-30/6, IGIG – Pl. IV, Fig. 9a–b.

Diagnosis: Up to 0.78 mm. Long, flat and almost vertical preadductor lobe (L2) situated in front of a long sigmoidal sulcus (S2). Anterior to the L2, an indistinct, narrow, ridge-like, vertical L1 is separated from both the L2 and the histiovelum by weak, narrow furrows. Posteroventral lobe (L3) flat, obliquely extending towards straight dorsal margin. It is separated from the posteroventral part of the histium by a flat semisulcus (S3). Velum forms anterocentrally an admarginal loculus and ventrally the inner antral fence of an admarginal histial antrum which diverges ventrally from the free margin in posterior direction but the velum does not form a rudimentary antrum. Lobate area antero- and posteroventrally corrugate reticulate. Ventral side of velar keel weakly reticulate.

Remarks: The species is characterized by the distinctly separated preadductor and posteroventral lobes; together with the histium they serve for the quadrilobate appearance of the valve.

Genus *Podolibolbina* Abushik and Sarv, 1983

***Podolibolbina luetkei* sp. nov.**

Pl. III, Fig. 3

Etymology: After the Lütke-Land on N' Nowaya Zemlya.
Holotype: Right female valve from sample 416-33/14 – Pl. III, Fig. 3.

Diagnosis: Up to 1.00 mm. Distinct laterovelar furrow in posterior half of the female valve. Lateral surface coarsely tuberculate.

Remarks: In the holotype the three anteroventral loculi typical for *Podolibolbina* seem to be obscured by rock material. The type species of the genus, *P. podolica* Abushik – Sarv, 1983, reaches nearly the same size (0.95 mm), but differs from the new species mainly by the weak or missing laterovelar furrow in the females. Furthermore, the lateral surface is not tuberculate (Abushik – Sarv 1983, Pl. 2, Figs 9, 11). By the weak or missing laterovelar furrow *P. podolica* resembles *Foramenella* and might even be its predecessor. With the distinct laterovelar furrow and the coarse-tuberculate lateral surface the new species is also similar to the type

species of *Deefgella*, *D. dajsveteri* Schallreuter, 1981, but the latter differs markedly by having developed several conical nodes (Schallreuter 1981, Fig. 7).

Subfamily Glossomorphitinae Hessland, 1954
Tribus Glossomorphitini Hessland, 1954

Genus *Ctenomorphites* gen. nov.

Etymology: Formed by a combination of the generic names *Ctenobolbina* and *Glossomorphites*.

Type species: *Ctenomorphites bila* sp. nov.

Diagnosis: Medium-sized. Distinctly preplete. Unisulcate. S2 long and only slightly sigmoidal. Long preadductor lobe (L2). Posteroventral lobe (L3v) high and similar to L2 extending almost perpendicular to straight dorsal margin. Lobes forming the maximum width of the valve. Histial ridge from anterodorsal region to postero-central region. Thick velar bulge from anterodorsal region to posteroventral region.

Remarks: The monotypic *Lingulibolbina* Melnikova, 1986 from the Ordovician of Kazakhstan is very similar in its lobation, but contrary to *Ctenomorphites* it has a short drop-like preadductor node which is distinctly set off from a flat L1 (Melnikova 1986, Pl. 8, Figs 4–5).

Concerning shape, outline, strong development of the L3v, and especially the bulgy velar sculpture, *Ctenomorphites* is similar to *Lenatella* which has been assigned to the Egorovellidae (Schallreuter – Kanygin – Hinz-Schallreuter 1999, 278, Fig. 4). However, relationships to that genus and/or family could not be excluded.

***Ctenomorphites brevis* sp. nov.**

Pl. I, Fig. 6.

Etymology: Brevis, short – according to the relatively high L:H ratio.

Holotype: Right valve from sample 416-30/6 – Pl. I, Fig. 6.

Diagnosis: As for genus which is currently monotypic.

Genus *Vittella* Schallreuter, 1964

***Vittella noze* sp. nov.**

Pl. III, Fig. 10; Pl. IV, Fig. 3

Etymology: Artificially formed from Novaya Zemlya.

Holotype: Right female valve from sample 416-10/5a – Pl. III, Fig. 10.

Diagnosis: Up to 0.86 mm. Deep and narrow sulcus distinct. Posteroventral lobe narrow and without spine. Dolon restricted to anteroventral region. Surface reticulate.

Remarks: Most similar Among all *Vittella* species *V. gullhoegensis* Schallreuter, 1984 from the Middle Ordovician of Sweden ist most similar to the new species.



V. gullhoegensis is only slightly larger (0.98 mm) and has also a short dolon which is restricted to the anterovenentral region. The sulcus, however, is less distinct.

Tribus Hippulinini Schallreuter, 1983

Genus *Hippula* Tromelin and Lebesconte, 1876

Subgenus *Hippula (Interruptula)* subgen. nov.

Etymology: after the interrupted histiovelum.

Type species: *Hippula (Interruptula) interrupta* sp. nov.

