

Chapter 4

TAXONOMIC NOTES AND ILLUSTRATIONS OF BENTHIC FORAMINIFERA FROM COLD-WATER CORAL ECOSYSTEMS

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SYSTEMATIC DESCRIPTION OF BENTHIC AND PLANKTONIC FORAMINIFERA

The benthic foraminiferal taxonomy presented in the Atlas is primarily based on the criteria and the rules formulated by the “International Commission on Zoological Nomenclature” and reported in the “International Code of Zoological Nomenclature (ICZN)” (Ride and others, 1999). The code fixes the criteria of selection and naming of holotypes of each known taxon. Holotypes illustrated in the Ellis and Messina catalogues (Ellis and Messina, 1940 and later) are used as reference for comparison of each illustrated specimen. At genus level the recent foraminiferal taxonomy is based on Loeblich and Tappan (1987). The taxonomic concepts from the ICZN, Ellis and Messina (1940 and supplements) as well as Loeblich and Tappan (1987) and the Stratigraphic Atlas of foraminifera from the Norwegian Continental Shelf (Kihle and Løfaldli, 1975), are applied to foraminiferal species reported in Plates 1 to 37. Note that Kihle and Løfaldli (1975) contain the photographic documentation of the species cited in the synonymies, but no page, plate or figure numbers. In case of discrepancies with the cited publications a note is added in the remarks. When the original illustration and/or description could be found the reference to the holotype and/or first description of each species is indicated as “in” or “fide” referring to the most important publication where it is found (e.g., the Ellis and Messina

catalogue). Poorly documented species are generally illustrated in the plates. The list of all species is reported in the range charts in the Appendices.

In the paragraph “Remarks” the occurrence of each benthic species in the different sedimentary facies is reported, which characterizes the cold-water coral ecosystems, together with some taxonomical and ecological notes (not included in Table 3.1, Chapter 3), when needed. Since sedimentary facies are strictly related to environmental parameters and water masses as described in detail in Chapter 3, we omit their description and refer only to facies names in the following systematic description and list of synonyms.

Order FORAMINIFERIDA Eichwald, 1830

Suborder TEXTULARIINA Delange and Hérouard, 1896

Superfamily ASTRORHIZACEA Brady, 1881

Family ASTRORHIZIDAE Brady, 1881

Subfamily ASTRORHIZINAE Brady, 1881

Genus *Astrorhiza* Sandahl, 1858

Type species: *Astrorhiza limnicola* Sandahl, 1858, p. 301.

Astrorhiza sp. cf. *A. catenata* Norman, 1877

Pl. 1, fig. 1

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Astrorhiza catenata Norman in Norman, 1877, p. 213.

Astrorhiza catenata Norman in Brady, 1879, p. 42, pl. 4, figs. 12-13.

Aschemonella catenata (Norman) in Jones, 1994, p. 35, pl. 27, fig. 3; pl. 27A, fig. 3.

Remarks. This form is found in samples retrieved in the sandy pebbly facies along the Norwegian margin and is generally very rare. The documented specimen consists of a single chamber with tubes at the opposite sides. The agglutinated grains dominantly consist of sand and a variety of siliceous sponge spicules.

Family BATHYSIPHONIDAE Avnimelech, 1952

Genus *Bathysiphon* Sars, 1872

Type species: *Bathysiphon filiformis* Sars, 1872, p. 251.

Bathysiphon filiformis Sars, 1872

Pl. 1, fig. 2

Bathysiphon filiformis Sars in Sars, 1872, p. 251, pl. 6, fig. 4.

Bathysiphon filiformis Sars in Brady, 1884, p. 248, pl. 26, figs. 15, 17-20.

Bathysiphon filiformis Sars in Cushman, 1921, p. 41, pl. 2, fig. 1.

Bathysiphon filiformis Sars in Gooday, 1988, p. 98, text-fig. 1.

Bathysiphon filiformis Sars in Jones, 1994, p. 34, pl. 26, figs. 15, 17-20.

Remarks. This species is very rare and present in samples from the mud facies along the Norwegian margin only. The documented specimen displays very fine agglutination. Clearly visible are the thick horizontal lines perpendicular to the direction of growth that are typical of this species.

Family RHABDAMMINIDAE Brady, 1884

Subfamily RHABDAMMININAE Brady, 1884

Genus *Rhabdammina* Sars, 1869

Type species: *Rhabdammina abyssorum* Sars in Carpenter, 1869, p. 61.

Rhabdammina abyssorum Sars, 1869

Pl. 1, fig. 3

Rhabdammina abyssorum Sars in Carpenter, 1869, p. 61.

Rhabdammina abyssorum Sars in Brady, 1884, p. 266, pl. 21, figs. 1-8, 10-13.

Rhabdammina abyssorum Sars in Höglund, 1947, p. 25, pl. 1, fig. 2.

Rhabdammina abyssorum Sars in Jones, 1994, p. 32, pl. 21, figs. 1-8, 10-13.

Remarks. This rare species is found only in the mud facies from the Norwegian margin, it displays an irregularly agglutinated wall texture composed of sand grains and sponge spicules. It is usually tri- or quadri-radiate. It is usually very fragile and the documented specimens broke during SEM operations. The two fragments are represented in Plate 1, figs. 3a (the elongated part) and 3b the tri-radiate portion.

Family HIPPOCREPINELLIDAE Loeblich and Tappan, 1984

Genus *Hippocrepinella* Heron-Allen and Earland, 1932

Type species: *Hippocrepinella hirudinea* Heron-Allen and Earland, 1932, p. 71.

Hippocrepinella hirudinea Heron-Allen and Earland, 1932

Pl. 1, fig. 4

Hippocrepinella hirudinea Heron-Allen and Earland in Heron-Allen and Earland, 1932, p. 258, pl. 1, figs. 7-15.

Hippocrepinella hirudinea Heron-Allen and Earland in Majewski and others, 2005, figs. 4.1-3.

Remarks. This species is found only in the mud facies from the Norwegian margin where it is rare. The wall texture is finely agglutinated. The documented specimens closely resemble the holotype.

Family PSAMMOSPHAERIDAE Haeckel, 1894

Subfamily PSAMMOSPHAERINAE Haeckel, 1894

Genus *Psammosphaera* Schulze, 1875

Type species: *Psammosphaera fusca* Schulze, 1875, p. 113.

Psammosphaera fusca Schulze, 1875

Pl. 5, fig. 5

Psammosphaera fusca Schulze in Schulze, 1875, p. 113, pl. 2, fig. 8.

Psammosphaera fusca Schulze in Brady, 1884, p. 249, pl. 18, figs. 1-8.

Psammosphaera fusca Schulze in Höglund, 1947, p. 46, pl. 4, figs. 9-14.

Psammosphaera fusca Schulze in Hofker, 1972, p. 32, pl. 7, figs. 1-3.

Psammosphaera fusca Schulze in Schröder, 1986, p. 36, pl. 10, fig. 1.

Psammosphaera fusca Schulze in Jones, 1994, p. 31, pl. 18, figs. 1-8.

Psammosphaera fusca Schulze, in Milker and Schmiedl, 2012, p. 26, figs. 9. 2-3

Psammosphaera fusca Schulze in Hobourn and other, 2013, p. 428-429, figs. 1-2.

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Psammosphaera fusca Schulze var. *testacea* Flint, 1899

Pl. 1, fig. 6

Psammosphaera fusca var. *testacea* Flint in Flint, 1899, p. 268, pl. 8, fig. 2.

Psammosphaera testacea Flint in Cushman 1918, p. 38, Pl. 15, figs. 1-3.

Remarks. This species is extremely rare in the studied samples and it is present only in the mud facies from the Norwegian margin. The agglutinated wall texture of the documented specimen consists of sandy grains, sponge spicules and fragments of small benthic and planktonic foraminifers.

Family SACCAMMINIDAE Brady, 1884

Subfamily SACCAMMINIAE Brady, 1884

Genus *Lagenammmina* Rhumbler, 1911

Type species: *Lagenammmina laguncula* Rhumbler, 1911, p. 92, 111.

Lagenammmina fusiformis (Williamson, 1858)

Pl. 1, fig. 7

Protonina fusiformis Williamson in Williamson, 1858, p. 1, pl. 1, fig. 1.

Reophax fusiformis (Williamson) in Brady, 1884, p. 290, pl. 30, figs. 7-11.

Reophax fusiformis (Williamson) in Schröder, 1986, p. 44, pl. 15, fig. 9.

Lagenammmina fusiformis (Williamson) in Cimerman and Langer, 1991, p. 15, pl. 1, figs. 4-5.

Reophax fusiformis (Williamson) in Jones, 1994, p. 37, pl. 30, figs. 7-11.

Remarks. This form is found only in samples from the mud facies from the Norwegian margin, and it is always very rare. The wall texture is coarsely agglutinated. This species may present a large morphological variability. The holotype of *L. fusiformis* does not display a neck, however, the illustrated specimen seems to have a very short neck. *Lagenammmina atlantica* (Cushman) differs from *L. fusiformis* because of its very elongated neck.

Lagenammmina arenulata (Skinner, 1961)

Pl. 1, fig. 8

Reophax difflugiformis Brady var. *arenulata* Skinner in Skinner, 1961, p. 1239, pl. 30, fig. 5.

Lagenammmina arenulata (Skinner) in Jones, 1994, p. 37, pl. 30, fig. 5.

Remarks. This species has been found only in samples from the mud facies of the Norwegian margin. It differs from *L. atlantica* (Cushman) in lacking the distinctive neck.

Genus *Saccammina* Carpenter, 1869

Type species: *Saccammina sphaerica* Brady, 1871, p. 183.

Saccammina sphaerica M. Sars, 1872

Pl. 1, fig. 9

Saccammina sphaerica M. Sars in G. O. Sars, 1872, p. 250.

Saccammina sphaerica M. Sars in Brady, 1884, p. 253, pl. 18, figs. 11-15, 17.

Saccammina sphaerica M. Sars in Cushman, 1918, p. 44, pl. 16, figs. 4-5.

Saccammina sphaerica M. Sars in Höglund, 1947, p. 50, pl. 4, figs. 15-17.

Saccammina sphaerica M. Sars in Loeblich and Tappan, 1964, p. C196, fig. 112.1.

Saccammina sphaerica M. Sars in Hofker, 1972, p. 44, pl. 12, figs. 1-3.

Saccammina sphaerica M. Sars in Zheng, 1988, p. 33, pl. 4, fig. 12.

Saccammina sphaerica M. Sars in Jones, 1994, p. 31, pl. 18, figs. 11-15, 17.

Remarks. This species is found off-mound in the Porcupine Seabight and Rockall Bank regions; in the living coral and in the mud and pebbly sand facies along the Norwegian margin, however, it is always very rare. The wall texture is finely agglutinated.

Superfamily HIPPOCREPINACEA Rhumbler, 1895

Family HIPPOCREPINIDAE Rhumbler, 1895

Subfamily HYPERAMMININAE Eimer and Fickert, 1899

Genus *Hyperammmina* Brady, 1878

Type species: *Hyperammmina elongata* Brady, 1878, p. 433.

Hyperammmina elongata Brady, 1878

Pl. 1, fig. 10

Hyperammmina elongata Brady in Brady, 1878, p. 433, pl. 20, fig. 2.

Hyperammmina elongata Brady in Brady, 1884, p. 257, pl. 23, fig. 8.

Hyperammmina elongata Brady in Hofker, 1972, p. 45, pl. 12, figs. 4-7.

Hyperammmina elongata Brady in Schröder, 1986, p. 34, pl. 6, fig. 2.

Hyperammmina elongata Brady in Zheng, 1988, p. 28, pl. 4, figs. 4-5.

Hyperammmina elongata Brady in Jones, 1994, p. 33, pl. 23, fig. 8.

Hyperammmina elongata Brady in Holbourn and other, 2013, p. 310-311, figs. 1-2.

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Remarks. This species is very rare and present only in a few samples from the pebbly sand facies of the Norwegian margin. The illustrated specimen shows a sub-globular base with a larger diameter with respect to the tubular extension. It displays a rounded and large aperture. The wall texture is coarsely agglutinated.

Genus *Saccorhiza* Eimer and Fickert, 1899

Type species: *Hyperammina ramosa* Brady, 1879, p. 33.

Saccorhiza ramosa (Brady, 1879)

Pl. 1, fig. 11

Hyperammina ramosa Brady in Brady, 1879, p. 33, pl. 3, figs. 14-15.

Saccorhiza ramosa (Brady) in Schröder, 1986, p. 35, pl. 7, fig. 1.

Saccorhiza ramosa (Brady) in Loeblich and Tappan, 1987, p. 43, pl. 32, figs. 10-15.

Saccorhiza ramosa (Brady) in Cimerman and Langer, 1991, p. 16, pl. 2, figs. 4-5.

Saccorhiza ramosa (Brady) in Jones, 1994, p. 33, pl. 23, figs. 15-19.

Saccorhiza ramosa (Brady) in Hobourn and other, 2013, p. 502-503, fig.1.

Remarks. This species is very rare in the off-mound sediments from the Porcupine Seabight and Rockall Bank region. Along the Norwegian margin it may be very abundant in the mud facies and pebbly sand facies from the Røst Reef. The documented specimen broke into two pieces during SEM operations: the subglobular base (Plate 1, fig. 11a) and the tubular extension bearing a rounded and large aperture (Plate 1, fig. 11b). The agglutinated wall consists of almost exclusively a variety of siliceous sponge spicules. It differs from *H. elongata* in having the diameter of the sub-globular base equidimensional with the tubular extension. This species may develop several ramifications.

Family AMMODISCIDAE Reuss, 1862

Subfamily AMMODISCINAE Reuss, 1862

Genus *Ammodiscus* Reuss, 1862

Type species: *Ammodiscus infimus* Bornemann, 1874, p. 725.

Ammodiscus incertus (d'Orbigny, 1839)

Pl. 2, fig. 4

Operculina incerta d'Orbigny in d'Orbigny, 1839, p. 49, pl. 6, figs. 16-17.

Ammodiscus incertus (d'Orbigny) in Brady, 1884, p. 330, pl. 38, figs. 1-3.

Ammodiscus incertus (d'Orbigny) in Cushman, 1910, p. 73, figs. 95-96.

Ammodiscus incertus (d'Orbigny) in Schröder, 1986, p. 39, pl. 10, fig. 10.

Ammodiscus anguillae Höglund in Jones, 1994, p. 43, pl. 38, figs. 1, 3.

Remarks. This species is very rare in the samples from the coral rubble facies from the Norwegian margin. The wall texture is finely agglutinated. The illustrated specimen shows an elliptical and irregular profile, possibly due to post-mortem deformation.

Subfamily TOLYPAMMININAE Cushman, 1928

Genus *Ammolagena* Eimer and Fickert, 1899

Type species: *Trochammina irregularis* d'Orbigny var. *clavata* Jones and Parker, 1860, p. 304.

Ammolagena clavata (Jones and Parker, 1860)

Pl. 2, fig. 7

Trochammina irregularis d'Orbigny var. *clavata* Jones and Parker in Jones and Parker, 1860, p. 304.

Webbina clavata (Jones and Parker) in Brady, 1884, p. 349, pl. 41, figs. 12-16.

Ammolagena clavata (Jones and Parker) in Cushman, 1921, p. 61, pl. 6, figs. 1-4; pl. 10, figs. 3-4.

Ammolagena clavata (Jones and Parker) in Saidova, 1961, p. 24, pl. 7, fig. 32.

Ammolagena clavata (Jones and Parker) in Schröder, 1986, p. 40, pl. 11, figs. 5-6.

Ammolagena clavata (Jones and Parker) in Jones, 1994, p. 46, pl. 41, figs. 12-16.

Ammolagena clavata (Jones and Parker) in Abu-Zied and others, 2008, p. 51, pl. 1, fig. 1.

Ammolagena clavata (Jones and Parker) in Holbourn and others, 2013, p. 40-41, figs. 1-2.

Remarks. This species is very rare and present in samples from the coral rubble facies along the Norwegian margin. The wall texture is finely agglutinated.

Subfamily AMMOVERTELLININAE Saidova, 1981

Genus *Glomospira* Rzehak, 1885

Type species: *Trochammina squamata* Jones and Parker var. *gordialis* Jones and Parker, 1860, p. 304.

Glomospira charoides (Jones and Parker, 1860)

Pl. 2, fig. 5

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Trochammina squamata Jones and Parker var. *charoides* Jones and Parker in Jones and Parker, 1860, p. 304.

Ammodiscus charoides (Jones and Parker) in Brady, 1884, p. 334, pl. 36, figs. 10-16.

Glomospira charoides (Jones and Parker) in Cushman, 1918, p. 100, pl. 36, figs. 10-15.

Glomospira charoides (Jones and Parker) in Höglund, 1947, p. 129, pl. 3, fig. 11.

Glomospira charoides (Jones and Parker) in Resig, 1981, pl. 9, fig. 8.

Repmantina charoides (Jones and Parker) in Loeblich and Tappan, 1987, p. 52, pl. 39, figs. 24-26.

Repmantina charoides (Jones and Parker) in Cimerman and Langer, 1991, p. 17, pl. 3, figs. 6-9.

Usbekistania charoides (Jones and Parker) in Jones, 1994, p. 43, pl. 38, figs. 10-16.

Glomospira charoides (Jones and Parker) in Abu-Zied and others, 2008, p. 51, pl. 1, figs. 2-3.

Glomospira charoides (Jones and Parker) in Holbourn and others, 2013, p. 268-269, fig. 1.

Remarks. This species is very rare in the studied samples and it is present in the coral rubble facies from the Norwegian margin only. The wall texture is very finely agglutinated.

Superfamily HORMOSINACEA Haeckel, 1894

Family HORMOSINIDAE Haeckel, 1894

Subfamily REOPHACINAE Cushman, 1910

Genus *Hormosinella* Shchedrina, 1969

Type species: *Reophax distans* Brady, 1881, p. 50.

Hormosinella guttifera (Brady, 1881)

Pl. 2, fig. 2

Reophax guttifera Brady in Brady, 1881, p. 49, pl. 31, figs. 10-15.

Hormosinella guttifera (Brady) in Jones, 1994, p. 38, pl. 31, figs. 10-15.

Hormosinella guttifera (Brady) in Lobegeier and Gupta, 2008, p. 110, pl. 4, fig. 6.

Hormosinelloides guttifer (Brady) in Holbourn and others, 2013, p. 306-307, fig. 1.

Remarks. This species is rare in the coral facies but relatively common in the mud facies of the Norwegian margin only. The wall texture is coarsely agglutinated. The aperture is small and rounded at the end of the last elongated chamber. It differs from *R. scorpiurus* because it has typically elongated and small chambers instead of the quadrangular chambers described for *R. scorpiurus*. We retain the generic attribution to *Hormosinella* following Hayward and others (2013).

Genus *Reophax* de Montfort, 1808

Type species: *Reophax scorpiurus* de Montfort, 1808, p. 331.

Reophax scorpiurus de Montfort, 1808

Pl. 2, fig. 3

Reophax scorpiurus de Montfort in de Montfort, 1808, p. 330, fig. 130.

Reophax scorpiurus de Montfort in Brady, 1884, p. 291, pl. 30, figs. 15-17.

Reophax scorpiurus de Montfort in Cushman, 1921, p. 65, pl. 6, fig. 6.

Reophax scorpiurus de Montfort in Cimerman and Langer, 1991, p. 17, pl. 4, figs. 1-4.

Reophax sp. nov. (2) in Jones, 1994, p. 37, pl. 30, figs. 15-17.

Reophax scorpiurus de Montfort in Milker and Schmiedl, 2012, p. 32, fig. 9. 8.

Remarks. This species is rare in the off-mound sediments from the Porcupine/Rockall region, it is common to abundant in samples from the Norwegian margin, especially from the mud facies of Røst Reef, where it is sometimes dominant. The wall texture is coarsely agglutinated. It differs from *H. guttifera* because it possesses more quadrangular and larger chambers.

Reophax agglutinatus Cushman, 1913

Pl. 2, fig. 1

Reophax agglutinatus Cushman in Cushman, 1913, p. 637, pl. 79, fig. 6.

Reophax agglutinatus Cushman in Jones, 1994, p. 37, pl. 30, fig. 13.

Remarks. This species is found only in the mud facies from the Norwegian margin. It is very rare.

Superfamily LITUOLACEA de Blainville, 1827

Family HAPLOPHRAGMOIDIDAE Maync, 1952

Genus *Crirostomoides* Cushman, 1910

Type species: *Crirostomoides brady* Cushman, 1910, p. 108.

Crirostomoides subglobosum (Sars, 1868)

Pl. 2, fig. 6

Lituola subglobosa (Sars) in Carpenter, 1869, p. 250.

Lituola subglobosa (Sars) in Sars, 1872, p. 253.

Haplophragmoides subglobosa (Sars) in Cushman, 1910, p. 105, figs. 162-164; p. 108, fig. 167.

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Cribrostomoides bradyi (Sars) in Cushman, 1910, p. 108, fig. 167.

Cribrostomoides bradyi (Sars) in Loeblich and Tappan, 1987, p. 65, pl. 49, figs. 1-3.

Cribrostomoides subglobosum (Sars) in Schröder, 1986, p. 48, pl. 18, figs. 15-16.

Cribrostomoides subglobosus (Sars) in Jones, 1994, p. 40, pl. 34, figs. 8-10.

Cribrostomoides subglobosus (Sars) in Holbourn and others, 2103, p. 220-221, figs. 1-2.

Remarks. The abundance of this species varies from rare to dominant especially in the mud facies along the Norwegian margin. The wall texture is finely to coarsely agglutinated. The agglutinated grains may include small benthic and planktonic foraminifera.

Genus *Haplophragmoides* Cushman, 1910

Type species: *Nonionina canariensis* d'Orbigny, 1839, p. 128.

Haplophragmoides robertsoni Brady, 1887

Pl. 3, figs. 1-2

Haplophragmoides robertsoni Brady in Brady, 1887, p. 893.

Haplophragmoides bradyi Robertson in Robertson, 1891, p. 388.

Haplophragmoides bradyi Robertson in Höglund, 1947, p. 134, pl. 10, fig. 1; fig. 111.

Haplophragmoides bradyi Robertson in Murray, 1971, p. 25, pl. 5, figs. 1-2.

Haplophragmoides bradyi Robertson in Schröder, 1986, p. 46, pl. 18, fig. 8.

Remarks. This form is very rare and present exclusively in the mud facies and in the fine sediments from the coral rubble facies along the Norwegian margin. The wall texture is very finely agglutinated.

Haplophragmoides membranaceum Höglund, 1947

Pl. 3, fig. 3

Haplophragmoides membranaceum Höglund in Höglund, 1947, p. 136, pl. 10, fig. 5.

Haplophragmoides membranaceum Höglund in Gabel, 1971, p. 30, pl. 3, figs. 24-25.

Haplophragmoides membranaceum Höglund in de Stigter and others, 1998, p. 45, pl. 1, fig. 8.

Remarks. This species is rare and present in the coral rubble, sediment clogged coral and sandy pebbly facies along the Norwegian margin. Clearly visible in the documented specimen is the evolute coiling of the last three whorls.

Genus *Labrospira* Höglund, 1947

Type species: *Haplophragmium crassimargo* Norman, 1892, p. 17.

Labrospira jeffreysii (Williamson, 1858)

Pl. 2, figs. 8-9

Nonionina jeffreysii Williamson in Williamson, 1858, p. 34, pl. 3, figs. 72-73.

Haplophragmium canariensis d'Orbigny in Brady, 1884, p. 310, pl. 35, figs. 1-3, 5.

Cribrostomoids jeffreysii (Williamson) in Oki, 1989, p. 71, pl. 1, fig. 14.

Veleroninoides jeffreysii (Williamson) in Jones, 1994, p. 41, pl. 35, figs. 1-3, 5.

Cribrostomoids jeffreysii (Williamson) in Murray, 2003, p. 11, pl. 2, fig. 5.

