HOWELLELLA GONENSIS – A NEW SPECIES OF SPIRIFERIDS (BRACHIOPODA) FROM THE LOWER DEVONIAN BEDS OF NORTH-EAST ASIA

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Abstract. A new species, Howellella gonensis sp. nov. has been described from the Lower Prague beds of the Selennyakh Ridge (North-East Asia). (order Spiriferida) and its ontogeny is considered.

Keywords: *Lower Devonian, Howellella gonensis, spiriferids, Brachiopoda, North-East Asia*

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INTRODUCTION

Early Devonian spiriferids occur throughout the Lower Devonian section of Northeastern Asia (Alekseeva, 1967; Avdeeva, Baranov, 1995; Alekseeva et al., 1996; Baranov, Alkhovik, 2004, 2007; Baranov, 2009a, 2009b, 2014; Baranov, Blodgett, 2015; Baranov, Nikolaev, 2024). The first representatives of the genus Howellella Kozlowski, 1946 – H. labilis T. Modzalevskaya, 1994 and H. propria T. Modzalevskaya, 1994 in Northeastern Asia were established at the base of the Lochkovian stage of the Sette-Daban and Tas-Khayakhtakh Ranges. They were found there in association with

conodonts of the Ozarkodina remscheidensis zone (Alkhovik, Baranov, 2001). Their greatest diversity is observed at the base of the Pragian stage of the Tas-Khayakhtakh Range, where the genus Howellella is represented by the following species: H. prima Alekseeva, 1967 , H. yacutica Alekseeva, 1967, H. minora Rzonsnickaja, 1967, H. laeviplicata Kozlowski, 1929, H. pauciplicata Waite, 1929 (Alekseeva, 1967). The species H. gonensis sp. nov. was found in the Korotkinsky horizon (Lower Pragian) of the Selennyakh Ridge in the deposits of the brachiopod zone Sulcicostula tichiensis, Howellella prima (Alkhovik, Baranov, 2001).

MATERIAL

The collection of spiriferids is stored in the geological museum of the Institute of Geology of Diamonds and Precious Metals SB RAS (GM IGABM SB RAS), Yakutsk, No. 254.

SYSTEMATIC PALEONTOLOGY

① ORDER SPIRIFERIDA

① SUBORDER DELTHYRIDINA

② SUPERFAMILY DELTHYRIDOIDEA PHILLIPS, 1841

③ FAMILY DELTHYRIDIDAE PHILLIPS, 1841

3a SUBFAMILY HOWELLELLINAE JOHNSON ET HOU, 1994

④ Genus Howellella Kozlowski, 1946

⑤ Subgenus Howellella (Howellella) Kozlowski, 1946

⑤ Howellella gonensis Baranov et Nikolaev, sp. nov.

⑥ Pl. III, fig. 1–6; pl. IV, fig. 1–7 (see insert)

Species name – from Krivoy Creek, a right tributary of the Talyndzha River, on the right side of which it was found.

Holotype – GM IGABM SB RAS, Yakutsk, No. 2/254; Northeast Asia, Selennyakh Ridge, right bank of the Talyndzha River, Krivoy Creek; Lower Devonian, lower half of the Pragian Stage, Korotkinsky Regional Stage.

Description (fig. 2, 3). Shell small, oval, strongly inflated, slightly transversely elongated with maximum width and thickness near the middle or slightly shifted closer to the posterior margin. Anterior commissure sulcate. Ventral valve strongly convex with maximum thickness in the posterior half. Umbo high, incurved. Area high, triangular, concave, apsacline. Narrow sinus begins at the umbo and smoothly merges with the lateral slopes. Sometimes anteriorly it is bounded by low lateral folds. Tongue rounded, low. Dorsal valve less convex than the ventral one. Its maximum thickness is in the middle or closer to the posterior margin. Low fold smoothly merges with the lateral slopes. Surface of valves smooth or with two weakly developed folds on each side of the sinus and fold. Microsculpture represented by wide concentric growth lamellae with spines on their surface (pl. III, fig. 1–6, pl. IV, fig. 1–6).