Diagnosis: L1 developed bulb-like at dorsal margin and as an elongate lobe in its ventral half. L2 bulb-like dorsally (just above mid-length), its narrow ventral end connected with L1. Posteroventral lobe (L3) distinct. Histiovelum interrupted anteroventrally.

Hippula (Interruptula) interrupta sp. nov.

Pl. I, Fig. 7; Pl. III, Fig. 9

Etymology: after the interrupted histiovelum.

Holotype: Left tecnomorphic valve from sample 416-10/5a – Pl. I, Fig. 7.

Diagnosis: At least up to 0.88 mm.

Subgenus *Hippula (Cetona)* Schallreuter, 1964

Hippula (Cetona) brevisulcata sp. nov.

Pl. IV, Fig. 7

Etymology: According to the short sulcus.

Holotype: Right tecnomorphic valve from sample 416-30/6 – Pl. IV, Fig. 7.

Diagnosis: At least up to 1.01 mm. Sulcus short and restricted to dorsal half. Both preadductor lobe and posteroventral lobe indistinct. Velar flange paralleling ventral margin. Surface indistinctly reticulate.

Remarks: The species is characterized by its short sulcus and the indistinct lobes. The similar *H. (C.) serra* Schallreuter, 1984 from a Backsteinkalk geschiebe (Middle Ordovician) of Northern Germany differs by the velar ridge that diverges posteriorly from the free margin (Schallreuter 1984, Fig. 4.1).

Hippula (Cetona ?) facies sp. nov.

Pl. I, Fig. 10; Pl. II, Fig. 6; Pl. IV, Fig. 5

Etymology: According to the two lobes, the sulcus and the velum constituting a sculpture similar to a face.

Holotype: Left tecnomorphic valve from sample 416-10/5a – Pl. I, Fig. 10.

Diagnosis: At least up to 1.11 mm. Shape elongate. Sulcus not indistinctly delimited. Preadductor lobe and posteroventral lobe similarly developed as nodes, poster-

oventral lobe something higher and with short ridge-like top. Velar flange equally developed from anterocentral to centroventral region. Surface weakly reticulate.

Remarks: The species is characterized by the distinct preadductor lobe and posteroventral lobe. However, because of the broken velar ridge the subgeneric assignment is uncertain.

Genus *Ctenyginia* gen. nov.

Etymology: Formed by combination of the generic names *Ctenonotella* and *Kanyginia*.

Type species: *Ctenyginia crassivelata* sp. nov.

Diagnosis: Small. Unisulcate. S2 long and only slightly sigmoidal. Long preadductor lobe of about the same length as the posteroventral lobe. Strong, broad histiovelum that reaches the same height as the lobes.

Remarks: Concerning lobation, *Ctenyginia* is very similar to *Ctenomorphites* gen. nov. The main difference lies in the development of the stout histiovelum in *Ctenyginia* which resembles that of *Kanyginia* Schallreuter – Kanygin, 1992.

Ctenyginia crassivelata sp. nov.

Pl. III, Fig. 8

Etymology: According to the stout histiovelum.

Holotype: Posteriorly incomplete right valve from sample 416-10/5a – Pl. III, Fig. 8.

Diagnosis: As for genus which is currently monotypic. Length of holotype (without posterior end) 0.64 mm.

Genus *Spinohippula* Vannier, Krúta and Marek, 1977

Spinohippula ? biserrata sp. nov.

Pl. I, Fig. 5

Etymology: Serra, lat. – saw, according to the saw-like dentition of the adventral sculpture.

Holotype: Left tecnomorphic valve from sample 416-10/5a – Pl. I, Fig. 5.

Diagnosis: Length at least up to 0.54 mm. Unisulcate with short oblique sulcus (S2) in dorsal half. Two flat indistinct lobes (L2, L3) on both sides of the sulcus that fuse ventrally. Thick velar bend from anterocentral to posteroventral region, with two rows of triangular denticles in the plane of the lateral surface; tips of denticles vis-à-vis and alternating. Surface indistinctly reticulate.

Remarks: The type species, *Spinohippula esurialis* from the Bohemian Ordovician, the only yet known species, is nonsulcate and differs from the new species by having only the outer row of triangular spines developed (Vannier – Krúta – Marek 1977, Pls 50, 52, 54, 56).



Genus *Quaca* gen. nov.

Etymology: Formed artificially from *quadricarinata*.
Type species: *Quaca muca* sp. nov.

Diagnosis: Unisulcate. S2 long and sigmoidal, becoming weak ventrally. Both preadductor node and posteroventral lobe indistinctly flat. Anterocentral to centroventral regions between keel-like histial ridge and free margin with three perimarginal ridges. A single short perimarginal ridge occurs in ventral half of posterior part. Marginal sculpture developed as a row of spines that become flange-like posteroventrally. Lateral surface tuberculate and reticulate, except for a flat and smooth, indistinct, node-like swelling in the anterodorsal region.
Remarks: The genus resembles *Hippula* but lacks the characteristic histiovelum with the special compartments.

Quaca muca sp. nov.

Pl. I, Fig. 3

Etymology: Formed artificially from *multicarinata*.
Holotype: Left tecnomorphic valve from sample 416-30/6 – Pl. I, Fig. 3.