Labrospira jeffreysii (Williamson) in Majewski and Anderson, 2009, p. 138, fig. 6.

Remarks. This species is very rare and present in the coral rubble, mud and sediment clogged coral framework facies along the Norwegian margin.

Family LITUOLIDAE de Blainville, 1827

Subfamily AMMOMARGINULININAE Podobina, 1978

Genus *Ammobaculites* Cushman, 1910

Type species: *Spirolina agglutinans* d'Orbigny, 1846, p. 137.

Ammobaculites agglutinans (d'Orbigny, 1846)

Pl. 3, fig. 4

Spirolina agglutinans d'Orbigny in d'Orbigny, 1846, p. 137, pl. 7, figs. 10-12.

Haplophragmium agglutinans (d'Orbigny) in Brady, 1884, p. 301, pl. 32, figs. 19-20, 24-26.

Ammobaculites agglutinans (d'Orbigny) in Schröder, 1986, p. 50, pl. 21, figs. 1-4.

Ammobaculites agglutinans (d'Orbigny) in Jones, 1994, p. 39, pl. 32, figs. 19-20, 24-26.

Ammobaculites agglutinans (d'Orbigny) in Holbourn and other, 2013, p. 26-27, fig. 1.

Remarks. This species is extremely rare and present only in one sample from the coral rubble facies along the Norwegian margin. It is coarsely agglutinated. The test of the specimen in Plate 3, fig. 4 is slightly more arched than the holotype.

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Superfamily HAPLOPHRAGMIACEA Eimer and Fickert, 1899

Family AMMOSPHAERIODINIDAE Cushman, 1927

Subfamily AMMOSPHAERIODININAE Cushman, 1927

Genus *Adercotryma* Loeblich and Tappan, 1952

Type species: *Lituola glomerata* Brady, 1878, p. 433.

Adercotryma wrightii Brönnimann and Whittaker, 1987
Pl. 3, fig. 5

Adercotryma wrightii Brönnimann and Whittaker in Brönnimann and Whittaker, 1987, p. 27, figs. 3B, 7.

Adercotryma wrightii Brönnimann and Whittaker in Murray, 2003, p. 11, figs. 2.1-2.2.

Remarks. This species is very rare in the Porcupine Seabight and exclusively present in the off-mound facies. Along the Norwegian margin it is slightly more abundant and present in the mud, the living coral and in the sediment clogged coral framework facies. The documented specimen closely resembles the holotype even in the size of the agglutinated grains, which are coarser on the spiral and finer on the umbilical side.

Superfamily SPIROPLECTAMMINACEA Cushman, 1927

Family SPIROPLECTAMMINIDAE Cushman, 1927

Subfamily SPIROPLECTAMMININAE Cushman, 1927

Genus *Spiroplectinella* Kisel'man, 1972

Type species: *Spiroplecta wrightii* Silvestri, 1903, p. 63.

Spiroplectinella wrightii (Silvestri, 1903)

Pl. 3, fig. 6

Spiroplecta wrightii Silvestri in Silvestri, 1903, p. 59, figs. 1-6.

Textularia sagittula DeFrance in Brady, 1884, p. 361, pl. 42, figs. 17-18.

Spirorutilus wrightii (Silvestri) in Banner and Pereira, 1981, p. 104, pl. 6, figs. 7-8, 10; pl. 7, figs. 1-2, 5.

Spiroplectinella wrightii (Silvestri) in Kisel'man, 1972, p. 135, fig. 1.

Spiroplectinella wrightii (Silvestri) in Loeblich and Tappan, 1987, p. 112, pl. 120, figs. 1-10.

Spiroplectinella wrightii (Silvestri) in Jones, 1994, p. 47, pl. 42, figs. 17-18.

Spiroplectinella wrightii (Silvestri) in Milker and Schmiedl, 2012, p. 34, figs. 9.19-21.

Remarks. This species is present in the coral rubble, sediment clogged coral and mud facies along the Norwegian margin and generally in the off-mound and dead coral facies in the Porcupine/Rockall region. The documented specimen is finely to moderately agglutinated.

Subfamily VULVULININAE Saidova, 1981

Genus *Vulvulina* d'Orbigny, 1826

Type species: *Vulvulina capreolus* d'Orbigny, 1826 = *Nautilus (Ortoceras) pennatula* Batsch, 1791.

Vulvulina pennatula Batsch, 1791

Pl. 4, fig. 1

Vulvulina pennatula Batsch in Batsch, 1791, p. 3, 5, pl. 4, fig. 13.

Vulvulina pennatula Batsch in Jones, 1994, p. 49, pl. 45, figs. 1-8.

Vulvulina pennatula Batsch in Holbourn and Henderson, 2002, p. 10, pl. 2, figs. 17-18.

Vulvulina pennatula Batsch in Holbourn and others, 2013, p. 612-613, figs. 1-2.

Remarks. This species is very rare in the off-mound sediments from the Porcupine/Rockall region and in the pelagic drape from the Alboran Sea (Maya Mud volcano). The documented specimen displays several biserial chambers and may be interpreted as a microspheric generation. The wall texture is very finely agglutinated.

Superfamily TROCHAMMINACEA Schwager, 1877

Family TROCHAMMINIDAE Schwager, 1877

Subfamily TROCHAMMININAE Schwager, 1877

Genus *Portatrochammina* Echols, 1971

Type species: *Portatrochammina eltaninae* Echols, 1971

Portatrochammina antarctica (Parr, 1950)

Pl. 4, fig. 4

Trochammina antarctica Parr in Parr, 1950, p. 280, pl. 5, figs. 2-4.

Portatrochammina antarctica (Parr) in Lobegier and Gupta, 2008, p. 110, pl. 4, figs. 14-15.

Portatrochammina antarctica (Parr) in Majewski and Anderson, 2009, p. 138, text-fig. 3, fig. 7.

Remarks. This species is very rare and present only in the sediment clogged coral framework from the Norwegian margin. The test surface is coarsely

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agglutinated on the spiral side and finely agglutinated on the umbilical side.

Genus *Tritaxis* Schubert, 1921

Type species: *Tritaxis fusca* Williamson, 1858, p. 55.

Tritaxis fusca (Williamson, 1858)

Pl. 4, fig. 3

Rotalina fusca Williamson in Williamson, 1858, p. 55, pl. 5, figs. 114-115.

Tritaxis fusca (Williamson) in Hedley, Hurdle and Burdett, 1964, p. 420, fig. 1.

Tritaxis fusca (Williamson) in Loeblich and Tappan, 1987, p. 122, pl. 128, figs. 1-4.

Tritaxis fusca (Williamson) in Jones, 1994, p. 54, pl. 49, fig. 13.

Remarks. This species is very rare and present only in the coral rubble and pebbly sand facies from the Norwegian margin and in the off-mound sediments from the Porcupine Seabight.

Genus *Trochammina* Parker and Jones, 1859

Type species: *Nautilus inflatus* Montagu, 1808, p. 81.

Trochammina labiosa Höglund, 1947

Pl. 4, fig. 2

Trochammina labiosa Höglund in Höglund, 1947, p. 207, pl. 15, fig. 6.

Trochammina labiosa Höglund in Gabel, 1971, p. 40, pl. 8, figs. 3-5.

Remarks. This species is very rare and present only in the living coral facies along the Norwegian margin. The wall texture is very finely agglutinated.

Subfamily POLYSTOMAMMININAE Brönnimann and Beurlen, 1977

Genus *Lepidodeuterammina* Brönnimann and Whittaker, 1983

Type species: *Rotalina ochracea* Williamson, 1858, p. 55.

Lepidodeuterammina ochracea (Williamson, 1858)

Pl. 4, fig. 5

Rotalina ochracea Williamson in Williamson, 1858, p. 55, pl. 4, fig. 112, pl. 5, fig. 113.

Lepidodeuterammina ochracea (Williamson) in Vazquez Riveiros and Patterson, 2008, p. 10, pl. 4, fig. 3.

Remarks. This species is very rare and present in the coral rubble facies from the Norwegian margin.

Superfamily VERNEULINACEA Cushman, 1911

Family VERNEULINIDAE Suleymanov, 1973

Subfamily VERNEULININAE Cushman, 1911

Genus *Gaudryina* d'Orbigny, 1839

Type species: *Gaudryina rugosa* d'Orbigny, 1840, p. 44.

Gaudryina rudis Wright, 1900

Pl. 4, fig. 6

Gaudryina rudis Wright in Wright, 1900, p. 53, pl. 2, fig. 1.

Gaudryina rudis Wright in Gabel, 1971, p. 34, pl. 5, figs. 1-2.

Gaudryina rudis Wright in Wagener, 1988, p. 126, pl. 21, fig. 15.

Connemarella rudis (Wright) in Cimerman and Langer, 1991, p. 23, pl. 8, figs. 1-4.

Gaudryina rudis Wright in Murray, 2003, p. 13, pl. 2, figs. 12-13.

Remarks. This species occurs in the mud facies from the Norwegian margin, the dropstone, living coral, sandwave facies in the Porcupine/Rockall region and in the coral-rich horizons in the Alboran Sea. The documented specimen clearly shows the initial triserial coiling, which becomes biserial during ontogeny.

Superfamily TEXTULARIACEA Ehrenberg, 1838

Family EGGERELLIDAE Cushman, 1937

Subfamily EGGERELLINAE Cushman, 1937

Genus *Eggerella* Cushman, 1935

Type species: *Verneulina bradyi* Cushman 1911, p. 54.

Eggerella humboldti Todd and Brönnimann, 1957

Pl. 5, fig. 2

Eggerella humboldti Todd and Brönnimann in Todd and Brönnimann, 1957, p. 26, pl. 2, fig. 26.

Remarks. This species is present only in the coral rubble facies from the Norwegian margin and it is very rare. The wall texture is moderately coarse grained.

Genus *Eggerelloides* Haynes, 1973

Type species: *Bulimina scabra* Williamson, 1858, p. 65.

Eggerelloides scaber (Williamson, 1858)

Pl. 5, fig. 4

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Bulimina scabra Williamson in Williamson, 1858, p. 65, pl. 5, figs. 136-137.

Eggerelloides scabrus (Williamson) in Loeblich and Tappan, 1987, p. 170, pl. 189, figs. 5-7.

Eggerelloides scabrus (Williamson) in Cimerman and Langer, 1991, p. 21, pl. 8, fig. 7.

Eggerelloides scaber (Williamson) in Jones, 1994, p. 52, pl. 47, figs. 15-17.

Eggerelloides scaber (Williamson) in Murray, 2003, p. 13, pl. 2, fig. 11.

Remarks. This species occurs in the coral rubble facies and in the mud facies along the Norwegian margin. In the mud facies it may be dominant. In the Porcupine Seabight it is more abundant in the sandwave facies. It occurs in the pelagic drape in the Alboran Sea. Wall texture is moderately coarse.

Genus *Karrieriella* Cushman, 1933

Type species: *Gaudryina siphonella* Reuss, 1851, p. 78.

Karrieriella bradyi (Cushman, 1911)

Pl. 5, fig. 3

Gaudryina bradyi Cushman in Cushman, 1911, p. 67, pl. 107.

Gaudryina bradyi Cushman in Cushman, 1921, p. 149, pl. 29, fig. 3.

Karrieriella bradyi (Cushman) in Schröder, 1986, p. 55, pl. 22, figs. 8-9.

Karrieriella bradyi (Cushman) in Jones, 1994, p. 50, pl. 46, figs. 1-4.

Karrieriella bradyi (Cushman) in Loeblich and Tappan, 1994, p. 25, pl. 30, figs. 8-16.

Karrieriella bradyi (Cushman) in Holbourn and Henderson, 2002, p. 11, pl. 2, figs. 4-5.

Karrieriella bradyi (Cushman) in Holbourn and others, 2013, p. 318-319, figs. 1-4.

Remarks. This species is very rare in all the studied sites (1-3 specimens) and it does not seem to prefer a specific environment. The observed specimens strongly resemble the holotype.

Family TEXTULARIIDAE Ehrenberg, 1838

Subfamily TEXTULARIINAE Ehrenberg, 1838

Genus *Bigenerina* d'Orbigny, 1826

Type species: *Bigenerina nodosaria* d'Orbigny, 1826, p. 27.

Bigenerina nodosaria d'Orbigny, 1826

Pl. 5, fig. 5

Bigenerina nodosaria d'Orbigny in d'Orbigny, 1826, p. 261, pl. 11, figs. 9-12.

Bigenerina ? nodosaria d'Orbigny in Cimerman and Langer, 1991, p. 21, pl. 9, figs. 1-6.

Bigenerina nodosaria d'Orbigny in Jones, 1994, p. 49, pl. 44, figs. 14-18.

Bigenerina nodosaria d'Orbigny in Murray, 2003, p. 11, pl. 2, fig. 4.

Bigenerina nodosaria d'Orbigny in Duchemin and others, 2005, p. 205, pl. 1, fig. 5.

Bigenerina nodosaria d'Orbigny in Holbourn and others, 2013, p. 64-65, fig. 1.

Remarks. This species is very rare in the mud facies from the Norwegian and Porcupine /Rockall regions and it is absent in the Alboran Sea.

Bigenerina cylindrica Cushman, 1922

Pl. 5, fig. 6

Bigenerina cylindrica Cushman in Cushman, 1922, p. 26, pl. 3, figs. 7-8.

Bigenerina cylindrica Cushman in Jones, 1994, p. 49, pl. 44, figs. 19-24.

Remarks. This species characterizes only the mud facies along the Norwegian margin and can be relatively abundant.

Genus *Textularia* DeFrance, 1824

Type species: *Textularia sagittula* DeFrance in de Blainville, 1824, p. 177.

Textularia lateralis Laliker, 1935

Pl. 5, fig. 8

Textularia lateralis Laliker in Laliker, 1935, p. 1, pl. 1, figs. 3-5.

Textularia lateralis Laliker in Zheng, 1988, p.111, pl. 26, fig. 4.

Textularia lateralis Laliker in Loeblich and Tappan, 1994, p. 28, pl. 33, figs. 13-16.

Remarks. This species is present only in a few samples from the buried cold-water coral facies from the Alboran Sea (Dhaka MV). Some specimens have short spines at the periphery of each chamber. The specimen illustrated in Plate 5, fig. 8 does not show spines but only slightly lobulate periphery of the chambers.

Textularia truncata (Höglund, 1947)

Pl. 6, fig. 1

Textularia truncata Höglund in Höglund, 1947, p. 175, pl. 12, figs. 8-9.

Textularia truncata Höglund in Gabel, 1971, p. 32, pl. 4, figs. 20-21.

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Textularia truncata Höglund in Cimerman and Langer, 1991, p. 22, pl. 12, figs. 1-3.

Textularia truncata Höglund in Murray, 2003, p. 15, pl. 3, figs. 17-18.

Remarks. This species is generally rare and present in the pebbly sand, sediment clogged coral and coral rubble facies from the Norwegian margin, from the mud facies (off-mound) in the Porcupine/Rockall region, and in buried cold-water coral facies from the Alboran Sea (Dhaka MV).

Textularia earlandi Parker, 1952

Pl. 2, fig. 2

Textularia elegans Lacroix in Lacroix, 1931, p. 14.

Textularia elegans Lacroix in Lacroix, 1932, p. 8, pl. 4-6.

Textularia tenuissima Earland in Earland, 1933, p. 3, pl. 21-30.

Textularia tenuissima Earland in Murray, 2003, p. 15, pl. 3, figs. 15-16.

Textularia tenuissima Earland in Blais, 1995, p. 92, pl. 2-2, fig. 1.

Remarks. The name *Textularia tenuissima* was amended by Parker (1952) because it was pre-occupied by *Textularia tenuissima* Häusler 1881, a different species. He proposed the name *T. earlandi* for Earland's species. It is present in the mud facies from the Norwegian margin.

Textularia pseudotrochus Cushman, 1922

Pl. 5, fig. 1

Textularia pseudotrochus Cushman in Cushman, 1922, p. 21, pl. 5, figs. 1-3.

Textularia pseudotrochus Cushman in Lacroix, 1931, p. 12, pl. 5.

Textularia pseudotrochus Cushman in Hofker, 1960, p. 238, pl. A, figs. 21-23.

Textularia barkeri Hofker in Hofker, 1978, p. 27, pl. 1, fig. 3.

Sahulua patelliformis Hofker in Loeblich and Tappan, 1985, p. 203, pl. 14, figs. 1-10.

Remarks. This species is very rare and present in the living coral facies from the Porcupine/Rockall region.

Subfamily SIPHOTEXTULARIINAE Loeblich and Tappan, 1985

Genus *Siphotextularia* Finlay, 1939

Type species: *Siphotextularia wairoana* Finlay, 1939.

Siphotextularia obesa Parr, 1950

Pl. 5, fig. 7

Siphotextularia obesa Parr in Parr, 1950, p. 276, pl. 5, fig. 1.

Remarks. This species is extremely rare and present only in the mud (off-mound) facies in the Porcupine Seabight. In the studied specimens the shape of the aperture varies from slit-like to circular.

Family VALVULINIDAE Berthelin, 1880

Subfamily VALVULININAE Berthelin, 1880

Genus *Clavulina* d'Orbigny, 1826

Type species: *Clavulina parisiensis* d'Orbigny, 1826, p. 268.

Clavulina parisiensis d'Orbigny, 1826

Pl. 6, fig. 3

Clavulina parisiensis d'Orbigny in d'Orbigny, 1826, p. 268.

Remarks. This species is present only in the buried cold-water coral facies from the Alboran Sea.

Suborder SPIRILLININA Hohenegger and Piller, 1975

Family SPIRILLINIDAE Reuss and Fritsch, 1861

Genus *Mychostomina* Berthelin, 1881

Type species: *Spirillina vivipara* Ehrenberg var. *revertens* Rhumbler, 1906, p. 32.

Mychostomina revertens (Rhumbler, 1906)

Pl. 6, fig. 4

Spirillina vivipara Ehrenberg var. *revertens* Rhumbler in Rhumbler, 1906, p. 32, pl. 2, figs. 8-10.

Mychostomina revertens (Rhumbler) in Jones, 1994, p. 92, pl. 85, fig. 5.

Remarks. It differs from *S. vivipara* because the last portion of the enrolling tube turns toward the inner part of the test. It is found in the coral facies and sediment clogged coral facies from the Norwegian margin.

Genus *Spirillina* Ehrenberg, 1843

Type species: *Spirillina vivipara* Ehrenberg, 1843.

Spirillina vivipara Ehrenberg, 1843

Pl. 6, fig. 5

Spirillina vivipara Ehrenberg in Heron-Allen and Earland, 1930, p. 178.

Spirillina vivipara Ehrenberg in Le Calvez, 1958, p. 181.

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Spirillina vivipara Ehrenberg in Barker, 1960, pl. 85, figs. 1-5.

Spirillina vivipara Ehrenberg in Loeblich and Tappan, 1987, p. 304, pl. 318, figs. 4-7.

Spirillina vivipara Ehrenberg in Murray, 2003, p. 15, pl. 4, fig. 1.

Spirillina vivipara Ehrenberg in Milker and Schmiedl, 2012, p. 43, figs. 11.15-16.

Remarks. This species is documented from the living coral facies and sediment clogged coral facies from the Norwegian margin and Porcupine/Rockall regions and in the buried cold-water coral facies from the Alboran Sea.

Family PATELLINIDAE Rhumbler, 1906

Subfamily PATELLININAE Rhumbler, 1906

Genus *Patellina* Williamson, 1858

Type species: *Patellina corrugata* Williamson, 1858, p. 46.

Patellina corrugata Williamson, 1858

Pl. 6, fig. 6

Patellina corrugata Williamson in Williamson, 1858, p. 46, pl. 3, figs. 86-89.

Patellina corrugata Williamson in Loeblich and Tappan, 1987, p. 306, pl. 320, figs. 7-14.

Patellina corrugata Williamson in Jones, 1994, p. 93, pl. 86, figs. 1-7.

Patellina corrugata Williamson in Cimerman and Langer, 1991, p. 24, pl. 15, figs. 7-14.

Patellina corrugata Williamson in Murray, 2003, p. 24, pl. 9, figs. 6-7.

Patellina corrugata Williamson in Milker and Schmiedl, 2012, p. 43-44, figs. 11.21-23.

Patellina corrugata Williamson in Holbourn and others, 2013, p. 394-395, figs. 1-3.

Remarks. This species has been found only in the living coral, pebbly sand and coral rubble facies from the Norwegian margin.

Suborder MILIOLINA Delange and Hérouard, 1896

Superfamily CORNUSPIRACEA Schultze, 1854

Family CORNUSPIRIDAE Schultze, 1854

Subfamily CORNUSPIRINAE Schultze, 1854

Genus *Cornuspira* Schultze, 1854

Type species: *Orbis foliaceus* Philippi, 1844.

Cornuspira foliacea (Philippi, 1844)

Pl. 6, fig. 8

Orbis foliaceus Philippi in Philippi, 1844, p. 147, pl. 24, fig. 26.

Cornuspira foliacea (Philippi) in Loeblich and Tappan, 1987, p. 310, pl. 322, figs. 7-8.

Cornuspira foliacea (Philippi) in Cimerman and Langer, 1991, p. 24, pl. 15, figs. 1-3.

Cornuspira foliacea (Philippi) in Milker and Schmiedl, 2012, p. 44, figs. 11.24-25.

Remarks. This species is very rare and present only in the coral rubble facies from the Norwegian margin. It differs from *C. involvens* by the crescentic size of the enrolling tube.

Cornuspira involvens (Reuss, 1850)

Pl. 6, fig. 7

Operculina involvens Reuss in Reuss, 1850, p. 370, pl. 46, fig. 20.

Cornuspira involvens (Reuss) in Cimerman and Langer, 1991, p. 25, pl. 15, figs. 4-7.

Cornuspira involvens (Reuss) in Jones, 1994, p. 26, pl. 11, figs. 1-3.

Cornuspira involvens (Reuss) in Murray, 2003, p. 15, pl. 4, fig. 5.

Cornuspira involvens (Reuss) in Milker and Schmiedl, 2012, p. 44, fig. 12.1.

Remarks. This species is present in all the investigated regions but it is always very rare (1-2 specimens) and does not show any particular habitat preference.

Family HEMIGORDIOPSIDAE Nikitina, 1969

Subfamily HEMIGORDIOPSINAE Nikitina, 1969

Genus *Gordiospira* Heron-Allen and Earland, 1932

Type species: *Gordiospira fragilis* Heron-Allen and Earland, 1932.

Gordiospira elongata (Collins, 1958)

Pl. 6, fig. 10

Glomospira elongata Collins in Collins, 1958, p. 347, pl. 1, figs. 6-7.

Gordiospira elongata (Collins) in Loeblich and Tappan, 1994, p. 37, pl. 56, figs. 17-18; pl. 57, figs. 1-4.

Remarks. It is very rare and present only in the buried cold-water coral facies from the Alboran Sea.

Gordiospira sp.

Pl. 6, fig. 9

Remarks. The test is discoidal and planispiral with the proloculus followed by an undivided second chamber, which is irregularly enrolled. The surface

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shows transverse growth wrinkle. This species is always very rare and is present only in the pebbly sandy facies from the Norwegian margin.

Superfamily MILIOLACEA Ehrenberg, 1839

Family SPIROLOCULINIDAE Wiesner, 1920

Genus *Spiroloculina* d'Orbigny, 1826

Type species: *Spiroloculina depressa* d'Orbigny, 1826.

Spiroloculina dilatata d'Orbigny, 1846

Pl. 7, fig. 2

Spiroloculina dilatata d'Orbigny in d'Orbigny, 1846, p. 271, pl. 16, figs. 16-18.

Spiroloculina dilatata d'Orbigny in Wiesner, 1923, p. 35, pl. 4, fig. 26.

Spiroloculina dilatata d'Orbigny in Cimerman and Langer, 1991, p. 30, pl. 22, figs. 5-8.

Spiroloculina dilatata d'Orbigny in Milker and Schmiedl, 2012, p. 48, figs. 13.1-2.

