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Rokopella brummeri sp. nov., a new monoplacophoran species from the Mid-Atlantic Ridge in the northern Atlantic Ocean (Monoplacophora, Neopilinidae)

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A new monoplacophoran species was collected in the northern Atlantic Ocean, east of the Mid-Atlantic Ridge at a depth of 2,162 m. It is tentatively placed in *Rokopella*, and named *R. brummeri*. The species resembles *R. oligotropha* (Rokop, 1972), but has a much finer and predominantly striated sculpture. The description is based on shell morphology only.

Key-words: Monoplacophora, Neopilinidae, *Rokopella*, northern Atlantic Ocean, bathyal.

INTRODUCTION

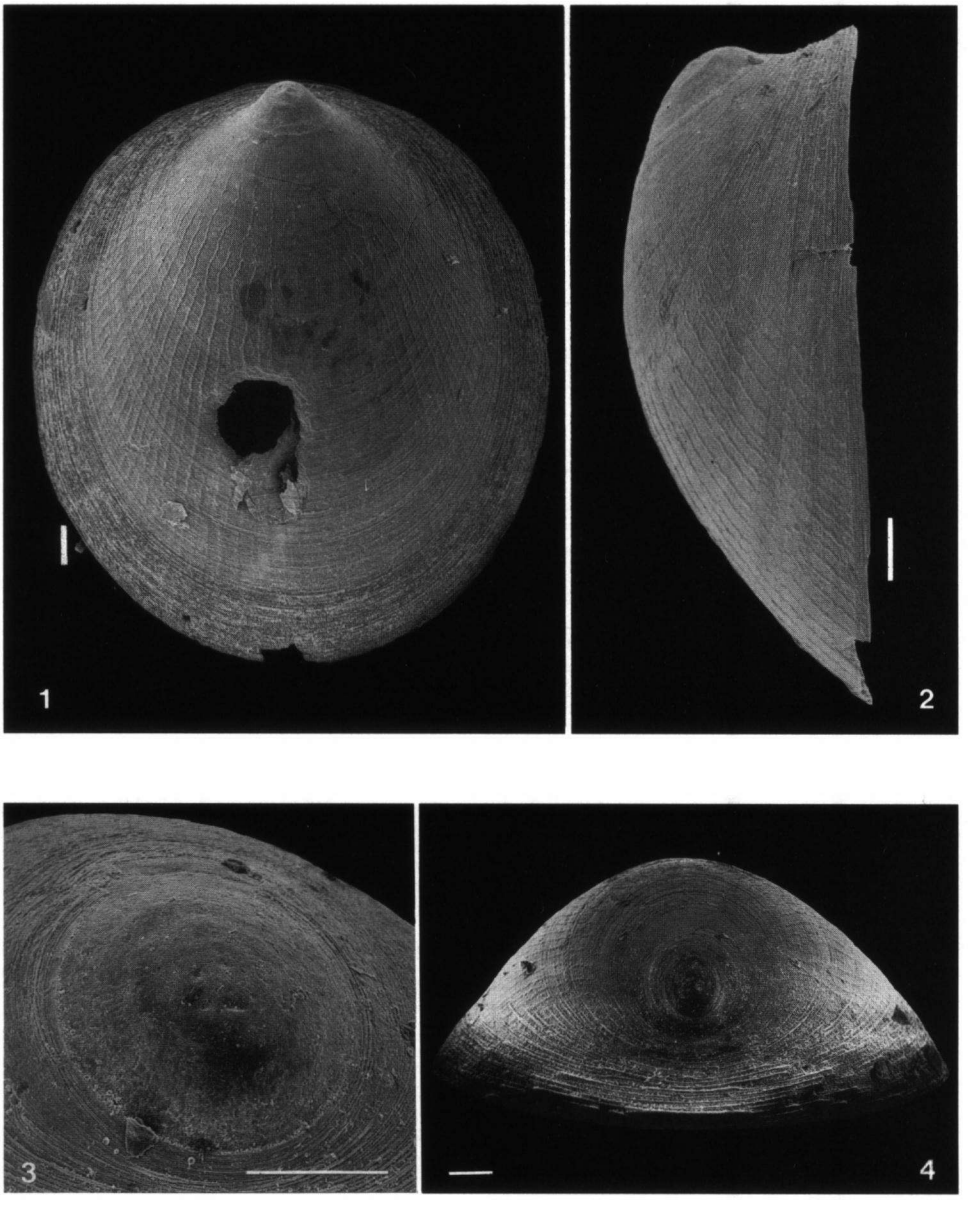
For a better understanding of the ocean's $CaCO_3$-cycle, the precipitation and dissolution processes, from the productive upper ocean down to the sediment, are studied by the Earth Sciences Department of the Free University of Amsterdam (VU). For this purpose, sediment trap samples were taken during APNAP-II and JGOFS-Legs I-IV expeditions. Dr. G. J. A. Brummer, participant of these expeditions, selected a box core sample, which was analysed with regard to the pteropods by Mr. A. W. Janssen (NNM). The remaining mollusks in this sample appeared to be gastropods and a single monoplacophoran species, which is here described as new to science.