Diagnosis: Length at least up to 0.91 mm. Preadductor bulb and posteroventral lobe weakly developed. Ventral surface above fine admarginal ridge characterized by three ridges with the uppermost ridge forming a histial edge. Surface reticulate and with scattered tubercles.

Quaca pura sp. nov.

Pl. III, Fig. 7; Pl. IV, Fig. 6

Etymology: *purus*, Latin – poor; according to the fewer admarginal ridges compared with the type species.
Holotype: Left tecnomorphic valve from sample 416-10/5a – Pl. IV, Fig. 6.

Diagnosis: Length at least up to 0.76 mm. No distinct preadductor node and posteroventral lobe. Ventral surface with two ridges, but no histial ridge. Surface wrinkled-reticulate.

Remarks: *Q. pura* differs from *Q. muca* by lack of the distinct preadductor bulb, histial ridge, and tuberculation; instead its surface is wrinkled reticulate.

Genus *Nowehrlina* gen. nov.

Etymology: Combined from *Nowaya Zemlya* and the genus name *Wehrlina*.
Type species: *Nowehrlina sperata* sp. nov.

Diagnosis: Small with relatively weak, long, strongly sigmoidal sulcus. Preadductor node and posteroventral lobe distinct. L1 developed as a strong sperum. Dolon fairly strongly convex in anterocentral, anteroventral and centroventral regions, forming a long botulate antrum. Distinct laterovellar furrow.

Remarks: The new genus differs from *Wehrlina* Schallreuter, 1964 by the distinct preadductor node, the posteroventral lobe, the development of a sperum, the distinct laterovellar furrow, and the strongly convex dolon. The assignment to the Wehrlinae is uncertain.

Nowehrlina sperata sp. nov.

Pl. II, Fig. 11

Etymology: According to the anterodorsal sperum.
Holotype: Posteriorly incomplete left female valve from sample 416-30/6 – Pl. II, Fig. 11.

Diagnosis: As for genus which is presently monotypic.

Family Monotiopleuridae Guber and Jaanusson, 1964

Genus *Tior* Schallreuter, 1998

Tior verticalis sp. nov.

Pl. IV, Fig. 4

Etymology: After the vertical sulcus.
Holotype: Left tecnomorphic valve (posterior part lost after scanning) from sample 416-30/6 – Pl. IV, Fig. 4.
Occurrence: Sample 416-30/6.

Diagnosis: Up to 0.73 mm. Sulcus (S2) extending perpendicular to dorsal margin and in some distance from the latter. Dorsally it is trumpet-like opened, but rather narrow ventrally. Surface weakly and irregularly reticulate.

Remarks: The type species *T. altior* (Schallreuter, 1993) from an upper Viruan geschiebe of N' Germany is very similar to the new species concerning outline as well as in the construction and position of the S2 with its trumpet-like dorsal opening. *T. altior* is, however, larger (0.81 mm) and more distinctly reticulate. The sulcus in *T. verticalis* is ventrally narrower than in *T. altior*.

T. fastidiosus (Sarv, 1959) from the Kundan of Estonia possesses a broader sulcus and a less convex posterior end (Sarv 1959, Pl. 31, Figs 1–4; Schallreuter 1999, Pl. 3, Fig. 5).

? Genus *Disparigonya* Schallreuter, 1985

Remarks: The type species, *Disparigonya voigti* Schallreuter, 1985 from an late Viruan (D_2) geschiebe of Northern Germany, seems to be a junior synonym of *Haploprimitia kogermani* Öpik, 1937 from the Kukruse beds (C_2) of Estonia where it is a very rare faunal element (Öpik 1937, Pl. 1, Fig. 2).

Disparigonya ? umbona sp. nov.

Pl. III, Fig. 5; Pl. IV, Fig. 10

Etymology: After the umbo.
Holotype: Right valve from sample 416-30/4 – Pl. IV, Fig. 10.
Occurrence: Samples 416-30/4 and 416-30/6.



D i a g n o s i s : Up to 1.42 mm. Strongly postplate. Weak, broad sulcal depression (S2) in the center of dorsal half. Posterior half of valve forming a broad inflation which is wider than the anterior half. A broad (long.) triangular umbo located posterodorsally to the S2 gives the dorsal margin its characteristic kink. Its anterior part is separated by a very weak depression within the weakly bulb-like inflation of the whole lobal element.

R e m a r k s : The type species differs mainly by its smaller size, the amplete outline, the weak but distinct sulcus and the missing umbo (Öpik 1937, Pl. 1, Figs 2–3; Pl. 13, Fig. 30; Sarv 1959, Pl. 31, Figs 9–11). These differences are so fundamental that the new species could be referred to the genus with great reservations only.

Disparigonya ? umbona sp. nov. also resembles *Medianella* Neckaja, 1966 but without seeing its inner side the relationship is speculative only.

Family unknown

Genus *Hallatina* Ivanova in Chugaeva, Rozman and Ivanova, 1964

Hallatina ? bulbata sp. nov.

Pl. II, Fig. 5

E t y m o l o g y : According to the dorsal bulb in the anterior half.