Remarks. This species is very rare and present only in the buried cold-water coral facies from the Alboran Sea.

Spiroloculina excavata d'Orbigny, 1846

Pl. 7, fig. 3

Spiroloculina excavata d'Orbigny in d'Orbigny, 1846, p. 271, pl. 16, figs. 19-21.

Spiroloculina excavata d'Orbigny in Cimerman and Langer, 1991, p. 30, pl. 23, figs. 1-3.

Spiroloculina excavata d'Orbigny in Sgarrella and Moncharmont-Zei, 1993, p. 169, pl. 5, fig. 6.

Spiroloculina excavata d'Orbigny in Murray, 1991, p. 17, pl. 4, figs. 13-14.

Spiroloculina excavata d'Orbigny in Milker and Schmiedl, 2012, p. 50, figs. 13.3-4.

Remarks. This species is rare and present only in the buried cold-water coral facies from the Alboran Sea and in the coral rubble facies from the Norwegian margin.

Spiroloculina tenuiseptata Brady, 1884

Pl. 7, fig. 1

Spiroloculina tenuiseptata Brady in Brady, 1884, p. 153, pl. 10, fig. 5.

Spiroloculina tenuiseptata Brady in Le Calvez, 1958, p. 162, pl. 1, fig. 7.

Spiroloculina tenuiseptata Brady in Cimerman and Langer, 1991, p. 31, pl. 24, figs. 6-9.

Spiroloculina tenuiseptata Brady in Milker and Schmiedl, 2012, p. 50, figs. 13.7-8.

Remarks. This species is rare and only present in the buried cold-water coral facies from the Alboran Sea and in the coral rubble facies from the Norwegian margin.

Family HAUERINIDAE Schwager, 1876

Subfamily SIPHONAPERTINAE Saidova, 1975

Genus *Ammomassilina* Cushman, 1933

Type species: *Massilina alveoliniformis* Millett, 1898, p. 609.

Ammomassilina arenaria (Brady, 1884)

Pl. 7, fig. 4

Spiroloculina arenaria Brady in Brady, 1884, p. 153, pl. 8, fig. 12.

Remarks. This species is very rare and present only in the buried cold-water coral facies from the Alboran Sea (Dhaka MV).

Subfamily HAUERININAE Schwager, 1876

Genus *Cycloforina* Luczkowska, 1972

Type species: *Quinqueloculina contorta* d'Orbigny, 1846, p. 298.

Cycloforina laevigata (d'Orbigny, 1839)

Pl. 7, fig. 5

Quinqueloculina laevigata d'Orbigny in d'Orbigny, 1839, p. 301, pl. 3, figs. 31-33.

Quinqueloculina laevigata d'Orbigny in Cimerman and Langer, 1991, p. 37, Pl. 33, figs. 8-11.

Remarks. Several specimens have been found in the buried cold-water coral facies from the Alboran Sea (Dhaka and Maya MVs). Only one specimen has been found in the coral rubble facies from the Porcupine Seabight. This species is attributed to the genus *Cycloforina* Luczkowska (1972) because it shows the typical rounded aperture with a short tooth.

Cycloforina stalker (Loeblich and Tappan, 1953)

Pl. 7, fig. 6

Quinqueloculina stalker Loeblich and Tappan in Loeblich and Tappan, 1953, p. 40, pl. 5, figs. 5-9.

Quinqueloculina stalker Loeblich and Tappan in Sgarrella and Moncharmont-Zei, 1993, p. 174, pl. 5, figs. 13-14.

Remarks. Only a few specimens have been found in the mud facies (off-mound) and dead coral facies from

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the Porcupine Seabight and in the buried cold-water coral facies from the Alboran Sea (Dhaka MV). This species is attributed to the genus *Cycloforina* Luczkowska (1972) because it shows the typical rounded aperture.

Genus *Quinqueloculina* d'Orbigny, 1826

Type species: *Serpula seminulum* Linné, 1758, p. 786.

Quinqueloculina seminula (Linné, 1758)

Pl. 7, fig. 8

Serpula seminula Linné in Linné, 1758, p. 786, pl. 2, fig. 1.

Quinqueloculina seminula (Linné) in Schlumberger, 1893, p. 208, pl. 4, figs. 80-81.

Quinqueloculina seminula (Linné) in Murray, 1971, p. 65, pl. 24, figs. 1-6.

Quinqueloculina seminula (Linné) in Cimerman and Langer, 1991, p. 38, pl. 34, figs. 9-12.

Quinqueloculina seminula (Linné) in Milker and Schmiedl, 2012, p. 59, figs. 15.30-31.

Remarks. This species is found in several samples from the buried cold-water coral facies from the Alboran Sea (Dhaka and Maya MVs) and in coral rubble and sediment clogged facies along the Norwegian margin.

Quinqueloculina arctica Cushman, 1933

Pl. 8, fig. 1

Quinqueloculina arctica Cushman in Cushman, 1933, p. 2, pl. 1, fig. 3.

Quinqueloculina arctica Cushman in Hermelin and Scott, 1985, p. 216, Pl.2, fig. 1.

Remarks. Very few specimens are documented from the Porcupine Seabight/Rockall region and the Norwegian margin. They do not show any habitat preference as they occur in the living and dead coral, coral rubble and mud facies.

Quinqueloculina viennensis Le Calvez and Le Calvez, 1958

Pl. 7, fig. 7

Quinqueloculina viennensis Le Calvez and Le Calvez in Le Calvez and Le Calvez, 1958, p. 187, pl. 5, figs. 42, 44-45.

Quinqueloculina viennensis Le Calvez and Le Calvez in Vénec-Peyré, 1984 pl. 4, fig. 1.

Quinqueloculina viennensis Le Calvez and Le Calvez in Sgarrella and Moncharmont-Zei, 1993, p. 176, pl. 7, fig. 8.

Quinqueloculina viennensis Le Calvez and Le Calvez in Milker and Schmiedl, 2012, p. 61, fig. 16.5-7.

Remarks. This species is found in the buried cold-water coral facies from the Alboran Sea (Dhaka and Maya MVs). It occurs also in the coral rubble and pebbly sand, more rarely in the sediment clogged facies from the Norwegian margin.

Subfamily MILIOLINELLINAE Vella, 1957

Genus *Biloculinella* Wiesner, 1931

Type species: *Biloculina labiata* Schlumberger, 1891, p. 556.

Biloculinella depressa (Wiesner, 1923)

Pl. 8, fig. 3

Biloculina labiata Schlumberger var. *depressa* Wiesner in Wiesner, 1923, p. 89-90, pl. 18, fig. 263.

Biloculina depressa Wiesner in Cimerman and Langer, 1991, p. 39, pl. 36, fig. 11.

Biloculina depressa Wiesner in Murray, 2003, p. 15, pl. 4, figs. 2-3.

Remarks. Only one specimen of this species has been found in the coral rubble facies from the Norwegian margin.

Biloculinella fragilis Le Calvez and Le Calvez, 1958

Pl. 8, fig. 4

Biloculinella fragilis Le Calvez and Le Calvez in Le Calvez and Le Calvez, 1958, p. 202-203, pl. 16, figs. 182-183.

Remarks. Only one specimen of this species has been found in the buried cold-water coral facies from the Alboran Sea.

Biloculinella globula (Bornemann, 1855)

Pl. 8, fig. 2

Biloculina globula Bornemann in Bornemann, 1855, p. 349, pl. 19, fig. 3.

Biloculinella globula Bornemann in Cimerman and Langer, 1991, p. 40, pl. 36, figs. 1-2.

Biloculinella globula Bornemann in Milker and Schmiedl, 2012, p. 62, fig. 16.19.

Remarks. This species is present in several samples from the buried cold-water coral facies from the Alboran Sea, and in the coral rubble, living, sediment clogged coral and mud facies from Norway.

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Genus *Miliolinella* Wiesner, 1931

Type species: *Vermiculum subrotundum* Montagu, 1803, p. 521.

Miliolinella subrotunda (Montagu, 1803)

Pl. 8, fig. 5

Vermiculum subrotundum Montagu in Montagu, 1803, p. 521.

Miliolinella subrotunda (Montagu) in Loeblich and Tappan, 1987, p. 340, pl. 350, figs. 1-12.

Miliolinella subrotunda (Montagu) in Cimerman and Langer, 1991, p. 42, pl. 38, figs. 4-9.

Miliolinella subrotunda (Montagu) in Jones, 1994, p. 20, pl. 4, fig. 3.

Miliolinella subrotunda (Montagu) in Murray, 2003, p. 15, pl. 4, fig. 6.

Miliolinella subrotunda (Montagu) in Duchemin and others, 2007, p. 16, pl. 1, fig. 9.

Miliolinella subrotunda (Montagu) in Milker and Schmiedl, 2012, p. 63, figs. 16.31-32.

Remarks. It is present but never common in the dead, living and dropstone facies from the Porcupine/Rockall region, coral rubble and sediment clogged coral facies from Norway in the buried cold-water coral facies from the Alboran Sea.

Miliolinella elongata Kruit, 1955

Pl. 9, fig. 1

Miliolinella circularis Borneman var. *elongata* Kruit in Kruit, 1955, p. 468, pl. 1, fig. 15.

Miliolinella elongata Kruit in Cimerman and Langer, 1991, p. 41, pl. 37, fig. 8.

Miliolinella circularis var. *elongata* Kruit in Sgarrella and Moncharmont-Zei, 1993, p. 187, pl. 8, fig. 2.

Miliolinella elongata Kruit in Milker and Schmiedl, 2012, p. 62, figs. 16. 23-24.

Remarks. It is only present in two samples from the buried cold-water coral facies from the Alboran Sea and in the coral rubble and pebbly sand facies from the Porcupine Seabight.

Genus *Pyrgo* Defrance, 1824

Type species: *Pyrgo laevis* Defrance, 1824, p. 273.

Pyrgo anomala (Schlumberger, 1891)

Pl. 9, fig. 4

Bilocolina anomala Schlumberger in Schlumberger, 1891, p. 569, pl. 11, figs. 84-86; pl. 12, fig. 101.

Pyrgo anomala (Schlumberger) in Cimerman and Langer, 1991, p. 44, pl. 41, figs. 3-5.

Pyrgo anomala (Schlumberger) in Milker and Schmiedl, 2012, p. 64, figs. 17. 8-9.

Remarks. It is rare and present in only a few samples from the buried cold-water coral facies from the Alboran Sea, the sandwave facies from the Porcupine/Rockall region and in the coral rubble, sediment clogged and mud facies from Norway.

Pyrgo comata (Brady, 1881)

Pl. 9, fig. 3

Bilocolina comata Brady in Brady, 1881, p. 45, pl. 3, fig. 9.

Bilocolina comata Brady in Brady, 1884, p. 144, pl. 3, figs. 9 a, b.

Bilocolina comata Brady in Schlumberger, 1891, p. 565, pl. 10, figs. 72-73.

Bilocolina comata Brady in Cushman, 1917, p. 81, pl. 34, fig. 1.

Bilocolina comata Brady in Cimerman and Langer, 1991, p. 44, pl. 41, fig. 9.

Bilocolina comata Brady in Jones, 1994, p. 19, pl. 3, fig. 9.

Pyrgo comata (Brady) in Holbourn and others, 2013, p. 452-453, figs. 1-2.

Remarks. This species is generally rare and only present in the coral facies from Norway. All the observed specimens show the distinctive longitudinal striae.

Pyrgo elongata (d'Orbigny, 1826)

Pl. 10, fig. 5

Bilocolina elongata d'Orbigny in d'Orbigny, 1826, p. 298.

Pyrgo elongata (d'Orbigny) in Cimerman and Langer, 1991, p. 44, pl. 41, figs. 6-8.

Pyrgo elongata (d'Orbigny) in Gabel, 1971, p. 38, pl. 7, figs. 27-28.

Pyrgo elongata (d'Orbigny) in Sgarrella and Moncharmont-Zei, 1993, p. 182, pl. 9, fig. 1.

Pyrgo elongata (d'Orbigny) in Milker and Schmiedl, 2012, p. 66, fig. 17.12.

Remarks. This species is very rare in the the buried cold-water coral facies from the Alboran Sea, the coral rubble and pebbly sand facies from the Norwegian margin and dead coral facies from the Porcupine region.

Pyrgo inornata (d'Orbigny, 1846)

Pl. 9, fig. 2

Bilocolina inornata d'Orbigny in d'Orbigny, 1846, p. 266, pl. 16, figs. 7-9.

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Remarks. This species is very rare in the buried cold-water coral facies from the Alboran Sea, and in the living coral facies from the Porcupine area.

Pyrgo lucernula (Schwager, 1866)

Pl. 10, fig. 4

Biloculina lucernula Schwager in Schwager, 1866, p. 202, pl. 4, fig. 17.

Pyrgo lucernula (Schwager) in Cimerman and Langer, 1991, p. 45, pl. 41, figs. 10-11.

Pyrgo lucernula (Schwager) in Jones, 1994, p. 18, pl. 2, figs. 5-6.

Pyrgo lucernula (Schwager) in Holbourn and others, 2013, p. 456-457, figs. 1-2.

Remarks. It is very rare and found only in the coral rubble facies from Norway.

Pyrgo murrhina (Schwager, 1866)

Pl. 10, fig. 3

Biloculina murrhina Schwager in Schwager, 1866, p. 203, pl. 4, fig. 15.

Pyrgo murrhina (Schwager) in Mullineaux and Lohmann, 1981, p. 38, pl. 1, fig. 13.

Pyrgo murrhina (Schwager) in Murgese and De Deckker, 2005, p. 34, text-fig. 4, figs. 9-10.

Pyrgo murrhina (Schwager) in Abu-Zied and others, 2008, p. 51, pl. 1, figs. 16-17.

Pyrgo murrhina (Schwager) in Holbourn and others, 2013, p. 458-459, figs. 1-2.

Remarks. It is very rare and found only in the pebbly sand facies from the Porcupine/Rockall region.

Pyrgo sarsi (Schlumberger, 1891)

Pl. 10, figs. 1-2

Biloculinella sarsi Schlumberger in Schlumberger, 1891, p. 553, pl. 9, figs. 55-59.

Pyrgo fornasinii Chapman and Parr in Chapman and Parr, 1935, p. 5.

Pyrgo sarsi (Schlumberger) in Jones, 1994, p. 18, pl. 2, fig. 7.

Remarks. This species is generally rare but can have abundance peaks in the mud facies from the Norwegian margin. According to the original description of Schlumberger (1891) figure 1 illustrates a specimen in a more juvenile stage with a rounded and small aperture displaying a T-shaped tooth. Figure 2 illustrates a more adult stage with the typical large and elongated aperture with the well developed and elongated tooth.

Pyrgo subsphaerica (d'Orbigny, 1840)

Pl. 9, figs. 5

Biloculina subsphaerica d'Orbigny in d'Orbigny, 1839, p. 162, pl. 8, figs. 25-27.

Remarks. Only one specimen has been found in the muddy sediments in the living coral facies from the Porcupine region.

Pyrgo williamsoni (Silvestri, 1923)

Pl. 9, figs. 6

Biloculina ringens Lamarck "typica" Williamson in Williamson, 1858, p. 79, pl. 6, figs. 169-170.

Biloculina williamsoni Silvestri in Silvestri, 1923, p. 73.

Pyrgo williamsoni (Silvestri) in Haynes, 1973, p. 61, text-fig. 14 (1-3).

Pyrgo williamsoni (Silvestri) in Murray, 2003, p. 17, pl. 4, figs. 7-8.

Remarks. It is very rare and present only in the living coral and coral rubble facies along the Norwegian margin.

Genus *Triloculina* d'Orbigny, 1826

Type species: *Miliolites trigonula* Lamarck, 1804, p. 351.

Triloculina trigonula (Lamarck, 1804)

Pl. 11, fig. 2

Miliolites trigonula Lamarck in Lamarck, 1804, p. 351, pl. 17, fig. 4.

Triloculina trigonula (Lamarck) in Cushman, 1917, p. 65, pl. 25, fig. 3.

Triloculina trigonula (Lamarck) in Whittaker and Hodgkinson, 1979, p. 34, pl. 3, fig. 8.

Triloculina trigonula (Lamarck) in Zheng, 1988, p. 242, pl. 19, fig. 3; pl. 23, fig. 9; pl. 33, fig. 5; text-fig. 59.

Triloculina trigonula (Lamarck) in Jones, 1994, p. 20, pl. 3, figs. 15-16.

Triloculina trigonula (Lamarck) in Hayward and others, 1999, p. 106, pl. 5, figs. 31-32.

Triloculina trigonula (Lamarck) in Holbourn and others, 2013, p. 566-567, figs. 1-2.

Remarks. It is rare and only present in a few samples from the buried cold-water coral facies of the Alboran Sea and is very rare in the living coral facies from Norway.

Triloculina marioni Schlumberger, 1893

Pl. 11, fig. 1

Triloculina marioni Schlumberger in Schlumberger, 1893, p. 62, pl. 1, figs. 38-41.

Triloculina marioni Schlumberger in Le Calvez and Le Calvez, 1958, p. 191, pl. 6, figs. 54-56.

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Triloculina marioni Schlumberger in Cimerman and Langer, 1991, p. 46, pl. 43, figs. 1-5.

Triloculina marioni Schlumberger in Milker and Schmiedl, 2012, p. 67, figs. 17.17-18.

Remarks. It is very rare and present only in a few samples from the buried cold-water coral facies of the Alboran Sea.

Triloculina tricarinata d'Orbigny, 1826

Pl. 11, fig. 3

Triloculina tricarinata d'Orbigny in d'Orbigny, 1826, p. 299.

Triloculina tricarinata d'Orbigny in Bock, 1971, p. 28, pl. 12, figs. 1-2.

Triloculina tricarinata d'Orbigny in Cimerman and Langer, 1991, p. 46, pl. 44, figs. 3-4.

Triloculina tricarinata d'Orbigny in Sgarrella and Moncharmont-Zei, 1993, p. 187, pl. 9, figs. 14-15.

Triloculina tricarinata d'Orbigny in Hottinger and others, 1993, p. 65, pl. 68, figs. 7-12.

Triloculina tricarinata d'Orbigny in Milker and Schmiedl, 2012, p. 68, figs. 17.23-24.

Triloculina tricarinata d'Orbigny in Holbourn and others, 2013, p. 564-565, figs. 1-2.

Remarks. This species is very rare and present only in the Alboran Sea and in the coral rubble and mud facies from Norway.

Subfamily SIGMOILINITINAE Luczkowska, 1974

Genus *Sigmoïnella* Saidova, 1975

Type species: *Sigmoïnella borealis* Saidova, 1975, p. 157.

Sigmoïnella borealis Saidova, 1975

Pl. 11, fig. 4

Sigmoïnella borealis Saidova in Saidova, 1975, p. 158, pl. 45, fig. 2.

Sigmoïnella borealis Saidova in Loeblich and Tappan, 1987, p. 349, pl. 356, figs. 19-20.

Remarks. This species is very rare and has been found only in one sample from the buried cold-water coral facies of the Alboran Sea.

Subfamily SIGMOILOPSINAE Vella, 1957

Genus *Sigmoilopsis* Finlay, 1947

Type species: *Sigmoilina schlumbergeri* Silvestri, 1904, p. 267.

Sigmoilopsis schlumbergeri (Silvestri, 1904)

Pl. 11, fig. 5

Sigmoilina schlumbergeri Silvestri in Silvestri, 1904, pp. 267, 269.

Sigmoilina schlumbergeri Silvestri in Kihle and Løfaldli, 1975.

Sigmoilopsis schlumbergeri (Silvestri) in Loeblich and Tappan, 1987, p. 350, pl. 356, figs. 8-13.

Sigmoilopsis schlumbergeri (Silvestri) in Cimerman and Langer, 1991, p. 48, pl. 46, figs. 10-14.

Sigmoilopsis schlumbergeri (Silvestri) in Milker and Schmiedl, 2012, p. 69-70, figs. 18.7-8.

Sigmoilopsis schlumbergeri (Silvestri) in Holbourn and others, 2013, p. 506-507, figs. 1-2.

Remarks. This species is common in buried cold-water coral facies of the Alboran Sea. It is rarer in the coral rubble, sediment clogged coral, pebbly sand and mud facies from Norway, and in the off mound, mud, sandwave and dropstone facies from the Porcupine/Rockall regions.

Sigmoilopsis woodi Atkinson, 1968

Pl. 11, fig. 6

Sigmoilopsis woodi Atkinson in Atkinson, 1968, p. 161, pl. 18, fig. 4.

Remarks. This species is only present in the coral rubble facies from the Norwegian margin.

Suborder LAGENINA Delange and Hérouard, 1896

Superfamily NODOSARIACEA Ehrenberg, 1838

Family NODOSARIIDAE Ehrenberg, 1838

Subfamily NODOSARIINAE Ehrenberg, 1838

Genus *Dentalina* Risso, 1826

Type species: *Nodosaria cuvieri* d'Orbigny, 1826, p. 255.

Dentalina cuvieri (d'Orbigny, 1826)

Pl. 12, fig. 1

Nodosaria cuvieri d'Orbigny in d'Orbigny, 1826, p. 255, pl. 9, fig. 57.

Remarks. This species is very rare and present only in off mound (muddy) sediments from the Porcupine Seabight.

Dentalina lamarcki Neugeboren, 1856

Pl. 12, fig. 2

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Dentalina lamarcki Neugeboren in Neugeboren, 1856, p. 91, pl. 4, fig. 16.

Remarks. This species is very rare and only found in the buried cold-water coral facies from the Alboran Sea (Dhaka MV)

Genus *Grigelis* Mikhalevich, 1981

Type species: *Nodosaria pyrula* d'Orbigny, 1826, p. 253.

Grigelis orectus (Loeblich and Tappan, 1994)

Pl. 12, fig. 3

Nodosaria pyrula d'Orbigny in d'Orbigny, 1826, p. 253.

Nodosaria pyrula d'Orbigny in Brady, 1884, p. 497, pl. 62, figs. 10-12.

Nodosaria pyrula d'Orbigny in Cushman, 1921, p. 187, pl. 33, figs. 3-5.

Dentalina guttifera (d'Orbigny) in Barker, 1960, p. 130, pl. 62, figs. 10-12.

Grigelis guttifera (d'Orbigny) in Loeblich and Tappan, 1987, p. 396, pl. 441, figs. 2-3.

Grigelis orectus (Loeblich and Tappan) in Loeblich and Tappan, 1994, p. 64, pl. 115, fig. 22.

Remarks. This species is very rare and present only in one sample from the buried cold-water coral facies from the Alboran Sea (Dhaka MV) and in one sample from the coral rubble facies of Norway.

Genus *Laevidentalina* Loeblich and Tappan, 1986

Type species: *Laevidentalina aphelis* Loeblich and Tappan, 1986, p. 242.

Laevidentalina sidebottomi (Cushman, 1933)

Pl. 12, fig. 4

Dentalina sidebottomi Cushman in Cushman, 1933, p. 12, pl. 3, fig. 4.

Laevidentalina sidebottomi (Cushman) in Loeblich and Tappan, 1987, p. 350, pl. 113, figs. 13-19.

Remarks. This species is very rare and present only in one sample from the buried cold-water coral facies retrieved in the Alboran Sea on the Dhaka MV.

Family VAGINULINIDAE Reuss, 1860

Subfamily LENTICULININAE Chapman, Parr and Collins, 1934

Genus *Lenticulina* Lamarck, 1804

Type species: *Lenticulites rotulata* Lamarck, 1804, p. 153.

Lenticulina calcar (Linné, 1758)

Pl. 12, fig. 5

Nautilus calcar Linné in Linné, 1758, p. 709, pl. 19, figs. b-c.

Lenticulina calcar (Linné) in Cimerman and Langer, 1991, p. 51, pl. 53, figs. 1-4.

Lenticulina calcar (Linné) in Sgarrella and Moncharmont-Zei, 1993, p. 194, pl. 12, fig. 11.