Dimensions in mm and ratios:

Specimen No.	L	W	T	L/W	L/T
1/ 254	7.7	8.0	5.4	0.96	1.43
Holotype					
2/254	6.6	6.2	4.4	1.06	1.5
3/254	6.5	7.3	4.2	0.89	1.55
4/254	5.5	5.8	3.4	0.95	1.62

5/254	4.6	4.9	3.7	0.94	1.24
6/252	4.3	4.8	4.0	0.90	1.08
7/254	3. *5*	4.3	3.0	0.81	1.2
8/254	3.3	3.6	2.5	0.92	1.32
9/254	3.3	3.3	2.2	1.0	1.5
10/254	2.6	3.0	1.9	0.87	1.37

Internal structure (fig. 2, 3). Dental plates are thin. Teeth are tongue-shaped. Inner socket plates are low. Apical thickening is absent. Hinge process is lamellar. Crural plates are inclined to the plane of symmetry. The number of turns in the spiralia of the brachidium reaches four.

Ontogeny. Shell sizes vary within a wide range: length – 2.6–7.7 mm, width – 3.0–8.0 mm, and thickness – 1.9–5.4 mm. The shape of juvenile shells, with a length of 2.6–3.3 mm, varies from slightly transversely elongated (pl. IV, fig. 6) to isometric (pl. IV, fig. 5). The surface of their valves is smooth with fine growth plates. Sinus and fold are absent. As shells grow to a length of 3.3–3.5 mm (pl. IV, fig. 3, 4), the shell outline remains similar, but a small sinus and dorsal deflection of the anterior margin of the ventral valve appear. When the shell length reaches 4.3–4.6 mm (pl. IV, fig. 1, 2), the convexity of the valves increases, and the sinus becomes deeper. Weakly expressed folds appear in the anterior half of the valves. In adult shells, with a length of 5.5 – 7.7 mm (pl. III, fig. 1–4), the convexity of the valves reaches its maximum value, while the height of the umbo and the width of the ventral valve area significantly increase.

Comparison. Type species Howellella – H. elegans (Muir-Wood, 1925) described from the Wenlock series deposits of Gotland Island (Sweden) and characterized by very small shells with two to three ribs on each side and microornamentation represented by single rows of spines on the edges of growth plates. In the Silurian of Northeast Asia, representatives of this genus are unknown. The first representatives of the genus Howellella appeared here during the wave of Early Devonian

transgression at the base of the Lochkovian stage and are represented by two species H. labilis T. Modzalevskaya, 1994 and H. propria T. Modzalevskaya, 1994. H. gonensis sp. nov. differs from them by weakly developed folds on the anterior margin and wide growth plates, from H. prima Alekseeva, 1967 and H. pauciplicata Waite, 1956 (Alekseeva, 1967) – by small shell size, absence of apical thickening, long dental plates and fewer spiral turns, from the second species – also by crural plates that do not rest on the valve floor.

M a t e r i a l. 46 complete shells in good preservation were found in the Selennyakh Ridge, on the right bank of the Talyndzha River, along the right side of the Krivoy Creek, at the base of the Korotkinsky horizon, sample C-13 (collections of V.V. Baranov and T.S. Alkhovik, 1971–1972).

FUNDING

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CONFLICT OF INTERESTS

The authors of this work declare that they have no conflicts of interest.

REFERENCES

1. *Avdeeva V.I., Baranov V.V.* Devonian Cyrtinoidea (Brachiopoda) of Northeast Russia // Geology and Mineral Resources of Yakutia. Yakutsk. YSU Publishing House, 1995. P. 34–42.
2. *Alekseeva R.E.* Brachiopods and Stratigraphy of the Lower Devonian of the Northeast USSR. Moscow: Nauka, 1967. 144 p.
3. *Alekseeva R.E., Sidyachenko A.I., Baranov V.V., et al.* Atlas of Devonian Brachiopods of Northeast Russia. Moscow: Nauka, 1996. 227 p.