H o l o t y p e : Left valve from sample 416-33/14 – Pl. II, Fig. 5.

D i a g n o s i s : Up to 0.81 mm. Outline slightly preplate. S2 developed only as a sulcal depression in the anterior centrodorsal region. Distinct velar ridge near free margin. Outer surface reticulate.

R e m a r k s : The other known species of the genus, *H. chanae* Ivanova in Chugaeva – Rozman – Ivanova, 1964, *H. orlovi* Ivanova in Chugaeva – Rozman – Ivanova, 1964 and *H. dentata* Kanygin, 1967 from the Ordovician of NE' Siberia becomes much larger (1.98 – 2.48 mm) and has a deeper S2 (Chugaeva – Rozman – Ivanova 1964, Pl. 24, Figs 8–9; Kanygin 1967, Pl. 6, Figs 2–11).

Genus *Estonaceratella* Schallreuter, 1984

Estonaceratella aspinata sp. nov.

Pl. III, Fig. 4

E t y m o l o g y : After the missing ventrolateral spine.

H o l o t y p e : Left valve from sample 416-30/6 – Pl. III, Fig. 4.

D i a g n o s i s : Up to 0.70 mm. Dorsal area with distinct broad (long.) umbo that forms an epicline dorsum. Lateral surface without any spine.

R e m a r k s : The type species *E. estona* (Sarv, 1962) is characterized by a spine in the posteroventral region, but has a less distinct umbo (Schallreuter 1986, Pl. 6, Fig. 4).

Discussion

The Ordovician ostracod faunas of Baltica and Siberia are quite different and have only few genera in common. Before that background the faunas from Novaya Zemlya with their interposing role become extremely significant. The yet described Ordovician ostracods from Novaya Zemlya represent about half of the entire collection. All species are new, but the genera show relations to both the Baltic region and Siberia. Typical Baltic genera are *Platybolbina*, *Cystomatochilina*, *Chilobolbina*, *Levisulculus*, *Havliceekites*, *Telegraphia*, *Sigmobolbina*, *Tior*, and *Estonaceratella*. Typical Siberian taxa are the egorovellids, the cherskiellids, and the genera *Bulbosulculus*, *Parajonesites*, and *Hallatina*. Some genera show relations to Laurentia, e.g., *Levisulculus*, and *Platybolbina* (Kesling 1960a, b).

In the latest palaeogeographic reconstructions Baltica and Siberia take positions on both sides of the Iapetus Ocean, Siberia at the equator, Baltica at about 30° S (e.g., Lehnert – Hinz-Schallreuter – Krueger 1999, Fig. 4). Until now Novaya Zemlya has been considered to be part of Baltica. The ostracod faunas, however, cast some doubt on this assumption and may suggest that Novaya Zemlya was a separate microcontinent, positioned somewhere between Baltica and Siberia, but closer to Baltica.

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Ordovičtí ostrakodi z Nové Země

Z ordoviku Nové Země je popsáno celkem 31 nových druhů a poddruhů ostrakodů patřících do celkem 28 rodů nebo podrodů (z toho 10 nových). Některí ostrakodi jeví vztahy k paleokontinentu Baltika, jiné druhy k Sibiři. Tyto údaje silně podporují paleogeograficky mezihradou pozici Nové Země mezi těmito dvěma paleokontinenty v ordovickém období.

Explanation of plates

Plate I

- 1 – *Cystomatochilina flotowi* sp. nov. Holotype, posteriorly incomplete tecnomorphic right valve, length 0.71 mm. Sample 416-30/6.
- 2 – *Cystomatochilina flotowi* sp. nov. Paratype, posteriorly incomplete tecnomorphic right valve, length 0.85 mm. Sample 416-30/6.
- 3 – *Quaca muca* gen. et sp. nov. Holotype, tecnomorphic left valve, length 0.91 mm. Sample 416-30/6.
- 4 – *Havlicekites fissuratus* gen. et sp. nov. Holotype, tecnomorphic left valve, length 1.85 mm. Sample 416-30/6.
- 5 – *Spinohippula biserrata* sp. nov. Holotype, tecnomorphic left valve, length 0.54 mm. Sample 416-10/5a.
- 6 – *Ctenomorphites brevis* gen. et sp. nov. Holotype, tecnomorphic right valve, length 1.13 mm. Sample 416-30/6.
- 7 – *Hippula (Interruptula) interrupta* subgen. et sp. nov. Holotype, tecnomorphic left valve, length 0.88 mm. Sample 416-10/5a.
- 8 – *Tetrada ? indistincta* sp. nov. Holotype, tecnomorphic left valve, length 0.54 mm. Sample 4126-30/6.
- 9 – *Parajonesites sawina* sp. nov. Holotype, right valve, length 0.78 mm. Sample 416-30/6.
- 10 – *Hippula (Cetona) ? facies* sp. nov. Holotype, tecnomorphic left valve, length 1.11 mm. Sample 416-10/5a.