Lenticulina calcar (Linné) in Milker and Schmiedl, 2012, p. 72, fig. 18.14.

Remarks. This species occurs only in a very few samples from the buried cold-water coral facies from the Alboran Sea.

Lenticulina gibba (d'Orbigny, 1826)

Pl. 12, fig. 7

Cristellaria gibba d'Orbigny in d'Orbigny, 1826, p. 292, no. 17.

Lenticulina gibba (d'Orbigny) in Kihle and Løfaldli, 1975.

Lenticulina gibba (d'Orbigny) in Cimerman and Langer, 1991, p. 51, pl. 53, figs. 7-11.

Lenticulina gibba (d'Orbigny) in Jones, 1994, p. 81, pl. 69, figs. 8-9.

Lenticulina gibba (d'Orbigny) in Holbourn and others, 2013, p. 334-335, figs. 1-2.

Remarks. This species is only present in the mud and coral rubble facies from Norway and in a few samples from the buried cold-water coral facies in the Alboran Sea (Dhaka and Maya MVs).

Lenticulina inornata (d'Orbigny, 1846)

Pl. 12, fig. 9

Robulina inornata d'Orbigny in d'Orbigny, 1846, p. 102, pl. 4, figs. 25-26.

Remarks. This species is generally rare along the Norwegian margin and present in the muddy-sandy sediments in the coral rubble, pebbly sand, sediment clogged framework and living coral facies. It is present and rare to common in the buried coral facies from the Alboran Sea and it is very rare in the off-mound and dropstone facies in the Porcupine/Rockall region.

Lenticulina orbicularis (d'Orbigny, 1846)

Pl. 12, fig. 8

Robulina orbicularis d'Orbigny in d'Orbigny, 1826, p. 288, pl. 15, figs. 8-9.

Lenticulina orbicularis (d'Orbigny) in Cimerman and Langer, 1991, p. 51, pl. 53, fig. 12.

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Lenticulina orbicularis (d'Orbigny) in Jones, 1994, p. 81, pl. 69, fig. 17.

Lenticulina orbicularis (d'Orbigny) in Kihle and Løfaldli, 1975.

Lenticulina orbicularis (d'Orbigny) in Milker and Schmiedl, 2012, p. 73, figs. 18.19-20.

Remarks. This species is present in all the studied regions and does not seem to have any habitat preference.

Lenticulina vortex (Fichtel and Moll, 1798)

Pl. 12, fig. 6

Nautilus vortex Fichtel and Moll in Fichtel and Moll, 1798, p. 33, pl. 2, figs. d-i.

Lenticulina vortex (Fichtel and Moll) in Jones, 1994, p. 81, pl. 69, figs. 14-16.

Remarks. This species is rare and has been observed only from the buried cold-water coral facies from the Alboran Sea (Dhaka and Maya MVs).

Genus *Neolenticulina* McCulloch, 1977

Type species: *Neolenticulina chathamensis* McCulloch, 1977, p. 8.

Neolenticulina peregrina (Schwager, 1866)

Pl. 12, fig. 10

Cristellaria peregrina Schwager in Schwager, 1866, p. 245, pl. 7, fig. 89.

Cristellaria variabilis Reuss in Brady, 1884 (not Reuss, 1850), p. 541, pl. 68, figs. 11-16.

Lenticulina peregrina (Schwager) in Cushman and McCulloch, 1950, p. 302, pl. 39, fig. 5.

Dimorphina peregrina (Schwager) in Hofker, 1978, p. 37, pl. 3, figs. 3-4, 7-8.

Neolenticulina peregrina (Schwager) in Loeblich and Tappan, 1987, p. 406, pl. 447, figs. 9-12, 16.

Neolenticulina variabilis (Reuss) in Jones, 1994, p. 80, pl. 68, figs. 11-16.

Neolenticulina peregrina (Schwager) in Milker and Schmiedl, 2012, p. 73, fig. 18.21.

Neolenticulina peregrina (Schwager) in Holbourn and others, 2013, p. 368-369, figs. 1-2.

Remarks. This species is very rare and observed only in one sample from the Porcupine Seabight and in a few samples from the Alboran Sea.

Genus *Saracenaria* Defrance, 1824

Type species: *Saracenaria italica* Defrance, 1824, in de Blainville, 1824, p. 176.

Saracenaria caribbeana Hofker, 1976

Pl. 13, fig. 1

Saracenaria caribbeana Hofker in Hofker, 1976, p. 191, pl. 65.

Saracenaria caribbeana Hofker in Jones, 1994, p. 80, pl. 68, fig. 17.

Remarks. This species is only observed from the Porcupine Seabight.

Subfamily MARGINULININAE Wedekind, 1937

Genus *Amphicoryna* Schlumberger, 1881

Type species: *Nautilus scalaris* Batsch, 1791, p. 1, 4.

Amphicoryna scalaris (Batsch, 1791)

Pl. 13, figs. 2-3

Nautilus (Ortoceras) scalaris, Batsch in Batsch, 1791, p. 91, pl. 2, figs. 4.

Nodosaria scalaris (Batsch) in Cushman, 1921, p. 199, pl. 35, fig. 6.

Amphicoryna scalaris (Batsch) in Barker, 1960, pl. 63, figs. 28-31.

Amphicoryna scalaris (Batsch) in Cimerman and Langer, 1991, p. 52, pl. 54, figs. 1-9.

Amphicoryna scalaris (Batsch) in Jones, 1994, p. 75, pl. 63, figs. 28-31.

Amphicoryna scalaris (Batsch) in Milker and Schmiedl, 2012, p. 73, figs. 18.22-25.

Amphicoryna scalaris (Batsch) in Holbourn and others, 2013, p. 42-43, fig. 1.

Remarks. This species is very abundant in the buried cold-water coral facies from the Alboran Sea and rare in the mud and dead coral facies of the Porcupine/Rockall region. It is very rare in the mud and coral rubble facies from Norway.

Genus *Astacolus* de Montfort, 1908

Type species: *Nautilus crepidula* Fichtel and Moll, 1798, p. 64.

Astacolus beerae Brenner and McMillan, 1976

Pl. 13, fig. 4

Astacolus beerae Brenner and McMillan in McLachlan, Brenner and McMillan, 1976, p. 351, pl. 11, figs. 13-18.

Remarks. This species has been observed only in the pebbly sand facies from Norway and it is always very rare.

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Subfamily VAGINULININAE Reuss, 1860

Genus *Planularia* DeFrance, 1824

Type species: *Peneroplis auris* DeFrance in de Blainville, 1824, p. 178.

Planularia perculata McCulloch, 1977

Pl. 13, fig. 5

Planularia perculata McCulloch, 1977, p. 10, pl. 96, fig. 14.

Remarks. This species is only found in the buried cold-water coral facies from the Alboran Sea (Maya MV), where it is rare.

Planularia costata (d'Orbigny, 1826)

Pl. 13, fig. 7

Robulina costata d'Orbigny in d'Orbigny, 1826, p. 43, pl. 44, fig. 3.

Remarks. This species is only observed in one sample from the Porcupine Seabight.

Family LAGENIDAE Reuss, 1862

Genus *Lagena* Walker and Jacob, 1798

Type species: *Serpula (Lagena) sulcata* Walker and Jacob, in Kanmacher, 1798, p. 634.

Lagena substriata Williamson, 1848

Pl. 13, fig. 6

Lagena substriata Williamson in Williamson, 1848, p. 15, pl. 2, fig. 12.

Lagena substriata Williamson in Murray, 2003, p. 17, pl. 5, fig. 7.

Lagena substriata Williamson in Jones, 1994, p. 64, pl. 57, fig. 19.

Remarks. This species is only present in one sample from the mud facies along the Norwegian margin.

Lagena meridionalis Wiesner, 1931

Pl. 13, fig. 8

Lagena gracilis Williamson var. *meridionalis* Wiesner in Wiesner, 1931, p. 117, pl. 18, fig. 211.

Lagena meridionalis Williamson in Jones, 1994, p. 66, pl. 58, fig. 19.

Lagena meridionalis Williamson in Vazquez Riveiros and Patterson, 2008, p. 16, pl. 6, fig. 4.

Remarks. This species is rare and can be found in the buried cold-water coral facies from the Alboran Sea,

and in the coral rubble, pebbly sand and living coral facies in Norway.

Lagena semilineata var. *spinigera* Earland, 1934

Pl. 13, fig. 9

Lagena semilineata Wright var. *spinigera* Earland in Earland, 1934, p. 173, pl. 7, fig. 21.

Lagena semilineata Wright var. *spinigera* Earland in Jones, 1994, p. 65, pl. 58, figs. 4, 17.

Remarks. This species is only present in one sample from the coral rubble facies from Norway.

Lagena squamosoalata Brady, 1881

Pl. 13, fig. 11

Lagena squamosoalata Brady in Brady, 1881, p. 61, pl. 60, fig. 23.

Lagena squamosoalata Brady in Jones, 1994, p. 70, pl. 60, fig. 23.

Remarks. It is only found in one sample from the dropstone facies from the Rockall Bank.

Lagena trigonolaevigata Balkwill and Millett, 1884

Pl. 13, fig. 12

Lagena trigonolaevigata Balkwill and Millett in Balwill and Millett, 1884, p. 86, pl. 3, fig. 4.

Remarks. This species is only present in the pebbly sand facies of the Norwegian margin.

Genus *Pygmaeoseistrion* Patterson and Richardson, 1987

Type species: *Lagena hispidula* Cushman, 1913, p. 14.

Pygmaeoseistrion laevis ovalis (Walker and Boys, 1798)

Pl. 13, fig. 10

Serpula laevis ovalis Walker and Boys in Walker and Boys, 1784, p. 3, pl. 1, fig. 9.

Vermiculum laeve Montagu in Montagu, 1803, p. 524, pl. 1, fig. 9.

Remarks. This species is observed only in the coral rubble facies from Norway.

Genus *Hyalinonetrion* Patterson and Richardson, 1987

Type species: *Hyalinonetrion sahalense* Patterson and Richardson, 1987.

Hyalinonetrion gracillimum (Costa, 1856)

Pl. 14, fig. 1

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Amphorina gracilis Costa in Costa, 1856, p. 121, pl. 11, fig. 11a (A).

Lagena gracillima (Costa) in Feyling-Hanssen, 1954, p. 206, pl. 4, fig. 1.

Lagena gracillima (Costa) in Gabel, 1971, p. 45, pl. 10, figs. 1-2.

Hyalinotrion gracillimum (Costa) in Cimerman and Langer 1991, p. 52, pl. 55, figs. 1-2.

Hyalinotrion gracillimum (Costa) in Milker and Schmedl, 2012, p. 74, fig. 18.30.

Remarks. This species is recorded only in one sample from the coral rubble facies from Norway.

Family POLYMORPHINIDAE d'Orbigny, 1839

Subfamily POLYMORPHININAE d'Orbigny, 1839

Genus *Globulina* d'Orbigny, 1839

Type species: *Polymorphina gibba* d'Orbigny, 1826, p. 266.

Globulina aequalis d'Orbigny, 1846

Pl. 14, fig. 2

Globulina aequalis d'Orbigny in d'Orbigny, 1846, p. 227, pl. 13, figs. 11, 12.

Remarks. This species is rare and observed only from the coral rubble facies from Norway.

Genus *Pseudopolymorphina* Cushman and Ozawa, 1928

Type species: *Pseudopolymorphina hanzawai* Cushman and Ozawa, 1928, p. 15.

Pseudopolymorphina sp.

Pl. 14, fig. 3

Remarks. This species is only found in one sample from coral rubble facies recovered along the Norwegian margin. This species resembles *Pseudopolymorphina suboblunga* Cushman and Ozawa 1930, but it differs for its less elongated test and its larger aboral side.

Genus *Pyrulina* d'Orbigny, 1839

Type species: *Polymorphina gutta* d'Orbigny, 1926, p. 267, 310.

Pyrulina cylindroides (Roemer, 1838)

Pl. 14, fig. 4

Polymorphina cylindroides Roemer in Roemer, 1838, p. 385, pl. 3, fig. 26.

Pyrulina cylindroides (Roemer) in Feyling-Hansen, 1954, p. 219, pl. 5, figs. 10-11.

Pyrulina cylindroides (Roemer) in Bolli, Beckmann and Saunders, 1994, p. 123, figs 33, 21-22.

Pyrulina cylindroides (Roemer) in Holbourn and others, 2013, p. 462-463, figs. 1-5.

Remarks. This species has been observed only from the living coral facies along the Norwegian margin.

Family ELLIPSOLAGENIDAE Silvestri, 1923

Subfamily OOLININAE Loeblich and Tappan, 1961

Genus *Favulina* Patterson and Richardson, 1987

Type species: *Entosolenia squamosa* Montagu var. *hexagona* Williamson, 1848, p. 20.

Favulina squamosa (Montagu, 1803)

Pl. 14, fig. 5

Vermiculium squamosum Montagu in Montagu, 1803, p. 526, pl. 14, fig. 2.

Oolina squamosa (Montagu) in Jones, 1994, p. 66, pl. 58, fig. 32.

Oolina squamosa (Montagu) in Kihle and Løfaldli, 1975.

Remarks. This species is observed in only 1 sample from the buried coral facies in the Alboran Sea (1 specimen), and a few specimens have been found in the pebbly sand and coral rubble facies in Norway.

Favulina melo (d'Orbigny, 1839)

Pl. 14, fig. 6

Oolina melo d'Orbigny in Kihle and Løfaldli, 1975.

Favulina melo (d'Orbigny) in Vazquez Riveiros and Patterson, 2008, p. 17, pl. 7, fig. 2.

Remarks. Only a few specimens are found in buried coral facies in the Alboran Sea and the coral rubble and sediment clogged coral framework facies in Norway.

Favulina hexagona (Williamson, 1848)

Pl. 14, fig. 7

Entosolenia squamosa (Montagu) var. *hexagona* Williamson in Williamson, 1848, p. 20, pl. 2, fig. 23.

Oolina hexagona (Williamson) in Jones, 1994, p. 66, pl. 58, fig. 33.

Favulina hexagona (Williamson) in Cimerman and Langer, 1991, p. 55, pl. 58, figs. 8-9.

Favulina hexagona (Williamson) in Milker and Schmedl, 2012, p. 77, fig. 19.4.

Remarks. It differs from *F. squamosa* by the larger size of the ornamentations. This species is present in the coral rubble and sediment clogged coral facies from the

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Norwegian margin and the dead coral facies from the Porcupine Seabight.

Genus *Homalohedra* Patterson and Richardson, 1987

Type species: *Lagena guntheri* Earland, 1934, p. 151

Homalohedra williamsoni (Alcock, 1865)

Pl. 14, fig. 8

Entosolenia williamsoni Alcock in Alcock, 1865, p. 195.

Oolina williamsoni (Alcock) in Feyling-Hansen, 1954, p. 227, pl. 18, figs. 1,2.

Oolina williamsoni (Alcock) in Murray, 2003, p. 17, pl. 5, fig. 10.

Homalohedra williamsoni (Alcock) in Debenay and others, 2001, pl. 3, fig. 5.

Remarks. This species is observed in the pebbly sand and coral rubble facies and in one sample from the living coral facies from Norway. It differs from *H. apiopleura* for the more spaced costae on the test surface.

Homalohedra apiopleura (Loeblich and Tappan, 1953)

Pl. 14, fig. 9

Lagena apiopleura Loeblich and Tappan in Loeblich and Tappan, 1953, p. 59, pl. 10, figs. 14-15.

Oolina apiopleura (Loeblich and Tappan) in Jones, 1994, p. 65, pl. 57, fig. 32.

Homalohedra apiopleura (Loeblich and Tappan) in Vazquez Riveiros and Patterson, 2008, p. 17, pl. 7, fig. 3.

Remarks. It is very rare and found only in the buried coral facies in the Alboran Sea and Lophhavet.

Homalohedra borealis (Loeblich and Tappan, 1954)

Pl. 15, fig. 1

Entosolenia costata Williamson in Williamson, 1858, p. 9, pl. 1, fig. 18.

Oolina costata (Williamson) in Loeblich and Tappan, 1953, p. 68, pl. 13, figs. 4-6.

Oolina borealis Loeblich and Tappan in Loeblich and Tappan, 1954, p. 384.

Homalohedra borealis (Loeblich and Tappan) in Vazquez Riveiros and Patterson, 2008, p. 17, pl. 7, fig. 4.

Remarks. This species is observed in the pebbly sand and coral rubble facies and from the muddy sediments of the living coral facies from Norway. It differs from *H. williamsoni* and *H. apiopleura* because of the thinner and well spaced longitudinal costae and a more

spherical test. The name *Oolina borealis* was proposed by Loeblich and Tappan 1954 to replace the name *Oolina costata* Williamson to avoid homonymy when *Entosolenia costata* Williamson was placed in the genus *Oolina*, where the species *Oolina costata* Egger, already existed. The genus *Homalohedra* was successively proposed for these species having longitudinal costae (Patterson and Richardson, 1987).

Homalohedra eucoata (McCulloch, 1977)

Pl. 15, fig. 2

Oolina eucoata McCulloch in McCulloch, 1977, pp. 78, 79, pl. 55, fig. 7.

Remarks. It is very rare and present only in the coral rubble facies along the Norwegian margin. It differs from the other species belonging to the genus *Homalohedra* because of the very thin and dense costae, which ornament its test.

Genus *Oolina* d'Orbigny, 1839

Type species: *Oolina laevigata* d'Orbigny, 1839, p. 19.

Oolina laevigata d'Orbigny, 1839

Pl. 15, fig. 6

Oolina laevigata d'Orbigny in d'Orbigny, 1839, p. 19, pl. 5, fig. 3.

Remarks. This species is rare and present only in the coral rubble facies from Norway.

Oolina lineata subsp. *communis* McCulloch, 1977

Pl. 15, fig. 3

Oolina lineata Williamson subsp. *communis* McCulloch in McCulloch, 1977, p. 81, pl. 55, fig. 18.

Remarks. It is very rare and present only in the pebbly sand facies from Norway.

Oolina ampulladistoma (Jones, 1874)

Pl. 15, fig. 4

Lagena vulgaris Williamson var. *ampulladistoma* Jones in Jones, 1874, p. 63, pl. 19, fig. 5.

Remarks. It is very rare and present only in the muddy-sandy fraction of the coral rubble facies from Norway.

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Oolina globosa (Montagu, 1803)

Pl. 15, fig. 5

Vermiculum globosum Montagu in Montagu, 1803, p. 523, pl. 1, fig. 8.

Lagena globosa (Montagu) in Brady, 1884, p. 452, pl. 56, figs. 1-3.

Oolina globosa (Montagu) in Sgarrella and Moncharmont-Zei, 1993, p. 199.

Oolina globosa (Montagu) in Jones, 1994, p. 61, pl. 56, figs. 1-3.

Remarks. Generally very rare, this species occurs in the mud facies and in the finer sediment fraction of the living coral facies from the Norwegian margin.

Genus *Fissurina* Reuss, 1850

Type species: *Fissurina laevigata* Reuss, 1850, p. 366.

Fissurina agassizi Todd and Brönnimann, 1957

Pl. 15, fig. 7

Fissurina agassizi Todd and Brönnimann in Todd and Brönnimann, 1957, p. 36, pl. 9, fig. 14.

Remarks. This species is very rare and present only in the buried coral facies from the Alboran Sea (Maya MV).

Fissurina annectens (Burrows and Holland, 1895, fide Jones, 1895)

Pl. 16, fig. 4

Lagena annectens Burrows and Holland in Jones, 1895, p. 203, pl. 7, fig. 11.

Lagena annectens Burrows and Holland in Buchner, 1940, p. 48, pl. 15, figs. 279-293.

Fissurina annectens (Burrows and Holland) in Kihle and Løfaldli, 1975, Figs. A-B.

Fissurina annectens (Burrows and Holland) in Sgarrella and Moncharmont-Zei, 1993, p. 200.

Remarks. This species is present only in the coral rubble facies from the Norwegian margin. It differs from *F. crassiporosa* because it possesses a keel along the peripheral margin in the lower part of the test.

Fissurina circularis Todd, 1954

Pl. 15, fig. 8

Fissurina circularis Todd in Todd, 1954, p. 351, pl. 87, fig. 27.

Remarks. This species is only found in the dropstone facies from the Porcupine/Rockall region.

Fissurina lucida (Williamson, 1848)

Pl. 16, fig. 1

Entosolenia marginata (Montagu) var. *lucida* Williamson in Williamson, 1848, p. 17, pl. 2, fig. 17.

Fissurina lucida (Williamson) in Kihle and Løfaldli, 1975, figs. A-B.

Fissurina lucida (Williamson) in Vazquez Riveiros and Patterson, 2008, p. 19, pl. 8, Fig. 2.

Remarks. This species is common in the muddy-silty sediments from coral rubble and pebbly sand facies from Norway. It is rare in the dropstone facies of the Porcupine/Rockall region and in the buried coral facies from the Alboran Sea.

Fissurina eburnea Buchner, 1940

Pl. 16, fig. 2

Fissurina eburnea Buchner in Buchner, 1940, p. 458, pl. 9, figs. 146, 147.

Fissurina eburnea Buchner in Vazquez Riveiros and Patterson, 2008, p. 19, pl. 8, figs. 1, 8.

Remarks. This species is present, but never abundant, in the finest sediment fraction from coral rubble, pebbly sand and the living coral facies from Norway.

Fissurina kerguelensis Parr, 1950

Pl. 16, fig. 3

Lagena staphyllearia Schwager in Brady, 1884, p. 474, pl. 59, figs. 8-11.

Fissurina kerguelensis Parr in Parr, 1950, p. 305, pl. 8, fig. 7.

Remarks. This species is only found in two samples from the buried coral facies from the Alboran Sea and it is also rare in the mud and pebbly sand facies from Norway. Brady (1884) termed this species *L. staphyllearia* Schwager, however, this species has a much thicker, more inflated test and does not possess a keeled periphery (Parr, 1950). It differs from *F. annectens*, *F. longpointensis* and *F. crassiporosa* because it has several spines on the aboral side instead of a keel.

Fissurina crassiporosa McCulloch, 1977

Pl. 16, fig. 5

Fissurina crassiporosa McCulloch in McCulloch, 1977, p. 98, pl. 56, figs. 15-16, 22.

Remarks. This species is present in the coral rubble, pebbly sand facies and in the finest sediments from the living coral facies in Norway. It differs from *F.*

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annectens, because it has a keel on the aboral side instead of spines.

Fissurina longpointensis McCulloch, 1977

Pl. 16, fig. 6

Fissurina longpointensis McCulloch in McCulloch, 1977, p. 114, pl. 59, fig. 9.

Remarks. This species is very rare and present only in the coral rubble facies from the Norwegian margin. It differs from *F. crassiporosa* because of its wider aperture.

Fissurina pseudoorbignyana (Buchner, 1940)

Pl. 17, fig. 3

Lagena pseudoorbignyana Buchner in Buchner, 1940, p. 460, pl. 10, figs. 157-160.

Remarks. This species is very rare in the pebbly sand and coral rubble facies from the Norwegian margin.

Fissurina dublini McCulloch, 1977

Pl. 17, fig. 4

Fissurina dublini McCulloch in McCulloch, 1977, p. 102, pl. 62, fig. 8.

Remarks. This species is very rare and present only in the off-mound (mud) facies from the Porcupine Seabight.

Fissurina derogata McCulloch, 1977

Pl. 17, fig. 5

Fissurina derogata McCulloch in McCulloch, 1977, p. 101, pl. 65, fig. 6.

Remarks. This species is present in the muddy-sandy sediments from the coral rubble and the living coral facies in Norway. It is very rare in the buried coral facies from the Alboran Sea.

Fissurina lacunata (Burrows and Holland, 1895, *vide* Jones, 1885)

Pl. 17, fig. 6

Lagena castrensis Brady in Brady, 1884, p. 485, pl. 1, figs. 1-3.

Lagena lacunata (Burrows and Holland) in Jones, 1895, p. 205, pl. 7, fig. 12.