The sample was collected on July 15, 1990 during the JGOFS-Leg IV expedition. It is indicated as T90-10B and contains the complete section of a box core with a sediment depth of 43 cm, containing pteropod-rich layers throughout. The locality is situated on the eastern slope of the Mid-Atlantic Ridge, in the southern part of the North-Atlantic Gulf Stream. The sample was taken at a depth of 2,162 m.

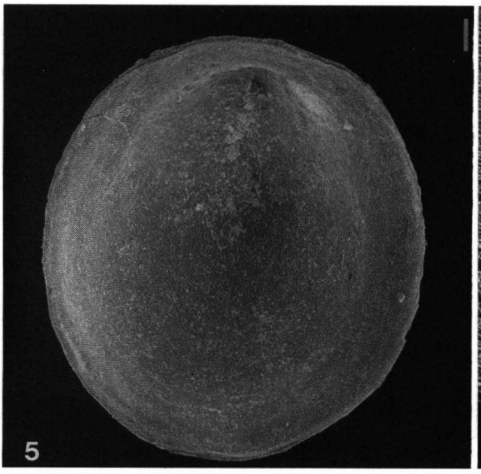
Rokopella brummeri is the fifth known and described Monoplacophora species from the North Atlantic. The other records are from: the Azores, 1,385 m [*Rokopella zografi* (Dautzenberg & Fischer, 1896)]; the Virgin Islands, Caribbean, 360-540 m [*Rokopella goesi* (Warén, 1988)]; off southeastern Iceland, 900-926 m [*Micropilina minuta* Warén, 1989]; from the Galicia Bank off NW. Spain, 985-1,000 m [*Laevipilina rolani* Warén & Bouchet, 1990]; and recently from A Quiniela, NW. Spain, 840 m [*Laevipilina rolani*] (Urgorri & Troncoso, 1992).