4. *Alkhovik T.S., Baranov V.V.* Stratigraphy of the Lower Devonian of Northeast Russia (northeast of Yakutia). Yakutsk: Yakutsk Branch of SB RAS Publishing House, 2001. 147 p.
5. *Baranov V.V.* Brachiopods of the family Ambocoeliidae George (order Spiriferida) from the Emsian stage of the Lower Devonian of Northeast Russia // Paleontol. Journ. 2009a. № 1. P. 54–62.
6. *Baranov V.V.* New brachiopods of the family Reticulariidae Waagen (order Spiriferida) from the Lower Devonian of northeastern Russia // Paleontol. Journ. 2009b. № 4. P. 18–22.
7. *Baranov V.V.* New taxa of spiriferids (Brachiopoda) from the Lower and Middle Devonian of northeastern Russia // Paleontol. Journ. 2014. № 3. P. 49 – 56.
8. *Baranov V.V.*, *Alkhovik T.S.* Devonian cyrtinoids (Brachiopoda) of Northeast Russia // Pacific Geol. 2004. Vol. 23. № 1. P. 69–75.
9. *Baranov V.V.*, *Alkhovik T.S.* Brachiopods of the suborder Delthyridina Ivanova (order Spiriferida) from the Lower and Middle Devonian of northeastern Russia // Paleontol. Journ. 2007. № 1. P. 37–45.
10. *Baranov V.V.*, *Blodgett R.B.* Early Devonian spiriferids (Brachiopoda) of northeastern Eurasia and North America // Otechestv. Geol. 2015. № 5. P. 75–82.
11. *Baranov V.V., Nikolaev A.I.* New taxa of spiriferids (Brachiopoda) from the Lower Devonian deposits of Northeastern Asia // Paleontol. Journ. 2024. № 1. P. 49–56.

Explanation to figures

Fig. 1. Location of findings of Howellella gonensis sp. nov. (*a*) and section (*b*) in which they were found. Legend: *1* – limestones, *2* – clayey limestones, *3* – biostrome, *4* – sampling point.

Fig. 2. Howellella gonensis sp. nov., serial transverse sections of the shell, paratype GM IGABM SB RAS, № 3/254; Northeastern Asia, Selennyakh Ridge, right bank of the Talyndzha River, Krivoy

Creek, sample C–13; Lower Devonian, basal layers of the Pragian Stage, Korotkinsky Regional Stage. Scale bar equals 2.5 mm.

Fig. 3. Howellella gonensis sp. nov., scanned images of sequential transverse sections of the shell, paratype GM IGABM SB RAS, No. 3/254; Northeast Asia, Selennyakh Ridge, right bank of Talyndzha River, Krivoy Creek, sample C–13; Lower Devonian, basal layers of the Pragian Stage, Korotkinsky Regional Stage. Scale bar equals 1 mm. Legend: *zb* – teeth, *zp* – dental plates, *zy* – dental sockets, *kp* – crural plates, *sp* – spiralia.

Explanation to Plate III

For figs. 1–4: a – ventral valve, b – dorsal valve, c – lateral view, d – anterior view, e – posterior view.

Figs. 1–6. Howellella gonensis sp. nov.: 1 – paratype GM IGABM SB RAS, No. 1/254; 2 – holotype GM IGABM SB RAS, No. 2/254; 3 – paratype GM IGABM SB RAS, No. 3/254 ; 4 – paratype GM IGABM SB RAS, No. 4/254; 5, 6 – microsculpture: 5 – paratype GM IGABM SB RAS, No. 1/254, 6 – paratype GM IGABM SB RAS, No. 2/254; Northeast Asia, Selennyakh Ridge, right bank of Talyndzha River, Krivoy Creek, sample C–13; Lower Devonian, basal layers of the Pragian Stage, Korotkinsky Regional Stage. Scale bar equals 5 mm.

Explanation to Plate IV

For figs. 1– 6: a – ventral valve, b – dorsal valve, c – lateral view, d – anterior view, e – posterior view.