Lagena lacunata (Burrows and Holland) in Milker and Schmiedl, 2012, p. 78, figs. 19.10-11.

Remarks. This species is only present in the pebbly sand facies from the Norwegian margin. Brady (1884)

termed this species *Lagena castrensis* Schwager, and indicated as characteristic the “large exogenous beads irregularly scattered over the large lateral face of the test”. However, this species has surface ornamentations consisting of shallow pittings (Burrows and Holland, 1895).

Fissurina nucelloides (Buchner, 1940)

Pl. 17, fig. 7

Lagena nucelloides Buchner in Buchner, 1940, p. 518, pl. 22, figs. 476-477.

Remarks. This species is very rare in the sandwave facies from the Porcupine/Rockall region.

Fissurina pseudolucida Zheng, 1979

Pl. 17, fig. 8

Fissurina pseudolucida Zheng in Zheng, 1979, p. 215, pl. 13, figs. 8-9.

Remarks. This species is only present in the coral rubble facies from the Norwegian margin.

Genus *Palliolatella* Patterson and Richardson, 1987

Type species: *Palliolatella avita* Patterson and Richardson, 1987, p. 219.

Palliolatella semimarginata (Reuss, 1870)

Pl. 18, fig. 1

Lagena marginata (Montagu) var. *semimarginata* Reuss in Reuss, 1870, p. 468, pl. 4, figs. 4-6, 10-12.

Fissurina semimarginata (Reuss) in Jones, 1994, p. 68, pl. 59, figs. 17, 19.

Remarks. This species is very rare in the Porcupine Seabight and only present in the off-mound muddy sediments. It is found also in the pebbly sand facies from Norway.

Subfamily PARAFISSURININAE Jones, 1984

Genus *Parafissurina* Parr, 1947

Type species: *Lagena ventricosa* Silvestri, 1904, p. 10.

Parafissurina basispinata McCulloch, 1977

Pl. 17, fig. 1

Parafissurina basispinata McCulloch in McCulloch, 1977, p. 139, pl. 72, figs. 1-3.

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Remarks. This species is very rare and only found in one sample from the buried coral facies from the Alboran Sea.

Parafissurina marginata (Walker and Boys, 1784)

Pl. 17, fig. 2

Serpula (Lagena) marginata Walker and Boys, 1784, p. 2, pl. 1, fig. 7.

Vermiculum marginatum Montagu in Montagu, 1803, p. 524, pl. 1, fig. 7.

Fissurina marginata (Murray) in Murray, 2003, p. 17, pl. 5, figs. 3-4.

Remarks. This species does not show any habitat preference along the Norwegian margin, where it is rather common. It is, however, rare in the Porcupine/Rockall region and in the buried coral facies from the Alboran Sea.

Parafissurina felsinea (Fornasini, 1894)

Pl. 18, fig. 4

Lagena cf. ovum Ehrenberg in Fornasini, 1891, p. 1, pl. 2, fig. 8.

Lagena felsinea Fornasini in Fornasini, 1894, p. 1.

Oolina felsinea (Fornasini) in Anderson, 1975, pl. 7, fig. 12.

Parafissurina felsinea (Fornasini) in Jones, 1994, p. 61, pl. 56, fig. 4.

Remarks. This species is very rare and present only in the mud facies from Norway. It has been described by Fornasini (1894) referring to drawings of the holotype published in Fornasini (1891) and previously identified as *Lagena cf. ovum* Ehrenberg.

Parafissurina lateralis (Cushman, 1913)

Pl. 18, fig. 2

Lagena lateralis Cushman in Cushman, 1913, p. 9, pl. 1, fig. 1.

Parafissurina lateralis (Cushman) in Jones, 1994, p. 62, pl. 56, figs. 17-18.

Remarks. This species is very rare and only present in the mud facies from Norway.

Parafissurina robusta (Zheng, 1979)

Pl. 18, fig. 6

Fissurina robusta Zheng in Zheng, 1979, pp. 215-216, pl. 13, fig. 11.

Remarks. This species is very rare and only present in the muddy fraction in the coral rubble facies from Norway.

Suborder ROBERTININA Loeblich and Tappan, 1984

Superfamily CERATOBULIMINACEA Cushman, 1927

Family EPISTOMINIDAE Wedekind, 1937

Subfamily EPISTOMININAE Wedekind, 1937

Genus *Hoeglundina* Brotzen, 1948

Type species: *Rotalia elegans* d'Orbigny, 1826, p. 272.

Hoeglundina elegans (d'Orbigny, 1826)

Pl. 18, fig. 3

Rotalia (Turbinulina) elegans d'Orbigny in d'Orbigny, 1826, p. 276.

Hoeglundina elegans (d'Orbigny) in Hermelin and Scott, 1985, p. 210, pl. 6, figs. 6-7.

Hoeglundina elegans (d'Orbigny) in Cimerman and Langer, 1991, p. 56, pl. 59, figs. 10-12.

Hoeglundina elegans (d'Orbigny) in Kihle and Løfaldli, 1975, figs. A-D.

Hoeglundina elegans (d'Orbigny) in Milker and Schmiedl, 2012, p. 79, figs. 19.15-16.

Hoeglundina elegans (d'Orbigny) in Holbourn and others 2013, p. 298-299, figs. 1-3.

Remarks. This species is very rare in the coral rubble facies of Norway, it is rare in the muddy (off-mound) sediment and in the sandwave facies from the Porcupine Seabight and it is common in the buried coral facies in the Alboran Sea.

Superfamily CONORBOIDACEA Thalmann, 1952

Family ROBERTINIDAE Reuss, 1850

Subfamily ROBERTININAE Reuss, 1850

Genus *Robertinoides* Höglund, 1947

Type species: *Bulimina normani* Goës, 1894, p. 47.

Robertinoides bradyi (Cushman and Parker, 1936)

Pl. 18, fig. 7

Bulimina subteres Brady in Brady, 1881, p. 55.

Bulimina subteres Brady in Brady, 1884, p. 403, pl. 50, fig. 18.

Robertina bradyi Cushman and Parker in Cushman and Parker, 1936, p. 99, pl. 16, fig. 9.

Robertinoides bradyi (Cushman and Parker) in Jones, 1994, p. 55, pl. 50, fig. 18.

Remarks. This species is present in the sediment clogged, coral rubble and living coral facies from the Norwegian margin.

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Robertinoides pumilum Höglund, 1947

Pl. 18, fig. 8

Robertinoides pumilum Höglund in Höglund, 1947, p. 227, pl. 18, fig. 5.

Robertinoides pumilum Höglund in Kihle and Løfaldli, 1975, figs. A-B.

Remarks. This species is present in the coral rubble and living coral facies from Norway.

Suborder ROTALIINA Delange and Hérouard, 1896

Superfamily BOLIVINACEA Glaessner, 1937

Family BOLIVINIDAE Glaessner, 1937

Genus *Bolivina* d'Orbigny, 1839

Type species: *Bolivina plicata* d'Orbigny, 1839, p. 31.

Bolivina alata (Seguenza, 1862)

Pl. 19, fig. 1

Valvulina alata Seguenza in Seguenza, 1862, p. 115, pl. 2, fig. 5.

Brizalina alata (Seguenza) in Cimerman and Langer, 1991, pl. 61, figs. 12-14.

Bolivina alata (Seguenza) in Sgarrella and Moncharmont-Zei, 1993, p. 207, pl. 14, fig. 8.

Remarks. This species is relatively rare in the mud facies of Norway. It is common off-mound (muddy-sandy sediments) and rarer in the living coral facies of the Porcupine/Rockall region. It is common in the Holocene in the buried coral facies from the Lophhavet. It is present but never abundant in the buried coral facies from the Alboran Sea. We retain here the generic attribution to *Bolivina*, accepted in Hayward and others (2013).

Bolivina dilatata (Reuss, 1850)

Pl. 19, fig. 2

Brizalina dilatata Reuss in Reuss, 1850, p. 381, pl. 48, figs. 15 a-c.

Brizalina dilatata (Reuss) in Cimerman and Langer, 1991, p. 59, pl. 62, fig. 2.

Remarks. This species characterizes the muddy-sandy fractions in all facies in Norway. It is abundant in the off-mound (muddy facies) in the Porcupine Seabight and it is rather common in the Alboran Sea.

Bolivina pseudoplicata Heron-Allen and Earland, 1930

Pl. 19, fig. 4

Bolivina pseudo-plicata Heron-Allen and Earland in Heron-Allen and Earland, 1930, p. 81, pl. 3, figs. 36-40.

Bolivina pseudoplicata Heron-Allen and Earland in Kihle and Løfaldli, 1975.

Bolivina pseudoplicata Heron-Allen and Earland in Cimerman and Langer, 1991, pl. 61, figs. 1-3.

Bolivina pseudoplicata Heron-Allen and Earland in Milker and Schmiedl, 2012, p. 80, figs. 19.22-23.

Remarks. This species characterizes the muddy-sandy fractions in all facies in Norway and it is very rare in the Porcupine Seabight and Alboran Sea. All the observed specimens show the typical crenulation of the sutures and the rough surface of the wall texture.

Bolivina difformis (Williamson, 1858)

Pl. 19, fig. 6

Textularia variabilis var. *difformis* Williamson in Williamson, 1858, p. 77, pl. 6, figs. 166-167.

Bolivina difformis (Williamson) in Cushman, 1937, p. 164, pl. 15, figs. 13, 17.

Bolivina difformis (Williamson) in Cimerman and Langer, 1991, pl. 61, figs. 9-11.

Brizalina difformis (Williamson) in Murray, 2003, p. 20, pl. 6, fig. 2.

Remarks. This species is generally rare in the coral rubble and pebbly sand facies from the Norwegian margin. It is common to abundant in the buried coral facies from the Alboran Sea. All the observed specimens display the spine-like elongation of the chambers along the peripheral margin.

Bolivina spinescens (Cushman, 1911)

Pl. 19, fig. 7

Bolivina textularioides Brady in Brady, 1884, p. 419, pl. 52, figs. 24-25.

Bolivina spinescens Cushman in Cushman, 1911, p. 47, fig. 76.

Remarks. This species is very rare and present only in the coral rubble facies along the Norwegian margin.

Bolivina subspinescens Cushman, 1922

Pl. 19, fig. 8

Bolivina subspinescens Cushman in Cushman, 1922, p. 48, pl. 7, fig. 5.

Brizalina subspinescens (Cushman) in Gabel, 1971, p. 54, pl. 15, fig. 4-5.

Bolivina subspinescens Cushman in Milker and Schmiedl, 2012, p. 81, fig. 19.24.

Remarks. It is rare in the coral rubble, pebbly sand and sediment clogged framework facies in Norway. It is very rare in the off-mound (muddy) and dropstone facies from the Porcupine/Rockall region, and rare to

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common in the Alboran Sea. We retain here the generic attribution of *Bolivina* according to the accepted genus in Hayward and others (2013).

Genus *Bolivinellina* Saidova, 1975

Type species: *Bolivinellina pescicula* Saidova, 1975, p. 301.

Bolivinellina pseudopunctata (Höglund, 1947)

Pl. 19, fig. 3

Bolivina pseudopunctata Höglund in Höglund, 1947, p. 273, pl. 24, figs. 23-24.

Brizalina pseudopunctata (Höglund) in Murray, 1971, p. 109, pl. 44, figs. 3-6.

Bolivinellina pseudopunctata (Höglund) in Murray, 2003, p. 20, pl. 6, fig. 1.

Remarks. This species is very rare and characteristic of the coral rubble facies from Norway, and from the off-mound facies from the Porcupine Seabight. It is slightly more abundant in the buried coral facies of the Alboran Sea.

Bolivinellina striatula (Cushman, 1922)

Pl. 19, fig. 5

Bolivina striatula Cushman in Cushman, 1922, p. 27, pl. 3, fig. 10.

Bolivina striatula Cushman in Cushman, 1937, p. 154, pl. 18, figs. 30, 31.

Brizalina striatula (Cushman) in Cimerman and Langer, 1991, p. 60, pl. 62, figs. 6-9.

Remarks. This species is very rare (one sample only) from the sediment clogged coral facies from Norway, it is present but rare in the buried coral facies from the Alboran Sea and very rare in the off-mound facies and the finest sediments from within the living coral branches in the living coral facies.

Genus *Brizalina* Costa, 1856

Type species: *Brizalina aenariensis* Costa, 1856, p. 296.

Brizalina subaenariensis (Cushman, 1922)

Pl. 20, fig. 1

Bolivina aenariensis Costa in Brady, 1884, p. 423, pl. 53, figs. 10-11.

Bolivina subaenariensis Cushman in Cushman, 1922, p. 46, pl. 7, fig. 6.

Remarks. It is very rare in the off-mound facies from the Porcupine/Rockall region and in the buried coral facies from the Alboran Sea.

Superfamily CASSIDULINACEA d'Orbigny, 1839

Family CASSIDULINIDAE d'Orbigny, 1839

Subfamily CASSIDULININAE d'Orbigny, 1839

Genus *Cassidulina* d'Orbigny, 1826

Type species: *Cassidulina laevigata* d'Orbigny, 1826, p. 282.

Cassidulina laevigata d'Orbigny, 1826

Pl. 20, fig. 4

Cassidulina laevigata d'Orbigny in d'Orbigny, 1826, p. 282, pl. 15, figs. 4-5.

Cassidulina laevigata d'Orbigny in Cimerman and Langer, 1991, p. 61, pl. 63, figs. 1-3.

Cassidulina laevigata d'Orbigny in Murray, 2003, p. 21, pl. 6, fig. 10.

Cassidulina laevigata d'Orbigny in Milker and Schmiedl, 2012, p. 83, figs. 20.5-6.

Remarks. It is always present in samples from the Norwegian margin and is generally more abundant in the muddy facies, off-mound, coral rubble facies and among living coral branches. It is common in the buried coral facies from the Alboran Sea and in the off-mound facies of the Porcupine/Rockall region.

Cassidulina reniforme Nørvang, 1945

Pl. 20, fig. 3

Cassidulina crassa d'Orbigny var. *reniforme* Nørvang in Nørvang, 1945, p. 41, fig. 6.

Cassidulina reniforme Nørvang in Wollenburg and Mackensen, 2009, p. 18, pl. 3, fig. 12.

Remarks. This species is very rare and present only in the coral rubble facies along the Norwegian margin. It shows the slightly marked typical sutures as in the holotype.

Cassidulina carinata Silvestri, 1896

Pl. 20, fig. 5

Cassidulina laevigata d'Orbigny var. *carinata* Silvestri in Silvestri, 1896, p. 104, pl. 2, fig. 10.

Cassidulina laevigata carinata Silvestri in Jorissen, 1987, p. 34, pl. 1, fig. 8.

Cassidulina carinata Silvestri in Sagrrella and Moncharmont-Zei, 1993, p. 236, pl. 23, figs. 8-9.

Cassidulina laevigata carinata Silvestri in Seidenkrantz, 1995, p. 148, pl. 1, figs. 7-9; p. 156, pl. 5, figs. 7-8.

Remarks. It is present in most of the samples from the Norwegian margin and shows a marked preference for

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muddy-sandy sediment in all facies. It is very abundant to dominant in the off-mound facies from the Porcupine Seabight and it is common to abundant in the Alboran Sea. It is distinguished from *C. laevigata* by the distinct keel along the peripheral margin.

Cassidulina teretis Tappan, 1951

Pl. 20, fig. 6

Cassidulina teretis Tappan in Tappan, 1951, p. 7, pl. 1, fig. 30.

Cassidulina teretis Tappan in Seidenkrantz, 1995, p. 148, pl. 1, figs. 12-13; p. 151, pl. 2, figs. 15-18.

Cassidulina teretis Tappan in Holbourn and others, 2013, p. 138-139, figs. 1-5.

Remarks. This species has been found only in the mud facies from the Norwegian margin. *Cassidulina teretis* differs from *C. neoteretis* by its crescent-shaped, serrate, apertural plate, while *C. neoteretis* has smooth, broader apertural plate with a more distinct angle at the marginal end giving a subtriangular shape (Seidenkrantz, 1995).

Cassidulina neoteretis Seidenkrantz, 1995

Pl. 21, fig. 1

Cassidulina neoteretis Seidenkrantz in Seidenkrantz, 1995, p. 148, pl. 1, figs. 1-6; p. 151, pl. 2, figs. 1-14.

Cassidulina neoteretis Seidenkrantz in Wollenburg and Mackensen, 2009, p. 18, fig. 3, fig. 10.

Remarks. This species has been found only in the pebbly sand facies from the Norwegian margin.

Cassidulina crassa d'Orbigny, 1839

Pl. 21, fig. 3

Cassidulina crassa d'Orbigny in d'Orbigny, 1839, p. 56, pl. 7, figs. 18-20.

Cassidulina crassa d'Orbigny in Jones, 1994, p. 60, pl. 54, fig. 4.

Cassidulina crassa d'Orbigny in Wollenburg and Mackensen, 2009, p. 18, fig. 3, fig. 9.

Remarks. This species has been found only in the pebbly sand facies from the Norwegian margin. It differs from the other species of the genus *Cassidulina* by having a very thick and massive shell.

Genus *Takayanagia* Nomura, 1983

Type species: *Cassidulina delicata* Cushman, 1927, p. 168.

Takayanagia delicata (Cushman, 1927)

Pl. 21, fig. 2

Cassidulina delicata Cushman in Cushman, 1927, p. 168, pl. 6, fig. 5.

Takayanagia delicata (Cushman) in Loeblich and Tappan, 1987, p. 507, pl. 560, figs. 5-10.

Remarks. It is present in the mud facies (off-mound) from the Porcupine/Rockall region. This species is included in the genus *Takayanagia* Nomura instead of *Cassidulina* d'Orbigny because of the optical characteristic of the wall texture, which is radial instead of granular.

Genus *Globocassidulina* Voloshinova, 1960

Type species: *Cassidulina globosa* Hantken, 1876, p. 64.

Globocassidulina subglobosa (Brady, 1881)

Pl. 21, fig. 4

Cassidulina subglobosa Brady in Brady, 1881, p. 60, pl. 54, fig. 17.

Globocassidulina subglobosa (Brady) in Jones, 1994, p. 60, pl. 54, fig. 17.

Globocassidulina subglobosa (Brady) in Murray, 2003, p. 24, pl. 8, fig. 7.

Globocassidulina subglobosa (Brady) in Cimerman and Langer, 1991, p. 61, pl. 63, figs. 4-6.

Globocassidulina subglobosa (Brady) in Holbourn and others, 2013, p. 264-265, figs 1-2.

Remarks. This species is generally common in the Alboran Sea, it is continuously present but more abundant in mud facies (off-mound) from the Porcupine/Rockall region and Norwegian margin.

Genus *Cassidulinoides* Cushman, 1927

Type species: *Cassidulina parkeriana* Brady, 1881, p. 59.

Cassidulinoides bradyi (Norman, 1881)

Pl. 21, fig. 6

Cassidulina bradyi Norman in Norman, 1881, p. 59, pl. 54, figs. 6-10 (fide Ellis and Messina, 1940 and later).

Cassidulinoides bradyi (Norman) in Sgarrella and Moncharmont-Zei, 1993, p. 211, pl. 4, fig. 5.

Cassidulinoides bradyi (Norman) in Milker and Schmiedl, 2012, p. 84, fig. 20.9.

Remarks. This species is present, but never abundant, in the buried coral facies from the Alboran Sea. It also

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characterizes the mud and pebbly sand facies from Norway.

Genus *Islandiella* Nørvang, 1959

Type species: *Cassidulina islandica* Nørvang, 1945, p. 41.

Islandiella norcrossi (Cushman, 1933)

Pl. 21, fig. 5

Cassidulina norcrossi Cushman in Cushman, 1933, p. 7, pl. 2, fig. 7.

Islandiella norcrossi (Cushman) in Wollenburg and Mackensen, 2009, p. 18, text-fig. 3, fig. 13.

Remarks. This species is included in the genus *Islandiella* following Wollenburg and Mackensen (2009), because of its radial wall texture and internal tooth, although in the observed specimens these structures were not investigated in detail. It is present in the coral rubble facies from Norway.

Subfamily EHRENBBERGININAE Cushman, 1927

Genus *Ehrenbergina* Reuss, 1850

Type species: *Ehrenbergina serrata* Reuss, 1850, p. 377.

Ehrenbergina trigona Goës, 1896

Pl. 22, fig. 1

Ehrenbergina serrata Brady var. *trigona* Goës in Goës, 1896, p. 434, pl. 55, figs. 2-7.

Ehrenbergina trigona Goës in Jones, 1994, p. 61, pl. 55, figs. 2-3, 5.

Ehrenbergina trigona Goës in Hermelin and Scott, 1985, p. 206, pl. 4, figs. 15-16.

Remarks. This species is very rare and present only in the dropstone facies from the Porcupine/Rockall area. One specimen has been found also in the living coral facies in the Porcupine Seabight.

Superfamily TURRILINACEA Cushman, 1927

Family STAINFORTHIIDAE Reiss, 1963

Genus *Stainforthia* Hofker, 1956

Type species: *Virgulina concava* Höglund, 1947, p. 257.

Stainforthia fusiformis (Williamson, 1858)

Pl. 22, fig. 2

Bulimina pupoides var. *fusiformis* Williamson in Williamson, 1858, p. 63.

Stainforthia fusiformis (Williamson) in Kihle and Løfaldli, 1975.

Stainforthia fusiformis (Williamson) in Murray, 2003, p. 26, pl. 10, figs. 1-4.

Remarks. This species is very rare in the buried coral facies from the Alboran Sea. It is present but never abundant in the mud facies (off-mound) of the Porcupine/Rockall region, and it is typical in the muddy-sandy sediments in several facies from the Norwegian margin. It is generally more abundant off-reefs and in the Oslo Fjord. It is a typical opportunistic species, which can live in stressed environments (e.g., Alve, 2010).

Stainforthia loeblichii (Feyling-Hanssen, 1954)

Pl. 22, fig. 3

Virgulina loeblichii Feyling-Hanssen in Feyling-Hanssen, 1954, p. 191, pl. 1, figs. 14-18.

Stainforthia loeblichii (Feyling-Hanssen) in Kihle and Løfaldli, 1975, figs. A-B.

Remarks. It differs from *S. fusiformis* in being more elongated and less inflated. However, both species share similar ecological conditions; it is present along the Norwegian margin from the muddy-sandy sediments in several facies.

Stainforthia skagerakensis (Höglund, 1947)

Pl. 22, fig. 5

Virgulina skagerakensis Höglund in Höglund, 1947, p. 255, pl. 23, figs. 1-2.

Stainforthia skagerakensis (Höglund) in Kihle and Løfaldli, 1975, figs. A-C.

Remarks. This species is typical of the same facies as the other species of the genus *Stainforthia*. It differs from *S. fusiformis* and *S. loeblichii* in having the most elongated test.

Superfamily BULIMINACEA Jones, 1875 in Griffith and Henfrey, 1875

Family SIPHOGENERINOIDIDAE Saidova, 1981

Subfamily SIPHOGENERINOIDINAE Saidova, 1981

Genus *Parabrizalina* Zweig-Strykowski and Reiss, 1976

Type species: *Bolivina porrecta* Brady, 1881, p. 57.

Parabrizalina porrecta (Brady, 1881)

Pl. 20, fig. 2

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Bulimina (Bolivina) porrecta Brady in Brady, 1881, p. 57, pl. 52, fig. 22.

Parabrizalina porrecta (Brady) in Holbourn and others, 2013, p. 390-391, figs. 1-2.

Remarks. Only a few specimens have been observed in the pebbly sand facies from Norway and in the buried coral facies of Lophhavet.

Subfamily TUBULOGENERININAE Saidova, 1981

Genus *Rectuvigerina* Mathews, 1945

Type species: *Siphogenerina multicostata* Cushman and Jarvis, 1929, p. 14.

Rectuvigerina elongatastriata (Colom, 1952)

Pl. 22, fig. 6

Uvigerina cf. *tenuistriata* Reuss in Colom, 1952, p. 17, pl. 3, figs. 57-58.