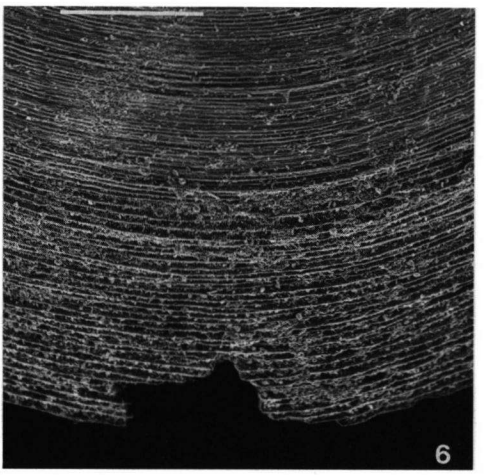
SYSTEMATICS

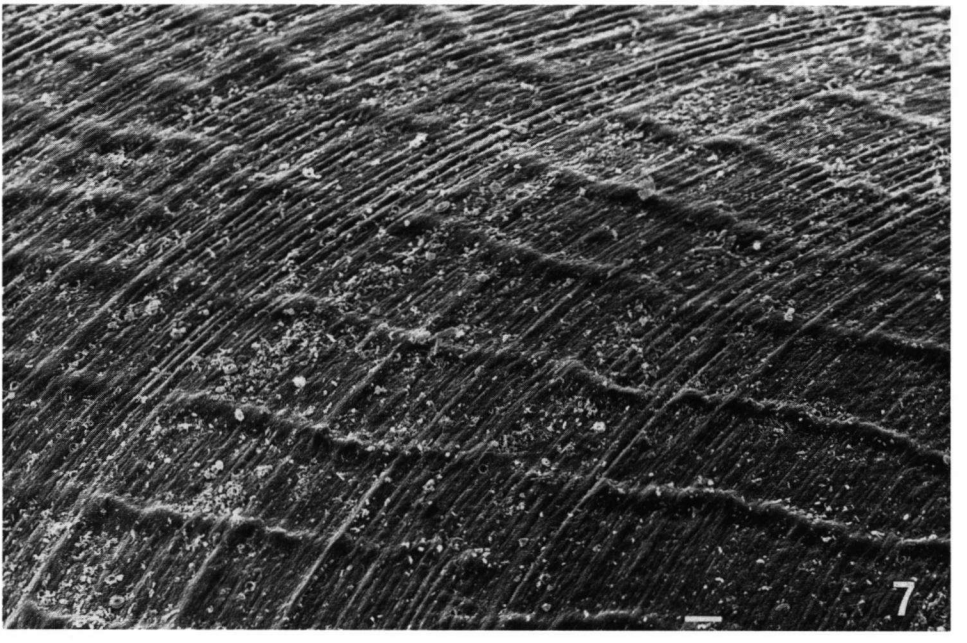
Because of the still fragmentary knowledge, with very little information about the anatomical differences within this class (Wingstrand, 1985), the more conservative approach of Warén (1989: 2, 3), with five genera in a single family, will be followed here. Only a single family of Monoplacophora might not be sufficient to reflect the evolutionary differentiation within this class. However, the splitting by Starobogatov & Moskalev (1987), classifying eleven living species, in six families, that are grouped into three superfamilies, seems somewhat premature.



Figs. 1-4. *Rokopella brummeri*. 1. holotype, dorsal view, length 1.45 mm, width 1.25 mm; 2. paratype 2, lateral view, length 1.08 mm, width 0.90 mm; 3. paratype 2, anterior view of protoconch; 4. holotype, anterior view. All scale bars are 0.1 mm







Figs. 5-7. *Rokopella brummeri.* 5. paratype 1, ventral view, length 1.38 mm, width 1.20 mm (scale bar = 0.1 mm); 6. holotype, posterior detail of marginal zone with fractured edge (scale bar = 0.1 mm); 7. holotype, laterodorsal detail of sculpture near the mid-point (scale bar = 0.01 mm).

MONOPLACOPHORA Wenz, 1940

NEOPILINIDAE Knight & Yochelson, 1958

Rokopella Starobogatov & Moskalev, 1987

Type species (by original designation): *Neopilina oligotropha* Rokop, 1972.

Original description (translated from Russian): Shell with elliptical basis, and apically hardly or not extending beyond the anterior margin; sculpture reticulate; decollated apex projecting, almost like a hemisphere. — Recent.

According to Warén (1989: 2, 3) *Neopilina veleronis* Menzies & Layton, 1962, *Neopilina oligotropha* Rokop, 1972, *Acmaea zografi* Dautzenberg & Fischer, 1896, and *Neopilina goesi* Warén, 1988, form a fairly uniform group that deserves generic status. This genus, for which the name *Rokopella* Starobogatov & Moskalev, 1987, is available, is partly based on shell morphology, since *R. zografi* as well as *R. goesi* are only known from empty shells. The new species can be classified here, because of its resemblance to especially the type species of *Rokopella*. Its shell surface is sculptured with fine radiating threads in contrast to that in *Laevipilina* McLean, 1979, and it lacks the hexagonal prismatic aragonite shell structure found in that genus (McLean, 1979: fig. 11; Bouchet & Warén, 1990: figs. 4, 5). It has neither muscle scars inside, nor pits all over the shell surface, described as typical for *Micropilina* Warén, 1989, by Warén (1989: 5). The inner shell surface consists of imbricated nacreous lamellae (fig. 9), in which it resembles *Rokopella zografi* (see Cesari et al., 1987: pl. 3 fig. 5)