Plate II

- 1 – *Levisulculus posterovertrolobatus* sp. nov. Holotype, female right valve, length 0.63 mm. Sample 416-30/6.
- 2 – *Octocristatia octo* gen. et sp. nov. Holotype, tecnomorphic left valve, length 0.73 mm. Sample 416-10/5a.
- 3 – *Strephites multicostatus* gen. et sp. nov. Paratype, anterodorsally incomplete tecnomorphic left valve, length 0.97 mm. Sample 416-33/14.
- 4 – *Octocristatia octo* gen. et sp. nov. Paratype, anterodorsally incomplete tecnomorphic right valve, length 0.64 mm. Sample 416-10/5a.
- 5 – *Hallatia ? bulbata* sp. nov. Holotype, left valve, length 0.81 mm. Sample 416-33/14.
- 6 – *Hippula (Cetona) ? facies* sp. nov. Paratype, tecnomorphic left valve, length 1.05 mm. Sample 416-10/5a.
- 7 – *Bulbosulculus dayylus* sp. nov. Holotype, posteriorly incomplete female right valve, length 0.62 mm. Sample 416-30/6.
- 8 – *Strephites multicostatus binodus* subsp. nov. Holotype, tecnomorphic right valve, length 0.56 mm. Sample 416-30/6.
- 9 – *Cupithis liobqua* gen. et sp. nov. Paratype, anteroventrally incomplete tecnomorphic right valve, length 0.59 mm. Sample 416-10/5a.
- 10 – *Cupithis liobqua* gen. et sp. nov. Holotype, posteriorly incomplete tecnomorphic right valve, length 0.73 mm. Sample 416-10/5a.
- 11 – *Nowehrlina sperata* gen. et sp. nov. Holotype, posteriorly incomplete female left valve, length 0.68 mm. Sample 416-30/6.