Angulogerina elongatastriata (Colom) in Colom, 1952, p. 29, pl. 4, figs. 6-9.

Rectuvigerina elongatastriata (Colom) in Cimerman and Langer, 1991, p. 61, pl. 63, figs. 7-9.

Remarks. This species is only present in the buried coral facies from the Alboran Sea where it is rare to common.

Genus *Siphogenerina* Schlumberger, 1882

Type species: *Siphogenerina costata* Schlumberger, 1883, p. 26.

Siphogenerina columellaris (Brady, 1881)

Pl. 22, fig. 7

Uvigerina columellaris Brady in Brady, 1881, p. 64, pl. 75, figs. 15-17.

Siphogenerina columellaris (Brady) in Jones, 1994, p. 87, pl. 75, figs. 15-17.

Remarks. This species has been found in the Alboran Sea only, where it is generally very rare. The observed specimens strongly resemble the holotype, with a very small triserial initial coiling and a long series of uniserial chambers.

Family BULIMINIDAE Jones, 1875 in Griffith and Henfrey, 1875

Genus *Bulimina* d'Orbigny, 1826

Type species: *Bulimina marginata* d'Orbigny, 1826, p. 269.

Bulimina marginata d'Orbigny, 1826

Pl. 22, fig. 9

Bulimina marginata d'Orbigny in d'Orbigny, 1826, p. 269, pl. 12, figs. 10-12.

Bulimina marginata var. *marginata*, d'Orbigny in Hottinger and others, 1993, p. 99, pl. 125, figs. 1-6.

Bulimina marginata d'Orbigny in Cimerman and Langer, 1991, p. 62, pl. 64, figs. 9-11.

Bulimina marginata d'Orbigny in Murray, 2003, p. 20, pl. 6, figs. 4-5.

Bulimina marginata d'Orbigny in Milker and Schmiedl, 2012, p. 87, fig. 20.23.

Bulimina marginata d'Orbigny in Holbourn and others, 2013, p. 108-109, figs. 1-2.

Remarks. This species characterizes the muddy sandy sediments from all facies along the Norwegian margin. It is abundant to very abundant both in the off-mound sediments from the Porcupine/Rockall region and the buried coral facies from the Alboran Sea.

Bulimina aculeata d'Orbigny, 1826

Pl. 22, fig. 8

Bulimina aculeata d'Orbigny in d'Orbigny, 1926, p. 269, n. 7.

Bulimina aculeata d'Orbigny in Cimerman and Langer, 1991, p. 61, pl. 63, figs. 10-11.

Bulimina aculeata d'Orbigny in Sgarrella and Moncharmont-Zei, 1993, p. 211, pl. 15, fig. 1.

Bulimina aculeata d'Orbigny in Holbourn and others, 2013, p. 88-89, figs. 1-3.

Remarks. This species is very rare in the coral rubble and sediment clogged framework coral facies from the Norwegian margin. It is present but never abundant in the buried coral facies from Norway and common in the off-mound (muddy) facies in the Porcupine/Rockall Basin. In some specimens the spines-like structures in the aboral part of the test are very well developed, in others they resemble short pustules.

Bulimina striata d'Orbigny, 1826

Pl. 22, fig. 10

Bulimina striata d'Orbigny in d'Orbigny, 1826, p. 269.

Bulimina inflata Seguenza in Brady, 1884, p. 406, pl. 51, figs. 11, 13.

Bulimina striata var. *notoensis* Asano in Wang and others, 1988, p. 150, pl. 21, fig. 4.

Bulimina striata d'Orbigny in Akimoto, 1990, p. 194, pl. 16, fig. 8.

Bulimina striata d'Orbigny in Van Marle, 1991, p. 88, pl. 5, figs. 6-8.

Bulimina striata d'Orbigny in Loeblich and Tappan, 1994, p. 125, pl. 242, figs. 8-14.

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Remarks. It is rare to common in the Alboran Sea and very rare in the off-mound sediments of the Porcupine/Rockall region.

Genus *Globobulimina* Cushman, 1927

Type species: *Globobulimina pacifica* Cushman, 1927, p. 67.

Globobulimina affinis (d'Orbigny, 1839)

Pl. 23, fig. 2

Bulimina affinis d'Orbigny in d'Orbigny, 1839, p. 105, pl. 2, figs. 25-26.

Bulimina affinis d'Orbigny in Brady, 1884, p. 400, pl. 50, fig. 14.

Bulimina affinis d'Orbigny in Cushman, 1911, p. 79, text-fig. 130.

Bulimina affinis d'Orbigny in Phleger and Parker, 1951, p. 15, pl. 7, figs. 21-22.

Bulimina affinis d'Orbigny in Loeblich and Tappan, 1994, p. 124, pl. 240, figs. 12-13.

Globobulimina affinis (d'Orbigny) in Sgarrella and Moncharmont-Zei, 1993, 212, pl. 15, figs. 8-9.

Globobulimina affinis (d'Orbigny) in Milker and Schmiedl, 2012, p. 89, fig. 20.24.

Remarks. This species is very rare in the mud facies from the Norwegian margin and coral rubble facies in the Porcupine Seabight. It is present but never abundant in the Alboran Sea.

Globobulimina doliolum (Terquem and Terquem, 1886)

Pl. 23, fig. 5

Bulimina doliolum Terquem and Terquem in Terquem and Terquem, 1886, p. 333, pl. 11, figs. 17-18.

Remarks. This species is very rare in the living coral facies from Norway. It is more abundant in the buried coral facies from the Lophavet reef (Northern Norway).

Globobulimina turgida (Bailey, 1851)

Pl. 23, fig. 1

Bulimina turgida Bailey in Bailey, 1851, p. 12, figs. 28-31, 67.

Globobulimina turgida (Bailey) in Gabel, 1971, p. 52, pl. 14, fig. 21.

Remarks. This species is present, but very rare only in the mud facies from the Oslo Fjord. It differs from the other species belonging to the genus *Globobulimina* by its more spherical morphology.

Genus *Praeglobobulimina* Hofker, 1951

Type species: *Bulimina pyrula* d'Orbigny var. *spinescens* Brady, 1884, p. 400.

Praeglobobulimina ovata (d'Orbigny, 1846)

Pl. 23, fig. 4

Bulimina ovata d'Orbigny in d'Orbigny, 1846, p. 185, pl. 11, figs. 13-14.

Bulimina ovata d'Orbigny in Brady, 1884, p. 400, pl. 50, fig. 13.

Praeglobobulimina ovata (d'Orbigny) in Jones, 1994, p. 54, pl. 50, fig. 13.

Remarks. This species is very rare and present only in the off-mound mud facies of the Porcupine Seabight.

Family BULIMINELLIDAE Hofker, 1951

Genus *Buliminella* Cushman, 1911

Type species: *Bulimina elegantissima* d'Orbigny, 1839, p. 51.

Buliminella spinigera Cushman, 1922

Pl. 23, fig. 6

Buliminella spinigera Cushman in Cushman, 1922, p. 113, pl. 23, figs. 1-3.

Remarks. This species is very rare and present only in the off-mound mud facies of the Porcupine Seabight. It is characterized by a single spine in aboral position.

Subfamily UVIGERININAE Haeckel, 1894

Genus *Uvigerina* d'Orbigny, 1826

Type species: *Uvigerina pygmaea* d'Orbigny, 1826, p. 268.

Uvigerina pygmaea d'Orbigny, 1826

Pl. 24, fig. 5

Uvigerina pygmaea d'Orbigny in d'Orbigny, 1826, p. 269, pl. 12, figs. 8-9.

Uvigerina pygmaea d'Orbigny in Thomas, 1980, pl. 3, fig. 3.

Uvigerina pygmaea d'Orbigny in Timm, 1992, p. 68, pl. 6, figs. 1a, b.

Uvigerina pygmaea d'Orbigny in Lutze, 1986, p. 36, pl. 3, figs. 6-8.

Uvigerina pygmaea d'Orbigny in Schönfeld, 2006, p. 357, pl. 1, figs. 6-11.

Uvigerina pygmaea d'Orbigny in Holbourn and others, 2013, p. 600-601, figs. 1-3.

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Remarks. This species is rare and recorded only in the living coral facies from the Porcupine Seabight.

Uvigerina auberiana d'Orbigny, 1839

Pl. 24, fig. 3

Uvigerina auberiana d'Orbigny in d'Orbigny, 1839, p. 106, pl. 2, figs. 23-24.

Uvigerina asperula Czjzek var. *auberiana* d'Orbigny in Brady, 1884, p. 579, pl. 75, fig. 9.

Uvigerina asperula Czjzek in Brady, 1884, p. 578, pl. 75, figs. 6-8.

Uvigerina asperula Czjzek in Ujiić, 1990, p. 31, pl. 13, figs. 7-8.

Uvigerina auberiana d'Orbigny in Uchio, 1960, p. 65, pl. 7, fig. 11.

Uvigerina auberiana d'Orbigny in Jones, 1994, p. 86, pl. 75, figs. 6-9.

Uvigerina auberiana d'Orbigny in Holbourn and others, 2013, p. 584-585, figs. 1-3.

Remarks. It is very rare in the Alboran Sea, where it occurs only in a few samples. It is very rare in the pebbly sand facies along the Norwegian margin and in the off-mound facies from the Porcupine Seabight. In this region it rarely occurs also in the living coral facies.

Uvigerina mediterranea Hofker, 1932

Pl. 24, fig. 1

Uvigerina mediterranea Hofker in Hofker, 1932, p. 118, fig. 32.

Uvigerina mediterranea Hofker in Cimerman and Langer, 1991, p. 63, pl. 65, figs. 7-9.

Uvigerina mediterranea Hofker in Abu-Zied and others, 2008, p. 52, pl. 2, figs. 17-18.

Uvigerina mediterranea Hofker in Milker and Schmiedl, 2012, p. 89, fig. 20.28.

Uvigerina mediterranea Hofker in Holbourn and others, 2013, p. 596-597, fig. 1.

Remarks. This species is present only in a few samples from the pebbly sand facies from Norway. It is abundant in the mud and dropstone facies from the Porcupine/Rockall region, and abundant in the buried coral facies from the Alboran Sea. It differs from *U. mediterranea* by the more spaced and thicker costae that ornament the wall of the test.

Uvigerina peregrina Cushman, 1923

Pl. 24, fig. 2

Uvigerina peregrina Cushman in Cushman, 1923, p. 166, pl. 42, figs. 7-10.

Uvigerina peregrina Cushman in Abu-Zied and others, 2008, p. 52, pl. 2, figs. 19-20.

Uvigerina peregrina Cushman in Phleger and Parker, 1951, p. 18, pl. 8, figs. 22, 24-26.

Uvigerina peregrina Cushman in Lutze, 1986, p. 32, pl. 1, figs. 1-6.

Uvigerina peregrina Cushman in Ujiić, 1990, p. 31, pl. 13, figs. 1-3.

Uvigerina peregrina Cushman in Milker and Schmiedl, 2012, p. 90, fig. 20.29.

Remarks. This species is present in the pebbly sand, coral rubble and mud facies from Norway. It is rarely found also in the living coral facies. In the Porcupine/Rockall region it occurs abundantly in the mud and dropstone facies. In the Alboran Sea it is common to abundant. It differs from *U. peregrina* by the denser and thinner costae, which ornament the wall of the test.

Uvigerina peregrina parva Lutze, 1986

Pl. 24, fig. 4

Uvigerina peregrina Cushman var. *parva* Lutze in Lutze, 1986, p. 36, pl. 3, figs. 1-5.

Uvigerina bradyana Fornasini in Austin and Evans, 2000, p. 690, fig. 3.1.

Uvigerina peregrina Cushman var. *parva* Lutze in Schönfeld, 2006, p. 359, pl. 1, figs. 12-13.

Remarks. This species is rare and observed only in one sample from the living coral facies from the Porcupine region. It differs from *U. peregrina* in its less elongated morphology and the more inflated chambers.

Genus *Trifarina* Cushman, 1923

Type species: *Trifarina bradyi* Cushman, 1923, p. 99.

Trifarina bradyi (Cushman, 1923)

Pl. 24, fig. 7

Rhabdogonium tricarinatum d'Orbigny in Brady, 1884, p. 525, pl. 67, figs. 1-3.

Trifarina bradyi Cushman in Cushman, 1923, p. 99, pl. 22, figs. 3-9.

Trifarina bradyi Cushman in Loeblich and Tappan, 1987, p. 526, pl. 574, figs. 10-13.

Trifarina bradyi Cushman in Van Marle, 1991, p. 110, pl. 7, figs. 8-9.

Trifarina bradyi Cushman in Jones, 1994, p. 78, pl. 67, figs. 1-3.

Trifarina bradyi Cushman in Loeblich and Tappan, 1994, p. 128, pl. 251, figs. 6-16.

Trifarina bradyi Cushman in Holbourn and others, 2013, p. 560-561, figs. 1-2.

Remarks. It is present in the pebbly sand and coral rubble from the Norwegian margin. It rarely occurs in the living coral facies from the Porcupine Seabight and it is very rare also in the buried coral facies from the

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Alboran Sea. It differs from *T. fornasini* for its more elongated and less inflated test.

Trifarina angulosa (Williamson, 1858)

Pl. 24, fig. 6

Uvigerina angulosa Williamson in Williamson, 1858, p. 67, pl. 5, fig. 140.

Angulogerina angulosa (Williamson) in Le Calvez, 1958, p. 180.

Trifarina angulosa (Williamson) in Barker, 1960, pl. 74, figs. 15-16.

Angulogerina angulosa (Williamson) in Loeblich and Tappan, 1987, p. 525, pl. 574, figs. 5-9.

Trifarina angulosa (Williamson) in Abu-Zied and others, 2008, p. 52, pl. 2, fig. 21.

Trifarina angulosa (Williamson) in Holbourn and others, 2013, p. 558-559, figs. 1-4.

Remarks. This species is present in the fine sediment fraction (muddy-sandy) from all facies along the Norwegian margin. It is relatively abundant in the off-mound facies from the Porcupine/Rockall region. It rarely occurs in the dropstone facies and it is common to abundant in the Holocene buried coral facies from the Lophhavet area. In the Alboran Sea this species is generally present but not abundant.

Trifarina fornasini (Selli, 1948)

Pl. 24, fig. 8

Angulogerina fornasini Selli in Selli, 1948, p. 40, pl. 43, figs. 1-4.

Trifarina fornasini (Selli) in Milker and Schmiedl, 2012, p. 91, fig. 21.5.

Remarks. This species is very rare and present only in the Alboran Sea. It differs from *T. bradyi* in having more inflated and less elongated test.

Superfamily FURSENKONACEA Loeblich and Tappan, 1961

Family FURSENKONINIDAE Loeblich and Tappan, 1961

Genus *Fursenkoina* Loeblich and Tappan, 1961

Type species: *Virgulina squamosa* d'Orbigny, 1826, p. 267.

Fursenkoina complanata (Egger, 1893)

Pl. 22, fig. 4

Virgulina schreibersiana Cziczek var. *complanata* Egger in Egger, 1893, p. 292, pl. 8, figs. 91-92.

Fursenkoina complanata (Egger) in Jones, 1994, p. 56, pl. 52, figs. 1-3.

Fursenkoina complanata (Egger) in Austin and Evans, 2000, p. 684, pl. 1, fig. n.

Fursenkoina complanata (Egger) in Holbourn and others, 2013, p. 258-259, figs. 1-2.

Remarks. This species is generally very rare in the mud, sediment clogged and coral rubble facies along the Norwegian margin.

Superfamily STILOSTOMELLACEA Finlay, 1947

Family STILOSTOMELLIDAE Finlay, 1947

Genus *Nodogenerina* Cushman, 1927

Type species: *Nodogenerina bradyi* Cushman, 1927, p. 79.

Nodogenerina virgula (Brady, 1884)

Pl. 24, fig. 9

Sagrina virgula Brady in Brady, 1884, pl. 76, fig. 8.

Nodogenerina virgula (Brady) in Jones, 1994, p. 88, pl. 76, fig. 8; suppl. pl. 2, figs. 2-3, 14.

Remarks. This species is only observed from the mud facies along the Norwegian margin where it is very rare.

Superfamily DISCORBACEA Ehrenberg, 1838

Family BAGGINIDAE Cushman, 1927

Subfamily BAGGININAE Cushman, 1927

Genus *Cancris* de Montfort, 1808

Type species: *Nautilus auricula* Fichtel and Moll, 1798, p. 108.

Cancris auriculus (Fichtel and Moll, 1798)

Pl. 24, fig. 10

Nautilus auricula Fichtel and Moll in Fichtel and Moll, 1798, p. 102, pl. 18, figs. g-i.

Cancris auriculatus (Fichtel and Moll) in Loeblich and Tappan, 1987, p. 545, pl. 591, figs. 1-4.

Cancris auriculus (Fichtel and Moll) in Jones, 1994, p. 105, pl. 106, fig. 4.

Cancris auricula (Fichtel and Moll) in Murray, 2003, p. 19, pl. 6, figs. 6-7.

Cancris auriculus (Fichtel and Moll) in Milker and Schmiedl, 2012, p. 92, figs. 21.14-15.

Cancris auriculus (Fichtel and Moll) in Holbourn and others, 2013, p. 134-135, figs. 1-3.

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Remarks. This species is only recorded in a few samples from the buried coral facies of the Alboran Sea and LoppHAVET area.

Genus *Valvulineria* Cushman, 1926

Type species: *Valvulineria californica* Cushman, 1926, p. 59.

Valvulineria bradyana (Fornasini, 1900)

Pl. 25, fig. 1

Discorbina bradyana Fornasini in Fornasini, 1900, p. 393, text-fig. 43.

Valvulineria bradyana (Fornasini) in Sgarrella and Moncharmont-Zei, 1993, 220, pl. 18, figs. 1-2.

Remarks. This species is rarely observed in the mud and coral rubble facies along the Norwegian margin, and it is present, but rare, in the buried coral facies of the Alboran Sea.

Family EPONIDIDAE Hofker, 1951

Subfamily EPONIDINAE Hofker, 1951

Genus *Ioanella* Saidova, 1975

Type species: *Truncatulina tumidula* Brady, 1884, p. 666.

Ioanella tumidula (Brady, 1884)

Pl. 25, fig. 2

Truncatulina tumidula Brady in Brady, 1884, p. 666, pl. 95, fig. 8.

Ioanella tumidula (Brady) in Duchemin and others, 2007, p. 18, pl. 3, figs. 16-18.

Ioanella tumidula (Brady) in Wollenburg and Mackensen, 2009, p. 18, text-fig. 3, fig. 4.

Ioanella tumidula (Brady) in Holbourn and others, 2013, p. 312-313, figs. 1-5.

Remarks. This species is very rare in the pebbly sand and in the living coral facies from Norway and in the buried coral facies from the LoppHAVET.

Subfamily STOMATORBININAE Saidova, 1981

Genus *Stomatorbina* Doreen, 1948

Type species: *Lamarckina torrei* Cushman and Bermudez, 1937, p. 21.

Stomatorbina concentrica (Parker and Jones, 1864)

Pl. 25, fig. 3

Pulvinulina concentrica Parker and Jones in Parker and Jones, 1864, p. 470, pl. 48, fig. 14.

Stomatorbina concentrica (Parker and Jones) in Cimerman and Langer, 1991, p. 65, pl. 68, figs. 7-9.

Mississippina concentrica (Parker and Jones) in Jones, 1994, p. 104, pl. 105, fig. 1.

Stomatorbina concentrica (Parker and Jones) in Milker and Schmiidl, 2012, p. 95, figs. 21.24-25.

Remarks. This species is rarely observed in the dead coral facies from the Porcupine Seabight. It is also very rare in the buried coral facies from the Alboran Sea and LoppHAVET and present in the coral rubble facies from Norway. Along the Norwegian margin it rarely occurs in the living coral facies.

Family ROSALINIDAE Reiss, 1963

Genus *Hyrrokkin* Cedhagen, 1994

Type species: *Hyrrokkin sarcophag* Cedhagen, 1994, p. 66.

Hyrrokkin sarcophagahagen, 1994

Pl. 25, figs. 4-5

Pulvinulina repanda var. *punctulata* d'Orbigny in Parker and Jones, 1865, p. 394, pl. 14, figs. 12-13.

Rosalina carnivora Todd in Todd, 1965, pp. 834-835, pl. 1, figs. 1-3; pl. 2, figs. 1-4; pl. 3, fig. 1.

Hyrrokkin sarcophaga Cedhagen in Cedhagen, 1994, p. 66, text-figs. 1-17.

Hyrrokkin sarcophaga Cedhagen in Freiwald and Schönfeld, 1996, p. 202, text-fig. 2.

Remarks. This species occurs in the coral rubble and pebbly sand facies from Norway, the buried coral facies from the LoppHAVET and the living coral facies from the Porcupine Seabight. It is very rare in the Alboran Sea. The first description of this species was given in Parker and others (1865) as *Pulvinulina repanda* var. *punctulata* d'Orbigny, 1826. However, the description does not correspond to the holotype of d'Orbigny deposited at the National History Museum in Paris (Cedhagen, 1994). The name *Hyrrokkin sarcophaga* was introduced by Cedhagen (1994) to designate species corresponding to the description of *Pulvinulina repanda* var. *punctulata* d'Orbigny, 1826 sensu Parker and others (1865). This species differs from *Rosalina carnivora* Todd 1965 by having a more rounded peripheral margin.

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Genus *Gavelinopsis* Hofker, 1951

Type species: *Discorbina praegeri* Heron-Allen and Earland, 1913, p. 122.

Gavelinopsis nitida (Williamson, 1858)

Pl. 26, fig. 1

Rotalina nitida Williamson in Williamson, 1858, p. 54, pl. 4, figs. 106-108.

Discorbina nitida (Williamson) in Heron-Allen and Earland, 1913, p. 269, pl. 42, figs. 26-30

Discorbis nitida (Williamson) in Cushman, 1931, p. 26, pl. 6, fig. 1.

Remarks. This species is rare in the coral rubble and pebbly sand facies and slightly more abundant in the living coral facies from Norway and the buried facies from LoppHAVET. It differs from *G. praegeri* in the absence of the umbilical boss.

Gavelinopsis praegeri (Heron-Allen and Earland, 1913)

Pl. 26, fig. 2

Discorbina praegeri Heron-Allen and Earland in Heron-Allen and Earland, 1913, p. 122, pl. 10, figs. 8-10.

Gavelinopsis praegeri (Heron-Allen and Earland) in Hofker, 1951, p. 486, text-figs. 332-334.

Gavelinopsis praegeri (Heron-Allen and Earland) in Zheng, 1980, p. 167, pl. 5, fig. 1.

Gavelinopsis praegeri (Heron-Allen and Earland) in Loeblich and Tappan, 1987, p. 560, pl. 608, figs. 6-12.

Gavelinopsis praegeri (Heron-Allen and Earland) in Loeblich and Tappan, 1994, p. 138, pl. 281, figs. 1-10.

Gavelinopsis praegeri (Heron-Allen and Earland) in Murray, 2003, p. 24, pl. 8, figs. 5-6.

Gavelinopsis praegeri (Heron-Allen and Earland) in Milker and Schmiedl, 2012, p. 96, figs. 22-3-4.

Remarks. This species does not show any habitat preference and it is present in variable numbers in all facies. It is, however, slightly more abundant in the off-mound facies from the Porcupine Seabight. It is abundant in the buried coral facies from the Alboran Sea and LoppHAVET. The observed specimens all show a well-marked boss in the umbilical area.

Gavelinopsis caledonia Murray and Whittaker, 2001

Pl. 26, fig. 3

Gavelinopsis caledonia Murray and Whittaker in Murray and Whittaker, 2001, p. 179, pl. 1, figs. 1-10; pl. 2, figs. 1-7.

Gavelinopsis caledonia Murray and Whittaker in Murray, 2003, p. 24, pl. 8, figs. 2-4.