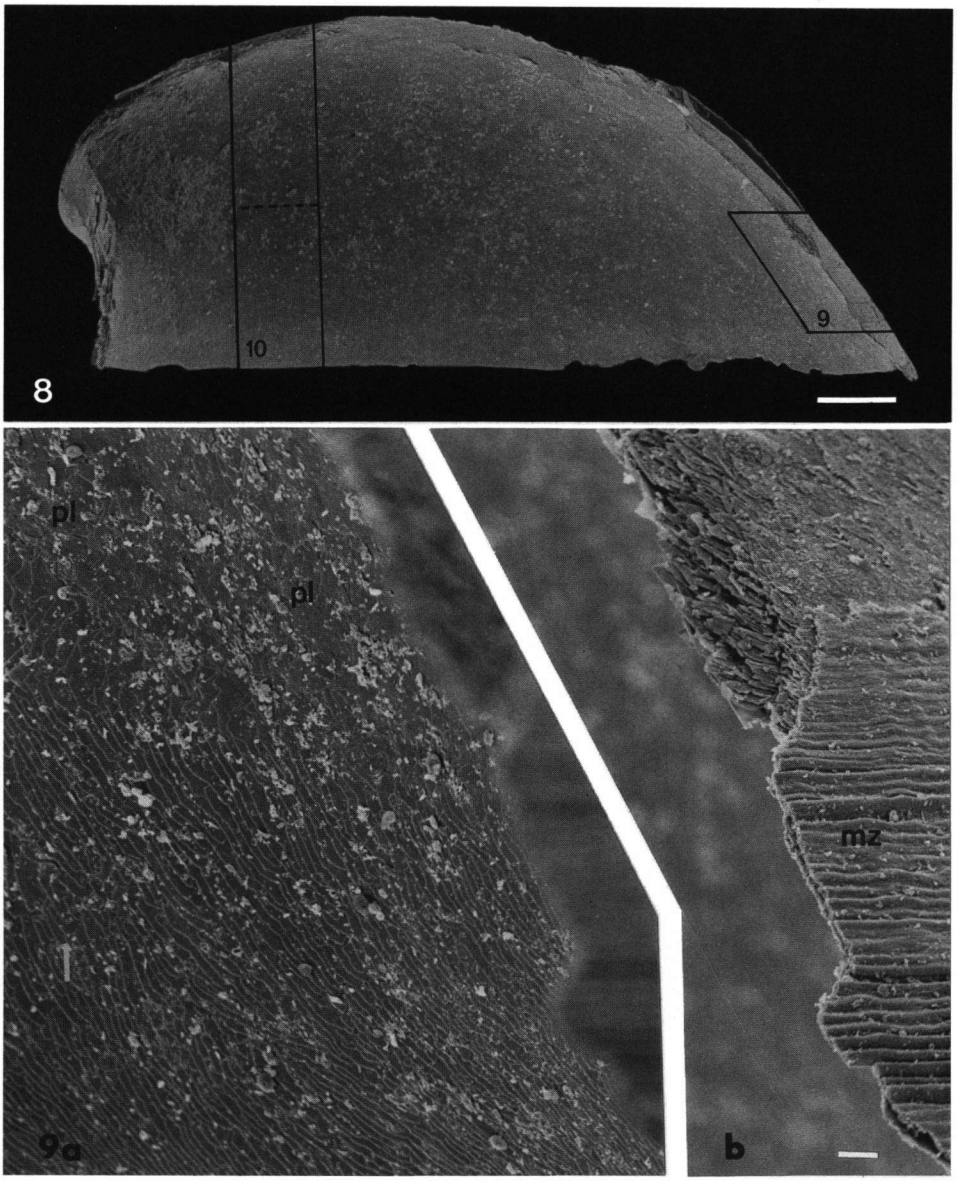
Rokopella brummeri spec. nov.
(figs. 1-10)

Material. — Holotype: National Museum of Natural History, Leiden (= NNM, formerly RMNH) no. 56742. Paratypes: NNM no. 56743/6.