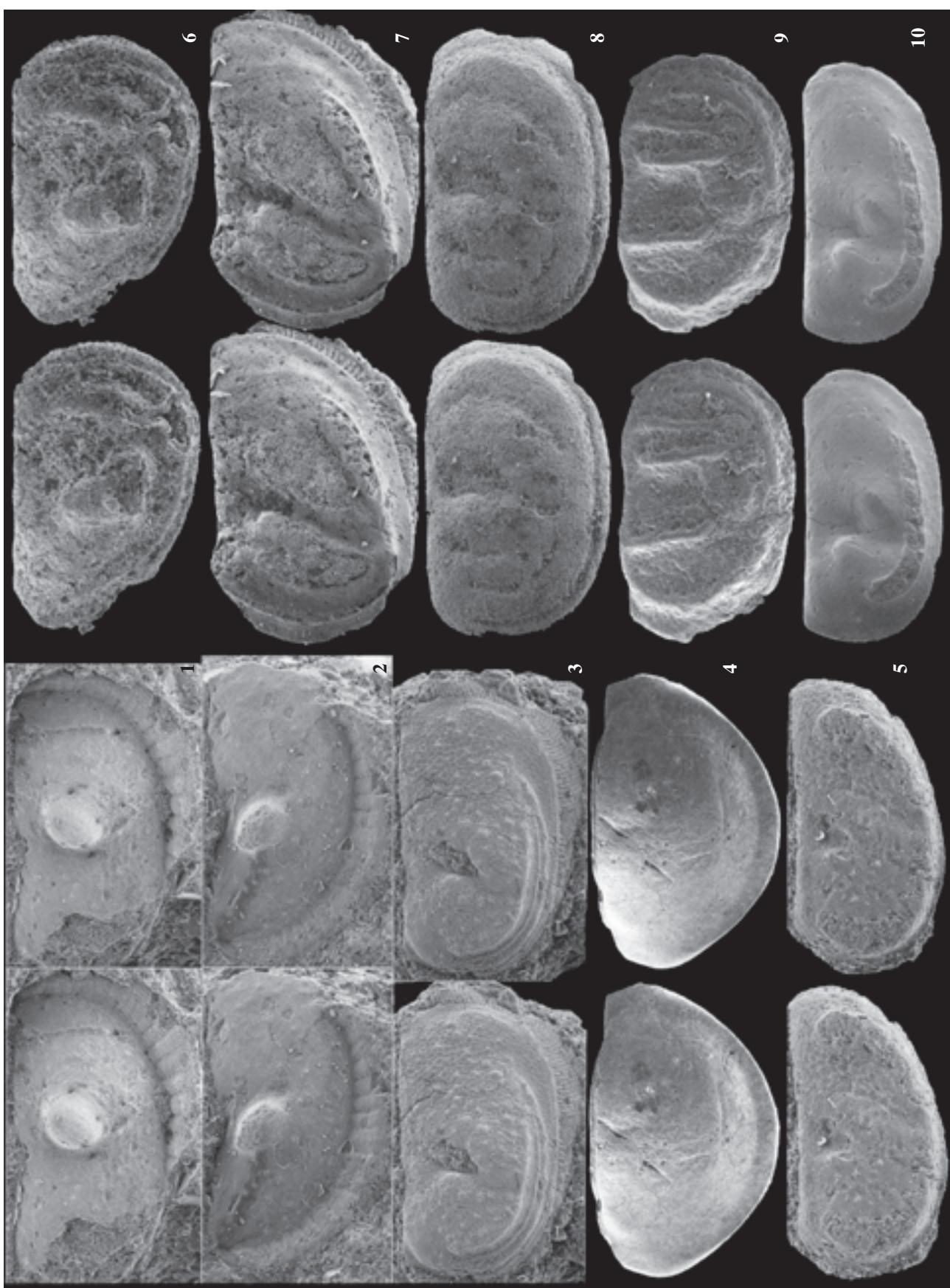
Plate III

- 1 – *Platybolbinoides guttasulcata* sp. nov. Holotype, female (?) right valve, length 0.98 mm. Sample 416-10/5a.
- 2 – *Strephites multicostatus* gen. et sp. nov. Holotype, tecnomorphic right valve, length 1.37 mm. Sample 416-33/14.
- 3 – *Podolibolbina luetkei* sp. nov. Holotype, female right valve, length 1.00 mm. Sample 416-33/14.
- 4 – *Estonaceratella aspirata* sp. nov. Holotype, left valve, length 0.66 mm. Sample 416-30/6.
- 5 – *Disparigonya ? umbona* sp. nov. Paratype, right valve, length 1.09 mm. Sample 416-30/6.
- 6 – *Chilobolbina pseudola* sp. nov. Holotype, right tecnomorphic valve, length 1.05 mm. Sample 416-10/5a.
- 7 – *Quaca pura* sp. nov. Paratype, posteriorly incomplete tecnomorphic left valve, height 0.44 mm. Sample 416-10/5a.
- 8 – *Ctenyginia crassivelata* gen. et sp. nov. Holotype, posterodorsally incomplete tecnomorphic right valve, length >0.64 mm. Sample 416-10/5a.
- 9 – *Hippula (Interruptula) interrupta* subgen. et sp. nov. Paratype, posteriorly incomplete tecnomorphic left valve, height 0.58 mm. Sample 416-10/5a.
- 10 – *Vittella noze* sp. nov. Holotype, female right valve, length 0.86 mm. Sample 416-10/5a.