Remarks. This species is present and relatively common in one sample from the coral rubble facies from Norway. It differs from the other species of the genus *Gavelinopsis* by its flatter morphology and more rounded peripheral margin.

Genus *Rosalina* d'Orbigny, 1826

Type species: *Rosalina globularis* d'Orbigny, 1826, p. 62.

Rosalina globularis d'Orbigny, 1826

Pl. 26, fig. 4

Rosalina globularis d'Orbigny in d'Orbigny, 1826, p. 271, pl. 13, figs. 1-4.

Discorbina globularis (d'Orbigny) in Brady, 1884, p. 643, pl. 86, fig. 13.

Rosalina globularis d'Orbigny in Todd, 1965, p. 11, pl. 3, fig. 4.

Rosalina globularis d'Orbigny in Loeblich and Tappan, 1987, p. 561, pl. 610, figs. 1-5; pl. 611, figs. 1-3.

Rosalina globularis d'Orbigny in Jones, 1994, p. 93, pl. 86, fig. 13.

Remarks. This species is present in the coral rubble and pebbly sand facies from Norway where it has been rarely observed also in the living coral facies. It is rather common in the buried coral facies from the Alboran Sea and LoppHAVET. It differs from *R. bradyi* in its depressed sutures and for the chamber morphology on the umbilical side. Chambers do not show the triangular prolongation into the umbilicus that is normally seen in *R. bradyi*.

Rosalina bradyi (Cushman, 1915)

Pl. 26, fig. 5

Discorbina globularis var. *bradyi* Cushman in Cushman, 1915, p. 12, pl. 8, fig. 1.

Discopulvinulina bradyi (Cushman) in Hofker, 1951, p. 452, fig. 310.

Rosalina bradyi (Cushman) in Hornibrook and Vella, 1954, p. 26.

Rosalina bradyi (Cushman) in Milker and Schmiedl, 2012, p. 98, figs. 22.9-10.

Remarks. This species rarely occurs in the coral rubble facies from Norway and in the buried coral facies of the LoppHAVET area.

Rosalina semipunctata (Bailey, 1851)

Pl. 27, fig. 1

Rotalina semipunctata Bailey in Bailey, 1851, p. 11, figs. 17-19, 67.

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Discanomalina semipunctata (Bailey), in Mediolini and Scott, 1978, p. 297, pl. 2, figs. 5-20.

Remarks. This species is found in the pebbly sand facies from the Norwegian margin. All specimens display the typical tubulospine-like structures. Mediolini and Scott (1978) have included in the genus *Discanomalina* the species *R. semipunctata*, *Discanomalina japonica* and *Discanomalina coronata*. Their revision is not retained herein because *D. coronata* and *D. japonica* are clearly planispiral and *R. semipunctata* is typically trochospiral. In the absence of a morphometric analysis we retain the three morphologies as separate species.

Family SPHAEROIDINIDAE Cushman, 1927

Genus *Sphaeroidina* d'Orbigny, 1826

Type species: *Sphaeroidina bulloides* d'Orbigny, 1826, p. 267.

Sphaeroidina bulloides d'Orbigny, 1826

Pl. 27, fig. 2

Sphaeroidina bulloides d'Orbigny in d'Orbigny, 1826, p. 267, pl. 2, fig. 58.

Sphaeroidina bulloides d'Orbigny in Kihle and Løfaldli, 1975, Figs. A-C.

Sphaeroidina bulloides d'Orbigny in Loeblich and Tappan, 1987, p. 564, pl. 617, figs. 1-6.

Sphaeroidina bulloides d'Orbigny in Milker and Schmiedl, 2012, p. 100, fig. 23.3-4.

Sphaeroidina bulloides d'Orbigny in Holbourn and others, 2013, p. 520-521, figs. 1-3.

Remarks. It has been observed in the coral rubble and pebbly sand facies from Norway and the buried coral facies of Lophhavet. It is present in the off-mound and dropstone facies from the Porcupine Seabight, where it rarely occurs in the living coral facies. It is always present and relatively common in the Alboran Sea.

Superfamily GLABRATELLACEA Loeblich and Tappan, 1964

Family GLABRATELLIDAE Loeblich and Tappan, 1964

Genus *Glabratella* Dorreen, 1948

Type species: *Glabratella crassa* Dorreen, 1948, p. 294.

Glabratella patelliformis (Brady, 1884)

Pl. 27, fig. 3

Discorbina patelliformis Brady in Brady, 1884, p. 647, pl. 88, fig. 3; pl. 89, fig. 1.

Glabratella patelliformis (Brady) in Jones, 1994, p. 94, pl. 88, fig. 3; p. 95, pl. 89, fig. 1.

Glabratella patelliformis (Brady) in Milker and Schmiedl, 2012, p. 102, fig. 23.16-17.

Remarks. This species has been found in the buried coral facies of the Alboran Sea and Lophhavet where it is always very rare.

Genus *Heronallenita* Seiglie and Bermudez, 1965

Type species: *Heronallenita striatospinata* Seiglie and Bermudez, 1965, p. 61.

Heronallenita lingulata (Burrows and Holland, 1895)

Pl. 27, fig. 5

Discorbina lingulata Burrows and Holland in Jones, 1895, p. 297, pl. 7, fig. 33.

Heronallenita lingulata (Burrows and Holland) in Hermelin, 1989, p. 68, pl. 12, figs. 14, 18.

Heronallenita lingulata (Burrows and Holland) in Jones, 1994, p. 96, pl. 91, fig. 3.

Remarks. This species is very rare and present only in the Alboran Sea samples.

Superfamily SIPHONINACEA Cushman, 1927

Family SIPHONINIDAE Cushman, 1927

Genus *Siphonina* Reuss, 1850

Type species: *Rotalina reticulata* Czjzek, 1848, p. 294.

Siphonina reticulata (Czjzek, 1848)

Pl. 27, fig. 4

Rotalia reticulata Czjzek in Czjzek, 1848, p. 145, pl. 13, figs. 7-9.

Siphonina reticulata (Czjzek) in Cimerman and Langer, 1991, p. 69, pl. 73, figs. 11-13.

Siphonina reticulata (Czjzek) in Loeblich and Tappan, 1987, p. 571, pl. 624, figs. 4-6, 13-15.

Siphonina reticulata (Czjzek) in Milker and Schmiedl, 2012, p. 103-104, fig. 23.24-26.

Remarks. A few specimens of this species have been recorded only in the Alboran Sea.

Superfamily DISCORBINELLACEA Sigal, 1952

Family PARRELLOIDIDAE Hofker, 1956

Genus *Cibicidoides* Thalmann, 1939

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Type species: *Truncatulina mundula* Brady, Parker and Jones, 1888, p. 228.

Cibicidoides mundulus Brady, Parker and Jones, 1888

Pl. 28, fig. 1

Truncatulina mundula Brady, Parker and Jones in Brady, Parker and Jones, 1888, p. 228, pl. 45, fig. 25.

Cibicides kullenbergi (Parker) in Phleger and others, 1953, p. 49, pl. 11, figs. 7-8.

Cibicides kullenbergi (Parker) in Boltovskoy, 1978, pl. 3, figs. 9-12.

Cibicidoides mundulus Brady, Parker and Jones in Hermelin, 1989, p. 86, pl. 17, figs. 9-11.

Cibicidoides mundulus Brady, Parker and Jones in Holbourn and others, 2013, p. 196-197, figs. 1-8.

Remarks. This species occurs in the coral rubble, pebbly sand and sediment clogged coral facies from the Norwegian margin. Schweizer and others (2009) suggested that *Cibicidoides pachyderma* and *C. kullenbergi* may belong to the same species because they form a single clade, we retain the distinction between *C. mundulus* (= *C. kullenbergi*) and *C. pachyderma* because of their distinct morphologies, and occurrence in cold-water coral ecosystems. *Cibicidoides mundulus* has a flatter test, it is rare in cold-water coral ecosystems, whereas, *C. pachyderma* is inflated and always very abundant in living coral facies.

Cibicidoides pachyderma (Rzehak, 1886)

Pl. 28, fig. 2

Truncatulina pachyderma Rzehak in Rzehak, 1886, p. 87, pl. 1, fig. 5.

Truncatulina pseudoungeriana Cushman in Cushman, 1922b, p. 97, pl. 20, fig. 9.

Cibicides pseudoungeriana Cushman in Cushman, 1931, p. 123, pl. 22, figs. 3-7.

Cibicidoides pachyderma (Rzehak) in van Morkhoven and others, 1986, p. 68, pl. 22, fig. 1.

Cibicidoides pachyderma (Rzehak) in Jones, 1994, p. 98, pl. 94, fig. 9.

Cibicidoides pseudoungerianus Cushman in Hess, 1998, p. 78, pl. 16, figs. 1-2.

Cibicidoides pachyderma (Rzehak) in Holbourn and others, 2013, p. 198-199, figs. 1-3.

Remarks. This species is very abundant in the coral rubble and pebbly sand facies from Norway. It is also present, and sometimes abundant, in the off-mound facies from the Porcupine Seabight. It dominates the Holocene buried coral facies from LoppHAVET. It is less abundant in the Alboran Sea. Concerning taxonomical attribution see also remarks for *C. mundulus*.

Cibicidoides wuellerstorfi (Schwager, 1866)

Pl. 30, fig. 2

Anomalina wuellerstorfi Schwager in Schwager, 1866, p. 258, pl. 7, figs. 105, 107.

Planulina wuellerstorfi (Schwager) in Cushman, 1931, p. 110, pl. 19, figs. 5-6.

Fontbotia wuellerstorfi (Schwager) in Gonzales-Donoso and Linares, 1970, p. 238, pl. 1, fig. 4.

Fontbotia wuellerstorfi (Schwager) in Loeblich and Tappan, 1987, p. 538, pl. 634, figs. 1-3.

Cibicidoides wuellerstorfi (Schwager) in Jones, 1994, p. 98, pl. 93, figs. 8-9.

Cibicides wuellerstorfi (Schwager) in Abu-Zied and others, 2008, p. 53, pl. 3, figs. 6-7.

Planulina wuellerstorfi (Schwager) in Holbourn and others, 2013, p. 416, figs. 1-3.

Remarks. This species dominates the mud facies from the Norwegian margin (including the buried facies of LoppHAVET). It is rare in the Porcupine Seabight and very rare in the Alboran Sea. According to Schweizer and others (2009) and based on molecular evidence, we include this species in the genus *Cibicidoides*.

Family PSEUDOPARRELLIDAE Voloshinova, 1952

Subfamily PSEUDOPARRELLINAE Voloshinova, 1952

Genus *Epistominella* Husezima and Maruhasi, 1944

Type species: *Epistominella pulchella* Husezima and Maruhasi, 1944, p. 397.

Epistominella vitrea Parker, 1952

Pl. 28, fig. 3

Epistominella vitrea Parker in Parker and others, 1953, p. 9, pl. 4, figs. 34-36, 40-41.

Epistominella vitrea Parker in Hayward and others, 1999, pl. 13, figs. 14-16.

Epistominella vitrea Parker in Duchemin and others, 2007, p. 17, pl. 2, figs. 5-6.

Epistominella vitrea Parker in Margreth and others, 2009, p. 2230, pl. 1, fig. 7.

Remarks. This species is common in the coral rubble and it is rare, but present, in the pebbly sand and sediment clogged coral facies from Norway (including LoppHAVET). It does not show any habitat preference in the Porcupine Seabight where it is, however, more abundant in the off-mound sediments. It is rare in the Alboran Sea.

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Epistominella exigua (Brady, 1884)

Pl. 28, fig. 4

Pulvinulina exigua Brady in Brady, 1884, p. 696, pl. 103, figs. 13-14.

Epistominella exigua (Brady) in Hermelin and Scott, 1985, p. 208, pl. 4, fig. 1.

Epistominella exigua (Brady) in Wollenburg and Mackensen, 2009, p. 18, text-fig. 3, fig. 5.

Epistominella exigua (Brady) in Margreth and others, 2009, p. 2230, pl. 1, fig. 6.

Epistominella exigua (Brady) in Holbourn and others, 2013, p. 240-241, figs. 1-6.

Remarks. This species is common in the mud facies and slightly rarer but present in the pebbly sand and sediment clogged coral facies from Norway (including LoppHAVET). It is present in the off-mound facies from the Porcupine Seabight and it is rare in the Alboran Sea.

Family DISCORBINELLIDAE Sigal, 1952

Subfamily DISCORBINELLINAE Sigal, 1952

Genus *Discorbinella* Cushman and Martin, 1935

Type species: *Discorbinella montereyensis* Cushman and Martin, 1935, p. 89.

Discorbinella bertheloti (d'Orbigny, 1839)

Pl. 28, fig. 5

Rosalina bertheloti d'Orbigny in d'Orbigny, 1839b, p. 135, pl. 1, figs. 28-30.

Discorbinella bertheloti (d'Orbigny) in Brady, 1884, p. 650, pl. 89, figs. 10-12.

Discorbinella bertheloti (d'Orbigny) in Cushman, 1931, p. 16, pl. 3, fig. 2.

Discopulvinulina bertheloti (d'Orbigny) in Hofker, 1951, p. 449.

Discorbinella bertheloti (d'Orbigny) in Loeblich and Tappan, 1987, p. 577, pl. 630, figs. 4-6.

Discorbinella bertheloti (d'Orbigny) in Jones, 1994, p. 95, pl. 89, figs. 10-12.

Discorbinella bertheloti (d'Orbigny) in Milker and Schmiedl, 2012, p. 104, figs. 23.29-30.

Discorbinella bertheloti (d'Orbigny) in Holbourn and others, 2013, p. 230-231, figs. 1-3.

Remarks. This species is present, but never abundant in the coral rubble and pebbly sand facies from Norway. It rarely occurs in the living coral facies. It is present in the buried coral facies of the Alboran Basin and the LoppHAVET.

Superfamily PLANORBULINACEA Schwager, 1877

Family PLANULINIDAE Bermudez, 1952

Genus *Planulina* d'Orbigny, 1826

Type species: *Planulina ariminensis* d'Orbigny, 1826, p. 66.

Planulina ariminensis d'Orbigny, 1826

Pl. 29, fig. 1

Planulina ariminensis d'Orbigny in d'Orbigny, 1826, p. 280 pl. 14, figs. 1-3.

Planulina ariminensis d'Orbigny in Hermelin and Scott, 1985, p. 214, pl. 4, figs. 9-11.

Planulina ariminensis d'Orbigny in Jones, 1994, p. 98, pl. 93, figs. 10-11.

Planulina ariminensis d'Orbigny in Abu-Zied and others, 2008, p. 52, pl. 2, figs. 31-32.

Planulina ariminensis d'Orbigny in Milker and Schmiedl, 2012, p. 106, figs. 24.3-4.

Planulina ariminensis d'Orbigny in Holbourn and others, 2013, p. 402-403, figs. 1-2.

Remarks. Along the Norwegian margin this species is generally rare and present in the coral rubble, pebbly sand and sediment clogged coral facies. In the Porcupine Seabight it occurs in all facies, but it is more abundant in the dropstone and dead coral facies. It is rare to common in the Alboran Sea.

Genus *Hyalinea* d'Orbigny, 1826

Type species: *Nautilus balthicus* Schröter, 1783, p. 20.

Hyalinea balthica (d'Orbigny, 1826)

Pl. 29, fig. 2

Nautilus balthicus Schröter in Schröter, 1783, p. 20, pl. 1, fig. 2.

Nautilus balthicus Schröter in Gmelin, 1791, p. 3370.

Hyalinea balthica (Schröter) in Murray, 1971, p. 173, Pl. 72, figs. 5-7.

Hyalinea balthica (Schröter) in Jones, 1994, p. 110, pl. 112, figs. 1-2.

Hyalinea balthica (Schröter) in Cimerman and Langer, 1991, p. 70, pl. 74, figs. 4, 7.

Hyalinea balthica (Schröter) in Milker and Schmiedl, 2012, p. 104, fig. 24. 1-2.

Hyalinea balthica (Schröter) in Holbourn and others, 2013, p. 308-309, figs. 1-2.

Remarks. Along the Norwegian margin this species characterizes all facies but it is more abundant in the mud and sediment clogged coral facies. It is present in the buried coral facies from LoppHAVET. In the

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Porcupine Seabight it is abundant in the off-mound facies. It is also common to abundant in the Alboran Sea.

Family CIBICIDIDAE Cushman, 1927

Subfamily CIBICIDINAE Cushman, 1927

Genus *Cibicides* de Montfort, 1808

Type species: *Cibicides refulgens* de Montfort, 1808, p. 122.

Cibicides refulgens de Montfort, 1808

Pl. 29, fig. 4

Cibicides refulgens de Montfort in de Montfort, 1808, p. 122.

Cibicides refulgens de Montfort in Kihle and Løfaldli, 1975.

Cibicides refulgens de Montfort in Cimerman and Langer, 1991, p. 70, pl. 75, figs. 5-9.

Cibicides refulgens de Montfort in Murray, 2003, p. 21, pl. 7, figs. 1-2.

Cibicides refulgens de Montfort in Schweizer and others, 2009, p. 301, figs. 1m, 1n.

Cibicides refulgens de Montfort in Milker and Schmiedl, 2012, p. 107, figs. 24.14-16.

Cibicides refulgens de Montfort in Holbourn and others, 2013, p. 154-155, figs. 1-3.

Remarks. This species is abundant in the coral rubble facies and is common in the pebbly sand and sediment clogged coral facies from Norway. It is present in the buried coral facies of Lophhavet, in the Porcupine Seabight it is rare but present in all facies. It is rare to common in the buried coral facies from the Alboran Sea.

Cibicides ungerianus (d'Orbigny, 1826)

Pl. 29, fig. 3

Rotalina ungeriana d'Orbigny in d'Orbigny, 1846, p. 157, pl. 8, figs. 16-18.

Cibicides ungerianus (d'Orbigny) in Schweizer and others, 2009, p. 301, text-figs. 1, fig. k-l.

Remarks. This species is rare but present in all facies from the Norwegian margin and Porcupine Seabight it is. However, it is more frequent in coral rubble and pebbly sand facies. It is common in the Holocene buried coral facies from the Lophhavet.

Cibicides aravaensis Perelis and Reiss, 1976

Pl. 29, fig. 5

Cibicides sp. Venec-Peyre in Venec-Peyre, 1973, p. 28, pl. C, fig. 2.

Cibicides aravaensis Perelis and Reiss in Perelis and Reiss, 1976, p. 93, pl. 8, figs. 1-7.

Remarks. Along the Norwegian margin (including the buried coral facies of Lophhavet) this species is observed in the coral rubble, pebbly sand and sediment clogged coral facies. However, the maximum abundance is recorded in the living coral facies. In the Porcupine Seabight it is present in the dropstone, dead coral and living coral facies. It differs from *C. ungerianus* in having a large umbilical boss.

Genus *Lobatula* Fleming, 1828

Type species: *Nautilus lobatulus* Walker and Jacob in Kanmacher, 1798, p. 642.

Lobatula lobatula (Walker and Jacob, 1798)

Pl. 30, fig. 1

Nautilus lobatulus Walker and Jacob in Kanmacher, 1798, p. 642, pl. 14, fig. 36.

Lobatula lobatula (Walker and Jacob) in Cimerman and Langer, 1991, p. 71, pl. 75, figs. 1-4.

Cibicides lobatulus (Walker and Jacob) in Jones, 1994, p. 97, pl. 93, figs. 1, 4-5.

Cibicides lobatulus (Walker and Jacob) in Murray, 2003, p. 21, pl. 6, figs. 13-15.

Lobatula lobatula (Walker and Jacob) in Milker and Schmiedl, 2012, p. 107, figs. 24.17-20.

Remarks. This species is present in all facies from Norway that provide suitable substrate (e.g., coral rubble, pebbly sand, sediment clogged and living coral facies). It is rare and present in all facies in the Porcupine Seabight and rare to common in the Alboran Sea. Schweizer and other (2009) attribute this species to the genus *Cibicidoides*, however, they state that in phylogenetic analyses it forms a monophyletic clade, which includes a mosaic of genotypes, with at least two geographic populations, in the Mediterranean and in the North Atlantic, respectively, that might represent separate species. The attribution to a clade separated from other *Cibicidoides*, in our opinion, justifies its attribution to the genus *Lobatula* instead of *Cibicidoides*.

Superfamily ASTERIGERINACEA d'Orbigny, 1839

Family EPISTOMARIIDAE Hofker, 1954

Subfamily EPISTOMARIINAE Hofker, 1954

Genus *Pseudoeponides* Uchio, 1950

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Type species: *Pseudoeponides japonicus* Uchio, in Kawai and others, 1950.

Pseudoeponides falsobeccarii Rouvillois, 1974

Pl. 30, fig. 3

Pseudoeponides falsobeccarii Rouvillois in Rouvillois, 1974, p. 4, pl. 1, figs. 1-12.

Ammonia falsobeccarii (Rouvillois) in Murray, 2003, p. 19, pl. 5, figs. 14-16.

Pseudoeponides falsobeccarii Rouvillois in Mojtahid and others, 2009, p. 188, pl. 1, fig. 2.

Remarks. This species is found only in one sample from Norway, and it is also rare in the Alboran Sea.

Subfamily NUTTALLIDINAE Saidova, 1981

Genus *Nuttallides* Finlay, 1939

Type species: *Eponides truempyi* Nuttall, 1930.

Nuttallides umbonifera (Cushman, 1933)

Pl. 30, fig. 4

Pulvinulinella umbonifera Cushman in Cushman, 1933, p. 90, pl. 9, fig. 9.

Nuttallides umbonifera (Cushman) in Hermelin, 1989, p. 69, pl. 12, figs. 15-17.

Nuttallides umbonifera (Cushman) in Holbourn and others, 2013, p. 380-381, figs. 1-3.

Remarks. This species is very rare along the Norwegian margin where it is present only in the pebbly sand facies. It occurs in the buried coral facies of the LoppHAVET. In the Porcupine Seabight it is very rare and present in the off-mound (mud) facies and in the fine sediments from the living coral facies. It is rare, but consistently present, in the Alboran Sea.

Nuttallides decorata (Phleger and Parker, 1951)

Pl. 30, fig. 5

Pseudoparrella? decorata Phleger and Parker in Phleger and Parker, 1951, p. 28, pl. 15, figs. 4-5.

Nuttallides decorata (Phleger and Parker) in Lobegeier and Gupta, 2008, p. 106, pl. 2, figs. 10, 13.

Remarks. This species is abundant in the Holocene buried coral facies from the LoppHAVET. It is very rare in the Alboran Sea. It differs from *N. umbonifera* in its smaller size, the less numerous chambers in the last whorl and the less pustulose wall on both sides.

Family ASTIGERINATIDAE Reiss, 1963

Genus *Astigerinata* Bermudez, 1949

Type species: *Astigerinata dominicana* Bermudez, 1949.

Astigerinata mamilla (Williamson, 1858)

Pl. 31, fig. 1

Rotalina mamilla Williamson in Williamson, 1858, p. 54, pl. 4, figs. 109-111.

Astigerinata mamilla (Williamson) in Cimerman and Langer, 1991, p. 73, pl. 82, figs. 1-4.

Astigerinata mamilla (Williamson) in Abu-Zied and others, 2008, p. 53, pl. 3, figs. 8-9.

Astigerinata mamilla (Williamson) in Milker and Schmiedl, 2012, p. 107, fig. 25.10-13.

Remarks. This species has been observed only in a few samples from the buried coral facies from the Alboran Sea.

Superfamily NONIONACEA Schultze, 1854

Family NONIONIDAE Schultze, 1854

Subfamily NONIONINAE Schultze, 1854

Genus *Nonion* de Montfort, 1808

Type species: *Nautilus faba* Fichtel and Moll, 1798, p. 103.

Nonion fabum (Fichtel and Moll, 1798)

Pl. 31, fig. 2

Nautilus faba Fichtel and Moll in Fichtel and Moll, 1798, p. 103, pl. 19, figs. a-c.