Type locality. — Atlantic Ocean, east of the Mid-Atlantic Ridge, 45° 21.3′ N, 27° 9.1′ W; 2,162 m depth; upper 43 cms of bottom sediment, with pteropod-rich layers throughout.

Description. — Shell very small (largest specimen known with 1.45 mm long basis), thin, slightly opaque, iridescent, its apical area transparent. Shell basis elliptical in outline, posterior and anterior margins evenly rounded. Basis with a length 1.15-1.20 times that of its width and 2.4-2.9 times that of the shell height. The maximal shell-height is reached anterior to the mid-point. Apex discoidal, smooth, positioned at or very close to, the anterior margin, not to slightly overhanging (as in paratype 6, fig. 8). The apical area is demarcated by an irregular, scar-like depression; it is 0.24 x 0.21 mm in diameter and provided centrally with three or four irregular roundish indentations.

Outer surface of the shell with fine radiating threads, starting at or somewhat behind the border of the apical area, becoming increasingly more prominent initially and slightly more obsolete again towards the margin. The marginal zone of the shell is clearly delimited laterally and posteriorly; its upper border corresponds to the location of the pallial line inside. No threads are present on the anterior side of the shell. The threads are most prominent on the central dorsal and lateral parts (fig.7); they number approximately 20 around the apex, increasing to more than 50 peripherally, because of additional threads that start further away from the apical area, resulting in interspaces



Figs. 8-9. *Rokopella brummeri*, paratype 6, broken along the median. 8. lateral view, shell length 1.11 mm, indicated are the details figured in figs. 9 and 10 (scale bar = 0.1 mm); 9. view along the broken shell edge, seen more from anterior, as in fig. 8, showing the upper part of the marginal zone (mz) and the bordering pallial line (pl), focussed on the inside (9a) and the outside (9b) respectively, (scale bar = 0.01 mm).