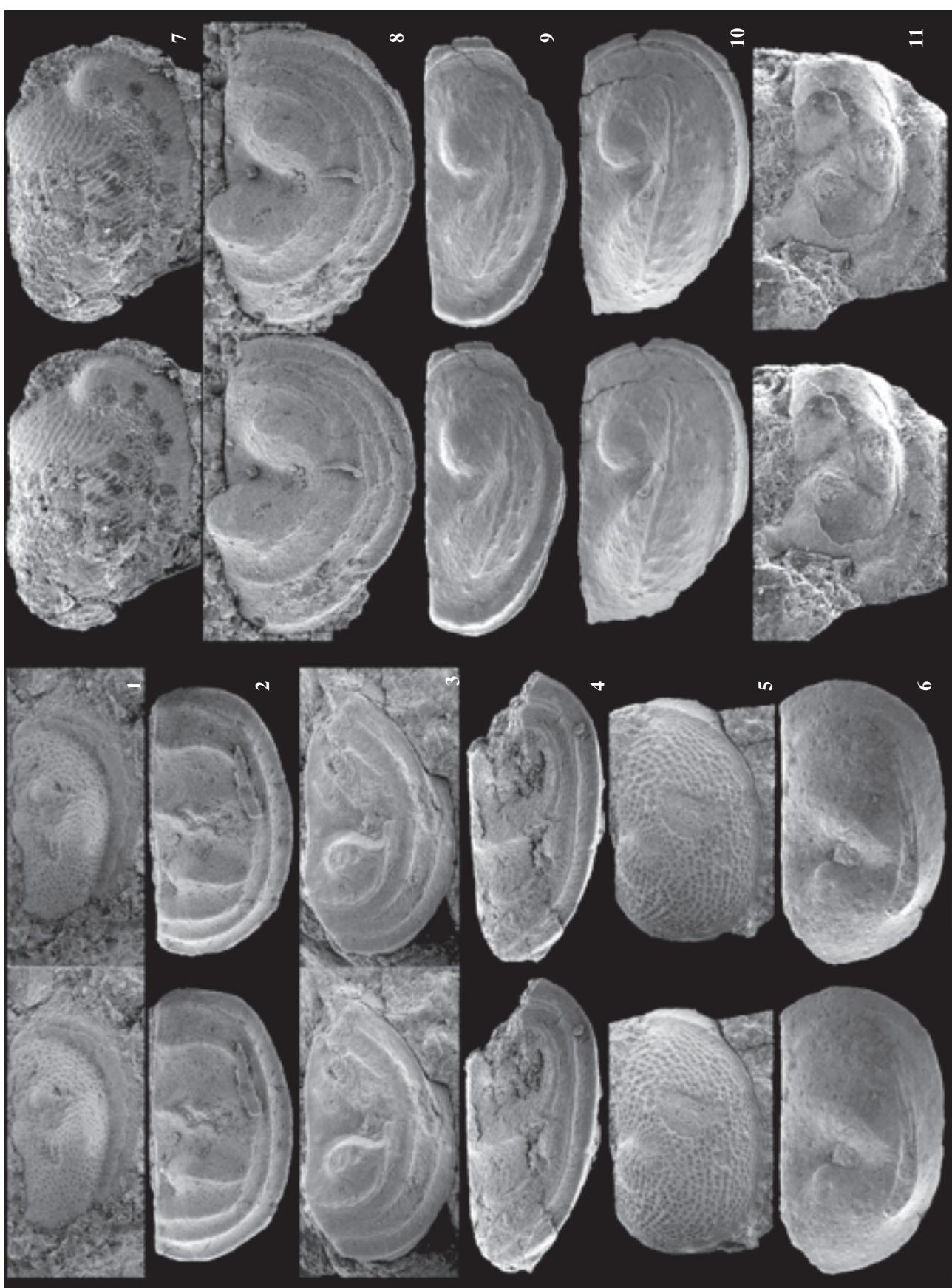
Plate IV

- 1 – *Platybolbina (R.) temperata petermanni* subsp. nov. Holotype, posteroventrally incomplete female (?) left valve, length 1.22 mm. Sample 416-33/14.
- 2 – *Pseudostrepula ? severa* sp. nov. Holotype, posteroventrally incomplete tecnomorphic left valve, length 0.69 mm. Sample 416-30/4.
- 3 – *Vittella noze* sp. nov. Paratype, slightly distorted female right valve, length 0.78 mm. Sample 416-10/5a.
- 4 – *Tior verticalis* sp. nov. Holotype, left valve, length 0.73 mm. Sample 416-30/16.
- 5 – *Hippula (Cetona) ? facies* sp. nov. Paratype, tecnomorphic left valve, length 0.80 mm. Sample 416-10/5a.
- 6 – *Quaca pura* sp. nov. Holotype, tecnomorphic left valve, height 0.73 mm. Sample 416-10/5a.
- 7 – *Hippula (Cetona) brevisulcata* sp. nov. Holotype, tecnomorphic right valve, length 1.01 mm. Sample 416-30/6.
- 8 – *Telegraphia novasemlaensis* sp. nov. Holotype, tecnomorphic right valve, length 0.71 mm. Sample 416-5/2.
- 9 – *Sigmobolbina w-formis* sp. nov. Holotype, female right valve in lateral (a) and ventral views (b), length 0.78 mm. Sample 416-30/6.
- 10 – *Disparigonya ? umbona* sp. nov. Holotype, right valve, length 1.42 mm. Sample 416-30/4.