Figs. 1–7. Howellella gonensis sp. nov.: 1 – paratype GM IGABM SB RAS, No. 5/254 ; 2 – paratype GM IGABM SB RAS, No. 6/254; 3 – paratype GM IGABM SB RAS, No. 7/254; 4 – paratype GM IGABM SB RAS, No. 8/254; 5 – paratype GM IGABM SB RAS, No. 9/254; 6 – paratype GM IGABM SB RAS, No. 10/254; 7 – paratype GM IGABM SB RAS, No. 6/254, microsculpture;

Northeast Asia, Selennyakh Ridge, right bank of Talyndzha River, Krivoy Creek, sample C–13; Lower Devonian, basal layers of the Pragian Stage, Korotkinsky Regional Stage. Scale bar equals 5 mm.

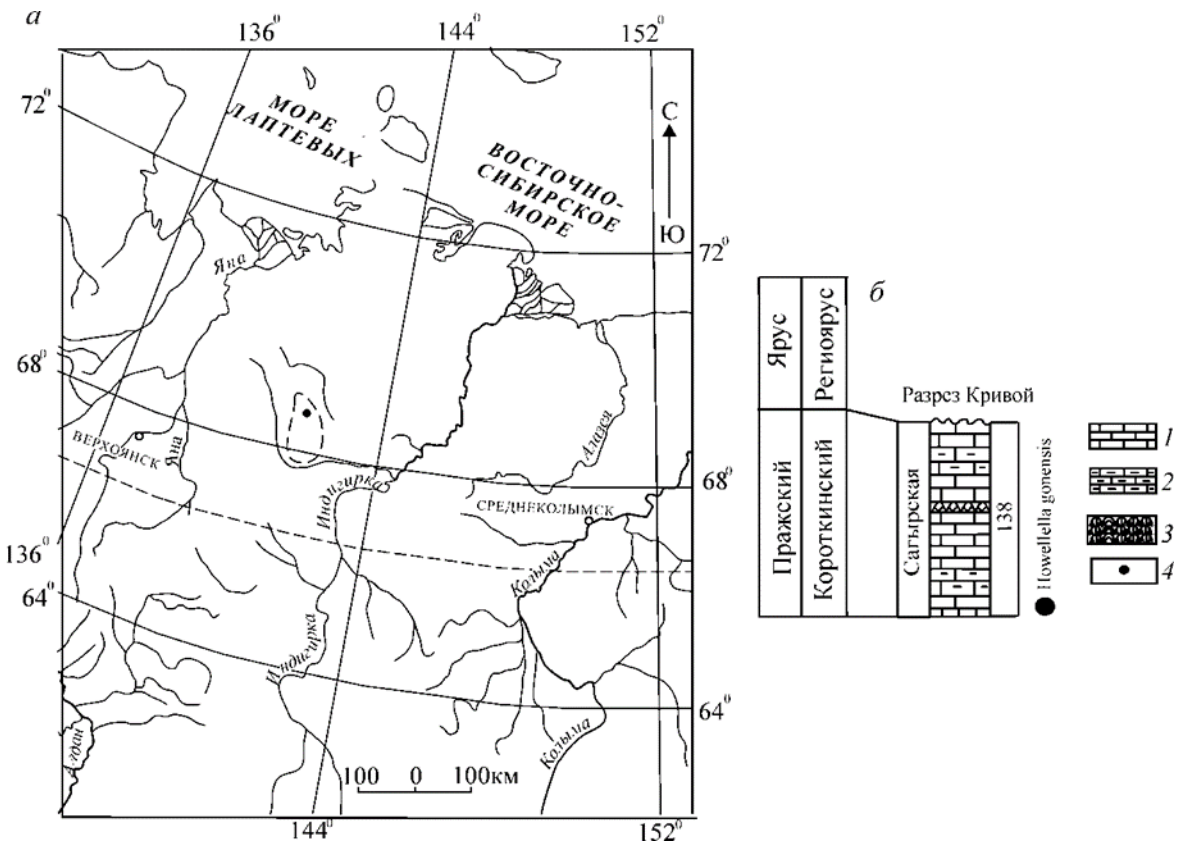


Fig. 1

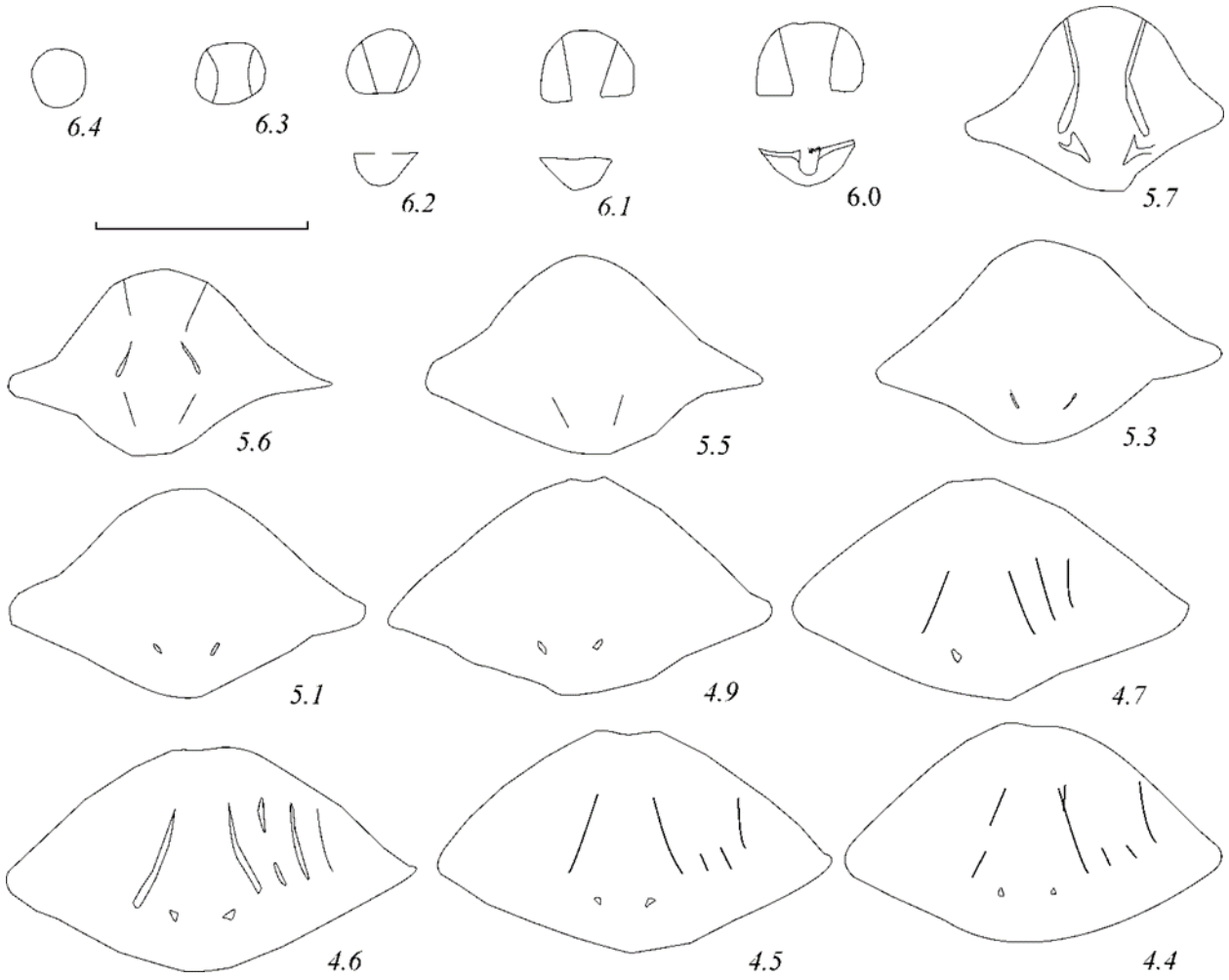
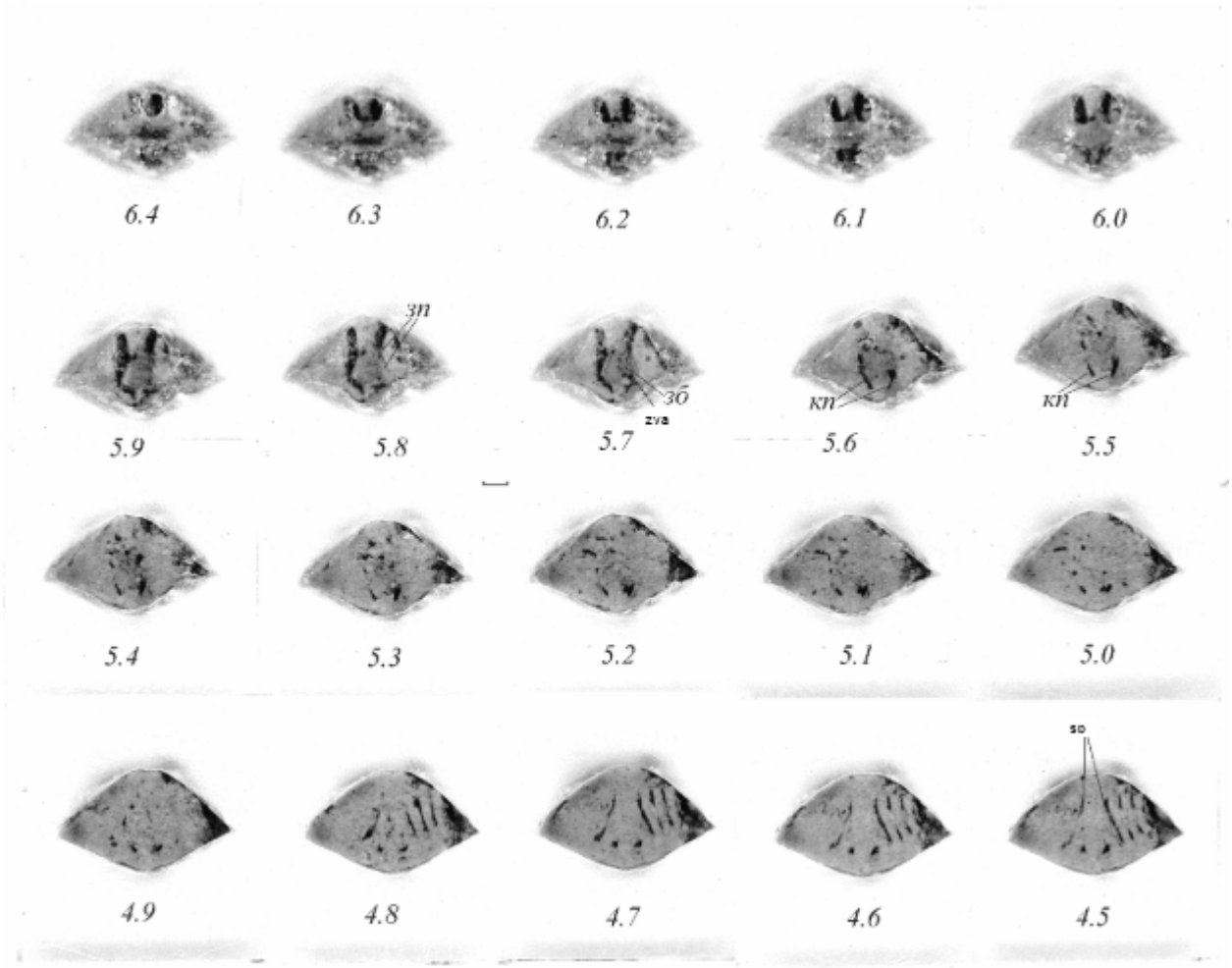