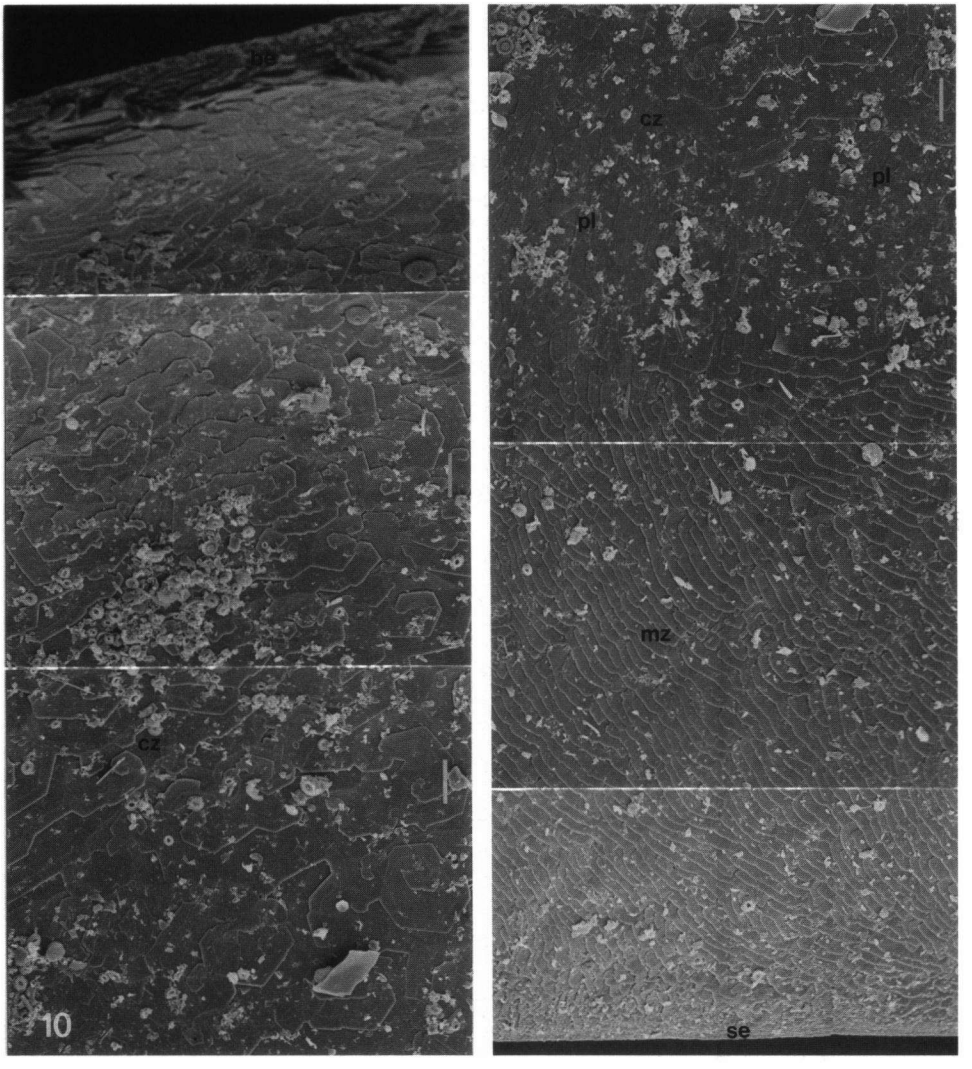


Fig. 10. *Rokopella brummeri*, paratype 6, detailed section of the interior as indicated in fig. 8 (left row is the upper part), showing: the broken shell edge (be) with numerous large nacreous lamellae; the central zone (cz) with widely spaced nacrous lamellae; the almost smooth pallial line (pl), only showing some very flat, vertically arranged lamellae; the marginal zone (mz), with dense imbricate lamellae; and the shell edge (se) at the basis. Width of section approximately 0.1 mm.

of about equal width. Very fine growth lines are present around the apex; these become somewhat more prominent on the central area, and are very prominent on the marginal zone and anteriorly, below the apical area. They are more narrowly spaced on the marginal zone. Periostracum thin, shiny and yellowish.

Inner surface of the shell very smooth, nacreous, with widely spaced lamellae in and around the apical area. Completely smooth on the pallial line and from there on with more and increasingly close-set imbricated lamellae towards the margin. Nacreous layer relatively thick. No muscle scars are visible.

No soft parts were found. The shells are slightly recrystallized, but certainly of recent origin.

Dimensions (in mm). —

	length	width	L/W	height	L/H	
holotype	1.45	1.25	1.16	0.60	2.42	
paratype 1	1.38	1.20	1.15	0.48	2.88	
paratype 2	1.08	0.90	1.20	0.38	2.84	
paratype 3	1.10	0.95	1.16	0.38	2.89	
paratype 4	1.30	1.03	1.27	0.40	-	apex broken
paratype 5	-	0.95	-	0.36	-	posteriorly damaged
paratype 6	1.11	-	-	0.46	-	laterally damaged (only one half left)

Derivatio nominis. — The species is named in honour of Dr. G. J. Brummer, participant of the expedition.

Differential diagnosis. — *R. brummeri* most closely resembles the type species of *Rokopella*, *R. oligotropha*. Both species are characterized by very small shells, with an elliptical basal outline. The sculpture of *R. oligotropha* is very different, however. It has much more narrowly spaced radiating threads and a regular concentric sculpture, that is about equal in prominence, which gives the shell a reticulate appearance. The apical indentations resemble the pits described for *Micropilina minuta* Warén, 1989, by Warén, (1989: 5, fig. 2), but they are more irregular, larger and shallower.

Distribution. — Known only from the type locality.

ACKNOWLEDGEMENTS

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