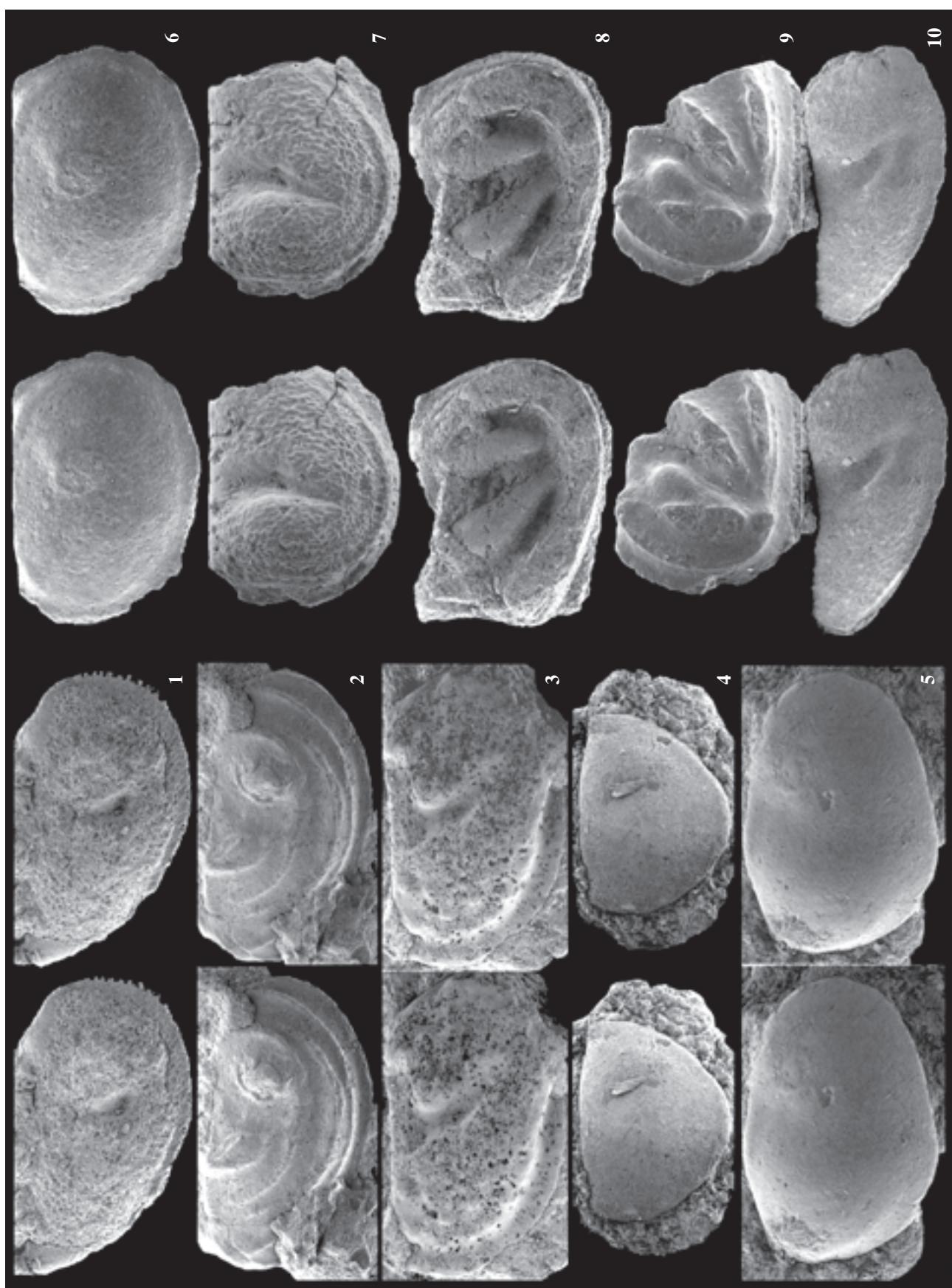
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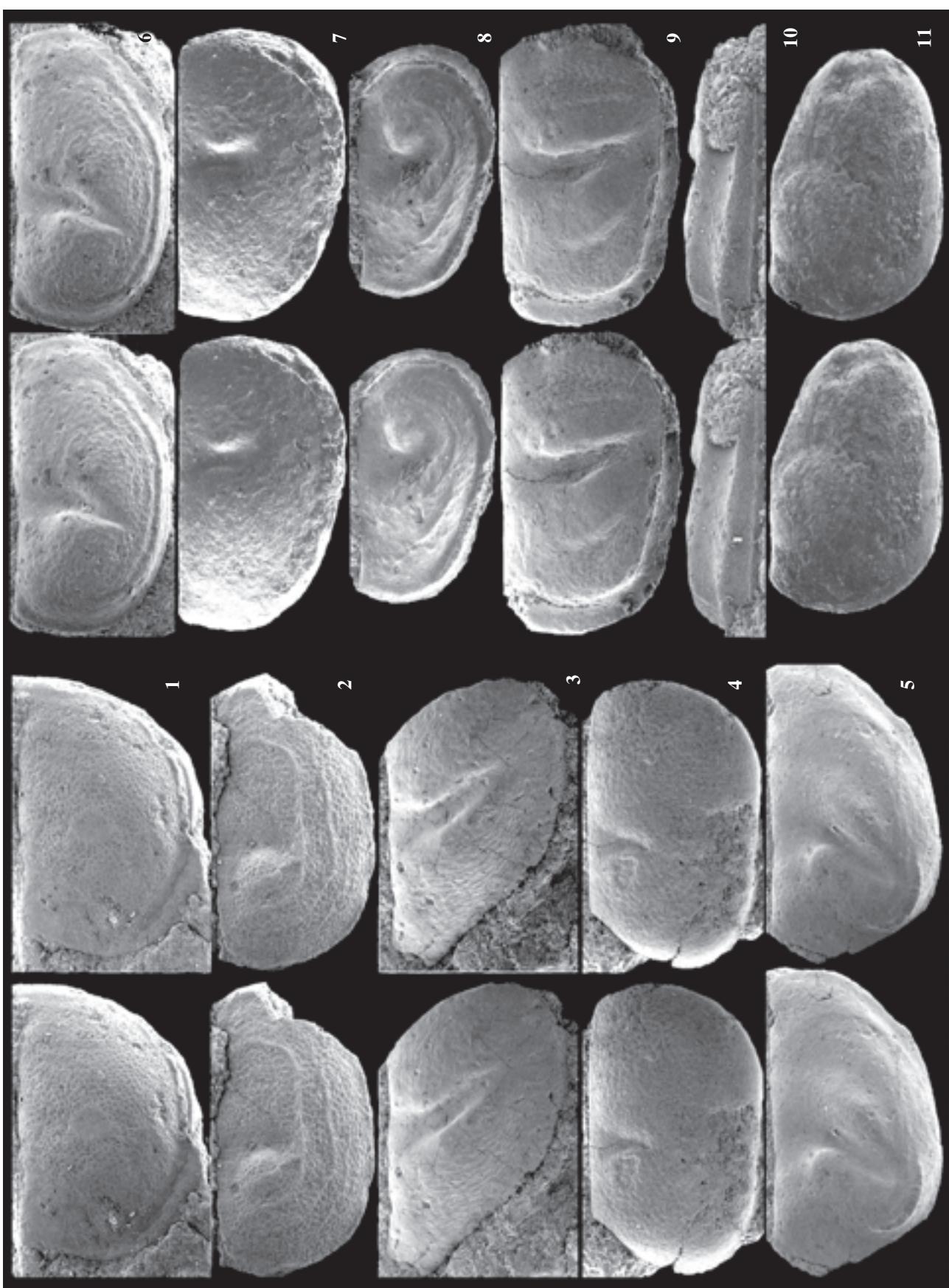
For explanation see p. 208



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