Fig. 2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6.3
6.2
6.1
6.0
зп
зб
zva
5.9
5.8
5.7
кп
5.6
кп
5.5
5.4
5.3
5.2
5.1
5.0
sb
4.9
4.8
4.7
4.6
4.5

Fig. 3

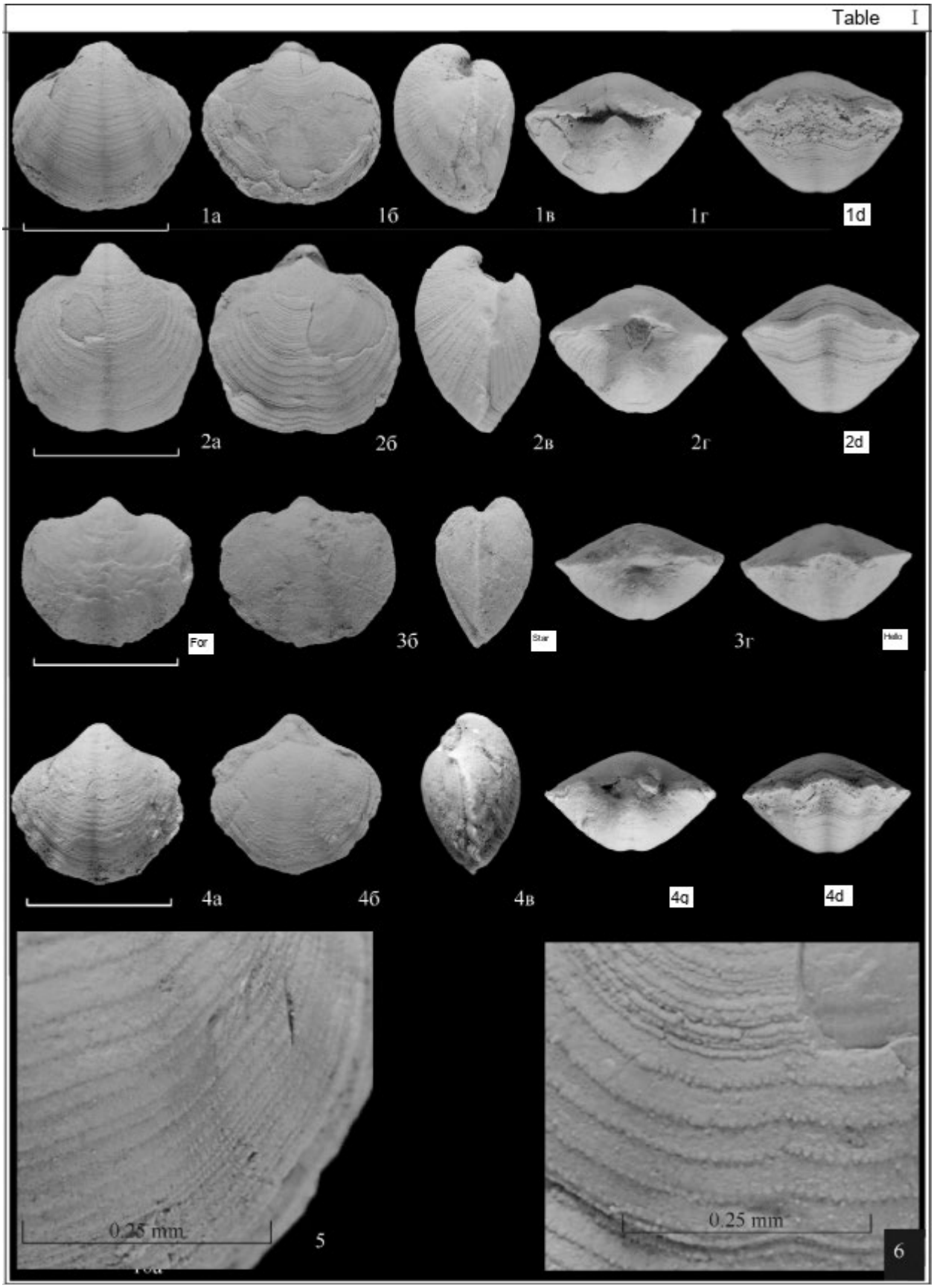
Table I
1a
1б
1в
1г
1d
2a
2б
2в
2г
2d
For
3б
Star
3г
Hello
4a
4б
4в
4q
4d
0.25 mm
5
0.25 mm
6

Plate IV

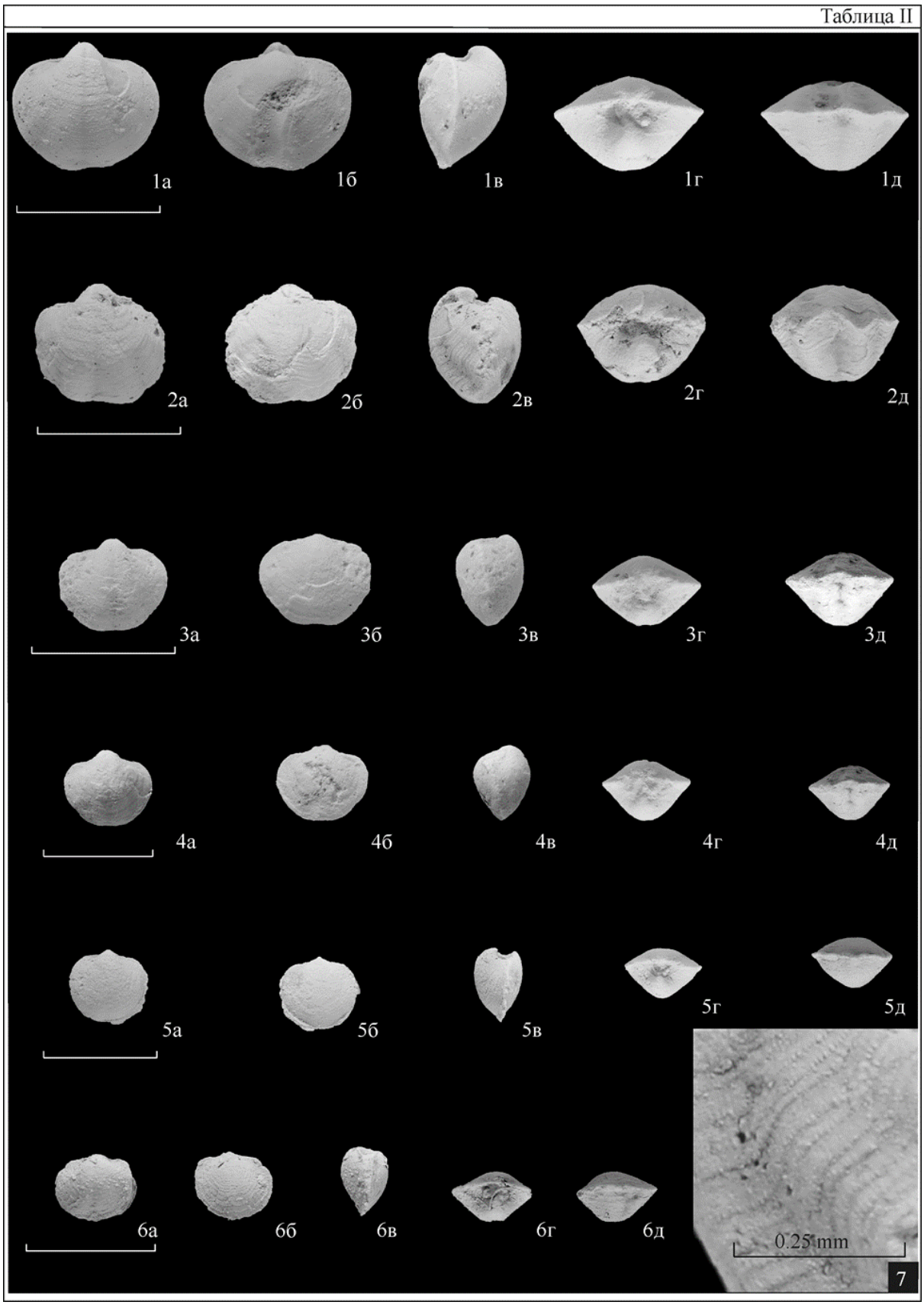
Таблица II
1а
1б
1в
1г
1д
2а
2б
2в
2г
2д
3а
3б
3в
3г
3д
4а
4б
4в
4г
4д
5а
5б
5в
5г
5д
6а
6б
6в
6г
6д
0.25 mm
7