Nonionina boueana d'Orbigny in Brady, 1884, p. 729, pl. 109, figs. 12-13.

Nonion fabum (Fichtel and Moll) in Loeblich and Tappan, 1987, p. 617, pl. 690, figs. 1-7, 14-16.

Nonion fabum (Fichtel and Moll) in Jones, 1994, p. 108, pl. 109, figs. 12-13.

Nonion fabum (Fichtel and Moll) in Milker and Schmiedl, 2012, p. 112, figs. 25.22-24.

Remarks. This species is present only in one sample from the buried coral facies in the Alboran Sea.

Nonion pauperatus (Balkwill and Wright, 1885)

Pl. 31, fig. 3

Nonionina pauperata Balkwill and Wright in Balkwill and Wright, 1885, p. 353, pl. 13, figs. 25-26.

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Nonion pauperatus (Balkwill and Wright) in Murray, 2003, p. 24, pl. 9, fig. 1.

Remarks. Along the Norwegian margin this species occurs only in the coral rubble facies. It is very rare in the buried coral facies from the Alboran Sea. It differs from *N. pauciloculum* in having a sub-acute margin and the very arched sutures.

Nonion pauciloculum Cushman, 1944

Pl. 31, fig. 5

Nonion pauciloculum Cushman in Cushman, 1944, p. 24, pl. 3, fig. 25.

Remarks. This species occurs only in the mud facies from Norway where it is very rare. It differs from *N. pauperatus* in its more rounded margin and the presence of straight sutures.

Genus *Nonionella* Cushman, 1926

Type species: *Nonionella miocenica* Cushman, 1926, p. 64.

Nonionella turgida (Williamson, 1858)

Pl. 32, fig. 1

Rotalina turgida Williamson in Williamson, 1858, p. 50, pl. 4, figs. 95-97.

Nonionella turgida (Williamson) in Murray, 2003, p. 24, pl. 9, figs. 4-5.

Nonionella turgida (Williamson) in Jones, 1994, p. 108, pl. 109, figs. 17-19.

Nonionella turgida (Williamson) in Cimerman and Langer, 1991, p. 74, pl. 84, figs. 6-8.

Nonionella turgida (Williamson) in Milker and Schmiedl, 2012, p. 113, figs. 26.1-6.

Nonionella turgida (Williamson) in Holbourn and others, 2013, p. 372-373, figs. 1-2.

Remarks. This species occurs in the mud, pebbly sand and coral rubble facies from the Norwegian margin. It is present in the off-mound facies in the Porcupine Seabight and in the buried coral facies in the Alboran Sea and LoppHAVET. It is, however, never abundant in any sample.

Nonionella iridea Heron-Allen and Earland, 1932

Pl. 32, fig. 2

Nonionella iridea Heron-Allen and Earland in Heron-Allen and Earland, 1932, p. 438, pl. 16, figs. 14-16.

Nonionella iridea Heron-Allen and Earland in Murray, 2003, p. 24, pl. 9, figs. 2-3.

Remarks. This species is present in all facies from Norway (including the buried facies of LoppHAVET), with higher abundances in the living coral facies. It is very rare in the mud facies from the Porcupine Seabight and rare in the buried coral facies from the Alboran Sea.

Genus *Nonionellina* Cushman, 1926

Type species: *Nonionina labradorica* Dawson, 1860, p. 192.

Nonionellina labradorica (Dawson, 1860)

Pl. 31, fig. 4

Nonionina labradorica Dawson in Dawson, 1860, p. 192, pl. 4.

Nonion labradoricum (Dawson) in Feyling-Hansen, 1954, p. 262, pl. 10, figs. 1-2.

Nonionellina labradorica (Dawson) in Vazquez Riveiros and Patterson, 2008, p. 29, pl. 12, fig. 7.

Nonionellina labradorica (Dawson) in Holbourn and others, 2013, p. 374-375, figs. 1-2.

Remarks. This species is present in all facies from Norway, where it is slightly more abundant in the coral rubble facies. It is very rare in the Porcupine Seabight. It dominates the glacial sediments transitional to the living coral facies in the LoppHAVET area (Chapter 3, Fig. 3.4B).

Subfamily ASTRONONIONINAE Saidova, 1981

Genus *Astrononion* Cushman and Edwards, 1937

Type species: *Nonionina stelligera* d'Orbigny, 1839, p. 128.

Astrononion gallowayi Loeblich and Tappan, 1953

Pl. 32, fig. 3

Astrononion gallowayi Loeblich and Tappan in Loeblich and Tappan, 1953, p. 90, pl. 17, figs. 4-7.

Astrononion gallowayi Loeblich and Tappan in Feyling-Hanssen and others, 1971, p. 266, pl. 10, figs. 10-12.

Astrononion gallowayi Loeblich and Tappan in Hermelin and Scott, 1985, p. 203, pl. 5, fig. 1.

Remarks. This species is present in all facies from the Norwegian margin (including LoppHAVET) but it is more common in the coral rubble and pebbly sand facies. In the Porcupine Seabight it is rare and restricted to the off-mound (mud) facies. It is common in the buried Holocene coral facies from LoppHAVET.

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Astrononion antarcticus Parr, 1950

Pl. 32, fig. 4

Nonionina stelligera d'Orbigny, in d'Orbigny, 1839, pl. 3, figs. 1, 2.

Nonion stelliger (d'Orbigny) in Earland, 1934, p. 189.

Astrononion antarcticus Parr in Parr, 1950, p. 371, pl. 15, figs. 13-14.

Remarks. This species is rare and it is recorded only in the coral rubble facies from Norway and in the buried facies of Lophhavet. It differs from *A. gallowayi* for its very irregular coiling, the strongly arched sutures and the irregular general morphology.

Subfamily PULLENIINAE Schwager, 1877

Genus *Melonis* de Montfort, 1808

Type species: *Nautilus pompilioides* Fichtel and Moll, 1798, p. 31.

Melonis pompilioides (Fichtel and Moll, 1798)

Pl. 32, fig. 5

Nautilus pompilioides Fichtel and Moll in Fichtel and Moll, 1798, p. 31, pl. 2, figs. a-c.

Melonis etruscus de Montfort in de Montfort, 1808, p. 67.

Melonis pompilioides (Fichtel and Moll) in Hermelin and Scott, 1985, p. 212, pl. 6, fig. 5.

Melonis pompilioides (Fichtel and Moll) in Cimerman and Langer, 1991, p. 74, pl. 85, figs. 1-4.

Melonis pompilioides (Fichtel and Moll) in Holbourn and others, 2013, p. 356-357, figs. 1-2.

Remarks. This species characterizes all the facies along the Norwegian margin. It is, however, more abundant in the mud facies and the finer sediments from the coral rubble facies. In the Porcupine Seabight it is very rare. In the Alboran Sea it is constantly present but never abundant. It differs from *M. barleeianum* in having a more inflated test.

Melonis barleeianum (Williamson, 1858)

Pl. 33, fig. 1

Nonionina barleeana Williamson in Williamson, 1858, p. 32, pl. 3, figs. 68-69.

Nonion barleeianum (Williamson) in Kihle and Løfaldli, 1975, Figs. A-C.

Nonion barleeianum (Williamson) in Hermelin and Scott, 1985, p. 212, pl. 5, fig. 2.

Melonis barleeianum (Williamson) in Murray, 2003, p. 24, pl. 8, figs. 11-14.

Melonis barleeianum (Williamson) in Milker and Schmiedl, 2012, p. 115, fig. 26. 11-12.

Melonis barleeianum (Williamson) in Holbourn and others, 2013, p. 358-359, figs. 1-4.

Remarks. This species characterizes all the facies along the Norwegian margin (including Lophhavet). It is, however, more abundant in the mud and pebbly facies. In the Porcupine Seabight it is abundant in the off-mound (mud) facies and less abundant in the other facies. In the Alboran Sea it is always common to abundant. It differs from *M. pompilioides* in having a less inflated and flatter test.

Genus *Pullenia* Parker and Jones, 1862

Type species: *Nonionina bulloides* d'Orbigny, 1846, p. 107.

Pullenia bulloides (d'Orbigny, 1826)

Pl. 33, figs. 3-4

Nonionina bulloides d'Orbigny in d'Orbigny, 1826, p. 293.

Nonionina bulloides d'Orbigny in d'Orbigny, 1846, p. 107, pl. 5, figs. 9-10.

Pullenia sphaeroides d'Orbigny in Brady, 1884, p. 615, pl. 84, figs. 12-13.

Pullenia bulloides (d'Orbigny) in Ujiie, 1990, p. 42, pl. 23, figs. 1-2.

Pullenia bulloides (d'Orbigny) in Jones, 1994, p. 92, pl. 84, figs. 12-13.

Pullenia bulloides (d'Orbigny) in Holbourn and others, 2013, p. 442-443, figs. 1-3.

Remarks. This species is relatively abundant in the mud, pebbly sand facies and in the fine sediments from the coral rubble facies in Norway. It is less abundant in the other facies, but present in the buried facies from the Lophhavet. It is very rare (one specimen) in the buried coral facies from the Alboran Sea. It differs from *P. bulloides* in having more numerous chambers in the last whorl and a sub-acute peripheral margin.

Pullenia subcarinata (d'Orbigny, 1839)

Pl. 33, fig. 2

Nonionina subcarinata d'Orbigny in d'Orbigny, 1839, p. 28, pl. 5, figs. 23-24.

Nonionina quinqueloba d'Orbigny in Reuss, 1851, p. 71, pl. 5, fig. 31.

Pullenia simplex Rhumbler in Wiesner, 1931, p. 132, pl. 22, fig. 263.

Pullenia quinqueloba (d'Orbigny) in Jones, 1994, p. 92, pl. 84, figs. 14-15.

Remarks. This species is relatively abundant in the mud facies and in the fine sediments from the coral

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rubble facies in Norway. It is rarer in the other facies and present in the buried coral facies of LoppHAVET.

Superfamily CHILOSTOMELLACEA Brady, 1881

Family CHILOSTOMELLIDAE Brady, 1881

Subfamily CHILOSTOMELLINAE Brady, 1881

Genus *Chilostomella* Reuss, 1849

Type species: *Chilostomella ovoidea* Reuss, 1850, p. 380.

Chilostomella oolina Schwager, 1878

Pl. 33, fig. 5

Chilostomella oolina Schwager in Schwager, 1878, p. 527, pl. 1, fig. 16.

Chilostomella ovoidea Reuss in Brady, 1884, p. 436, pl. 55, figs. 12-14, 17-18.

Chilostomella oolina Schwager in Cushman and Todd, 1949, p. 91, pl. 15, figs. 23-24.

Chilostomella oolina Schwager in Jones, 1994, p. 61, pl. 55, figs. 12-14, 17-18.

Chilostomella oolina Schwager in Loeblich and Tappan, 1994, p. 160, pl. 349, figs. 12-13.

Chilostomella oolina Schwager in Holbourn and others, 2013, p. 148-149, figs. 1-2.

Remarks. This species is present but never abundant in the buried coral facies from the Alboran Sea.

Family HETEROLEPIDAE Gonzales-Donoso, 1969

Genus *Anomalinoidea* Brotzen, 1942

Type species: *Anomalina pinguis* Jennings, 1936, p. 195.

Anomalinoidea globulosa (Chapman and Parr, 1937)

Pl. 34, fig. 1

Anomalina globulosa Chapman and Parr in Chapman and Parr, 1937, p. 117, pl. 9, fig. 27.

Anomalina globulosa Chapman and Parr in Feyling-Hanssen, 1954, p. 258, pl. 9, figs. 1-3.

Cibicoides globulosus (Chapman and Parr) in Jones, 1994, p. 98, pl. 94, figs. 4-5.

Anomalinoidea globulosus (Chapman and Parr) in Holbourn and others, 2013, p. 53-53, figs. 1-3.

Remarks. This species is very rare in the studied samples and occurs only in the dropstone facies from the Porcupine/Rockall region.

Family GAVELINELLIDAE Hofker, 1956

Subfamily GAVELINELLINAE Hofker, 1956

Genus *Discanomalina* Asano, 1951

Type species: *Discanomalina japonica* Asano, 1951, p. 13.

Discanomalina japonica Asano, 1951

Pl. 34, fig. 3

Discanomalina japonica Asano in Asano, 1951, p. 13, figs. 3-5.

Discanomalina semipunctata (Bailey) in Medioli and Scott, 1978, p. pl. 2, figs 1-2.296,

Remarks. This species has been found in the living coral facies from the Porcupine Seabight. It also occurs and it is relatively common in the Alboran Sea. We retain here *D. coronata* and *D. japonica* as a species because they possess a clearly planispiral morphology. The revision of Medioli and Scott (1978), which includes this species under the name *Discanomalina semipunctata* (= *Rosalina semipunctata* which is trochospiral) is not followed.

Discanomalina coronata (Parker and Jones, 1857)

Pl. 34, fig. 2

Anomalina coronata Parker and Jones in Parker and Jones, 1857, p. 294, pl. 10, figs. 15-16.

Discanomalina coronata (Parker and Jones) in Jones, 1994, p. 100, pl. 97, figs. 1-2.

Discanomalina coronata (Parker and Jones) in Schönfeld, 2002, p. 1858, pl. 1, fig. 14.

Discanomalina semipunctata (Bailey) in Milker and Schmiedl, 2012, p. 117, figs. 26. 24-25.

Remarks. This species is common in cold-water coral ecosystems. As an attached species it may live on any suitable substrate such as the pebbly sand and coral rubble facies in Norway, Porcupine Seabight, Alboran Sea and LoppHAVET. However, it is clearly more abundant and always present in the living coral facies from the Porcupine Seabight. It is dominant in the Holocene buried coral facies from LoppHAVET. See taxonomic comments for *D. japonica*.

Genus *Gyroidina* d'Orbigny, 1826

Type species: *Gyroidina orbicularis* d'Orbigny, 1826, p. 190.

Gyroidina altiformis (Steward and Steward, 1930)

Pl. 35, fig. 3

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Gyroidina soldanii d'Orbigny var. *altiformis* Steward and Steward in Cushman and others, 1930, p. 67, pl. 9, fig. 2.

Gyroidina soldanii d'Orbigny var. *altiformis* Steward and Steward in Cushman, 1931, p. 41, pl. 8, fig. 10; pl. 9, fig. 1.

Gyroidina soldanii d'Orbigny var. *altiformis* Steward and Steward in Renz, 1948, p. 140, pl. 8, fig. 13.

Hansenisca altiformis (Steward and Steward) in Finger, 1990, pp. 124-125, figs. 1-8; text-fig. 2.

Gyroidina altiformis Steward and Steward in Sgarrella and Moncharmont-Zei, 1993, 240, pl. 25, figs. 3-4.

Remarks. This species is rare to common in the Alboran Sea. It differs from the other species belonging to the genus *Gyroidina* in having a higher conical morphology, a wide and deep umbilicus and more raised sutures.

Gyroidina laevigata d'Orbigny, 1826

Pl. 34, fig. 4

Gyroidina laevigata d'Orbigny in d'Orbigny, 1826, p. 278.

Gyroidinoides laevigata (d'Orbigny) in Hasegawa and Sprovieri, 1990, pl. 5, figs. 7-9.

Remarks. This species is very rare along the Norwegian margin where it occurs in the mud, coral rubble and sediment clogged coral facies. In the Alboran Sea it is present but never abundant. We retain here the original genus *Gyroidina*.

Gyroidina lamarckiana (d'Orbigny, 1839b)

Pl. 34, fig. 5

Rotalia lamarckiana d'Orbigny in d'Orbigny, 1839b, p. 131, pl. 2, figs. 13-15.

Gyroidina lamarckiana (d'Orbigny) in Phleger and others, 1953, p. 41, pl. 8, figs. 33-34.

Gyroidina lamarckiana (d'Orbigny) in Todd, 1965, p. 19, pl. 6, fig. 3.

Gyroidina lamarckiana (d'Orbigny) in Loeblich and Tappan, 1994, p. 163, pl. 361, figs. 7-12.

Remarks. This species has been observed in the Alboran Sea only. It differs from *G. laevigata* in having a more compressed test and more numerous chambers in the last whorl.

Gyroidina neosoldanii Brotzen, 1936

Pl. 35, fig. 2

Rotalina soldanii (d'Orbigny) in Brady, 1884, p. 107, figs. 6-7.

Gyroidina neosoldanii Brotzen in Brotzen, 1936, p. 158.

Gyroidinoides soldanii (Brotzen) in Jones, 1994, p. 106, pl. 107, figs. 6-7.

Gyroidina neosoldanii Brotzen in Hermelin, 1989, p. 81, pl. 15, figs. 16-18.

Remarks. This species is very rare in the coral rubble and pebbly sand facies from Norway and in the buried facies of LoppHAVET. It is rare in the fine sediment from the mud, coral rubble, dead coral and dropstone facies from the Porcupine Seabight. It is also rare in the Alboran Sea. It differs from *G. soldanii* in having a higher, more conical test, and having a wider umbilicus. The species was described by Brotzen (1936), who erected as holotype the specimen documented in Brady (1884), pl. 107, figs. 6-7.

Gyroidina soldanii d'Orbigny, 1839

Pl. 35, fig. 1

Gyroidina soldanii d'Orbigny in d'Orbigny, 1826, p. 278, no. 5.

Rotalia soldanii (d'Orbigny) in d'Orbigny, 1846, p. 155, pl. 8, figs. 10-12.

Gyroidina soldanii d'Orbigny in Papp and Schmid, 1985, p. 60, pl. 50, figs. 4-9.

Hansenisca soldanii (d'Orbigny) in Loeblich and Tappan, 1987, p. 639, pl. 719, figs. 5-9.

Gyroidinoides soldanii (d'Orbigny) in Milker and Schmiedl, 2012, p. 116, figs. 26.20-21.

Gyroidinoides soldanii (d'Orbigny) in Holbourn and others, 2013, p.278-279, figs. 1-3.

Remarks. This species is present but rare in the coral rubble facies from Norway and in the buried facies of LoppHAVET. In the Porcupine Seabight it is present in fine sediments from the mud, coral rubble, living, dropstone and dead coral facies, but it is always very rare. This species is rare in sediments from the Alboran Sea. We retain the generic attribution to *Gyroidina* and not *Hansenisca* for this species. The umbilical chamber flaps surrounding the umbilicus, identified by Loeblich and Tappan (1987) as typical of *Hansenisca* are also typical of other genera of the Family Gyroidinoidinae, thus their presence does not justify the genus *Hansenisca*.

Genus *Hanzawaia* Asano, 1944

Type species: *Hanzawaia nipponica* Asano, 1944, p. 98.

Hanzawaia boueana (d'Orbigny, 1846)

Pl. 35, figs. 4-5

Truncatulina boueana d'Orbigny in d'Orbigny, 1846, p. 169, pl. 9, figs. 24-26.

Cibicides boueanus (d'Orbigny) in Graham and Militante, 1959, p. 116, pl. 19, fig. 11.

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Hanzawaia boueana (d'Orbigny) in Zheng, 1980, p. 171, pl. 5, fig. 10.

Hanzawaia boueana (d'Orbigny) in Loeblich and Tappan, 1994, p. 164, pl. 364, figs. 1-8.

Remarks. This species occurs in all facies from the Norwegian margin and the Porcupine Seabight and the Alboran Sea. However, it is usually never abundant except in the Holocene buried coral facies from LoppHAVET.

Family TRICHOHYALIDAE Saidova, 1981

Genus *Buccella* Andersen, 1952

Type species: *Eponides hannai* Phleger and Parker, 1951, p. 21.

Buccella frigida (Cushman, 1922)

Pl. 36, fig. 1

Pulvinulina frigida Cushman in Cushman, 1922, p. 144.

Buccella frigida (Cushman) in Feyling-Hanssen and others, 1971, p. 253, pl. 8, figs. 12-14; pl. 19, fig. 1.

Buccella frigida (Cushman) in Kihle and Løfaldli, 1975.

Buccella frigida (Cushman) in Vazquez Riveiros and Patterson, 2008, p. 30, pl. 13, fig. 3.

Remarks. This species occurs in the pebbly sand facies from Norway, where it is slightly more abundant in the living coral facies. It occurs also in the buried coral facies from LoppHAVET.

Superfamily ORBITOIDACEA Schwager, 1876

Family ELPHIDIINAE Galloway, 1933

Genus *Elphidium* de Montfort, 1808

Type species: *Nautilus macellus* var. " β " Fichtel and Moll, 1798, p. 66.

Elphidium albiumbilicatum (Weiss, 1954)

Pl. 36, fig. 2

Nonion pauciloculum Cushman subsp. *albiumbilicatum* Weiss in Weiss, 1954, p. 157, pl. 32, figs. 1-2.

Elphidium albiumbilicatum (Weiss) in Feyling-Hanssen and others, 1971, p. 268, pl. 10, figs. 15-19, pl. 19, figs. 4-8.

Elphidium albiumbilicatum (Weiss) in Murray and others, 2003, p. 687, text-fig. 6.

Remarks. A single specimen of this species has been found in the living coral facies from Norway. It is common in the glacial facies from LoppHAVET. All

specimens show the granulose wall texture in the umbilical area as well as along the sutures.

Elphidium groenlandicum Cushman, 1933

Pl. 36, fig. 3

Elphidium groenlandicum Cushman in Cushman, 1933, p. 4, pl. 1, fig. 10.

Elphidium groenlandicum Cushman in Feyling-Hanssen and others, 1971, p. 275, pl. 12, figs. 1-8; pl. 21, figs. 1-3.

Elphidium groenlandicum Cushman in Kihle and Løfaldli, 1975, Figs. A-C.

Remarks. This species is very rare and occurs only in the mud facies from the Norwegian margin.

Elphidium hanzawai Asano, 1939

Pl. 36, fig. 4

Elphidium hanzawai Asano in Asano, 1939, p. 426, figs. 3-4.

Remarks. Rare specimens are found in samples from the buried coral facies from the Alboran Sea. They display the flat test typical of the species.

Elphidium incertum (Williamson, 1858)

Pl. 37, fig. 1

Polystomella umbilicata Walker var. *incerta* Williamson in Williamson, 1858, p. 44, pl. 3, fig. 82a.

Polystomella striatopunctata Brady in Brady, 1884, p. 739, pl. 109, fig. 23.

Elphidium incertum (Williamson) in Feyling-Hanssen and others, 1971, p. 277, pl. 12, figs. 11-12; pl. 21, figs. 8-9.

Elphidium incertum (Williamson) in Kihle and Løfaldli, 1975, Figs. A-C.

Cribrononion incertum (Williamson) in Jones, 1994, p. 108, pl. 109, fig. 23.

Elphidium incertum (Williamson) in Milker and Schmiedl, 2012, p. 121, fig. 27.19-20.

Remarks. Rare specimens occur in the finer sediments from the mud, coral rubble and pebbly sand facies from Norway. This species is abundant in the glacial facies from the LoppHAVET. These specimens display the typical morphology of the species with the small and elongated crenulations along the sutures.

Elphidium magellanicum Heron-Allen and Earland, 1932

Pl. 37, fig. 2

Elphidium (Polystomella) magellanicum Heron-Allen and Earland in Heron-Allen and Earland, 1932, p. 440, pl. 16, figs. 26-28.

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Elphidium magellanicum Heron-Allen and Earland in Kihle and Løfladli, 1975, Figs. A-C.

Elphidium magellanicum Heron-Allen and Earland in Murray, 2003, p. 21, pl. 7, figs. 9-10.

Criboelphidium magellanicum (Heron-Allen and Earland) in Vazquez Riveiros and Patterson, 2008, p. 34, pl. 15, fig. 4.

Remarks. A few specimens have been found in the pebbly sand facies from the Norwegian margin. It differs from *E. albiumbilicatum* in having smaller granular areas in the umbilical region and along the sutures and a more inflated test.

Elphidium subarcticum Cushman, 1944

Pl. 37, fig. 3

Elphidium subarcticum Cushman in Cushman, 1944, p. 27, pl. 3, figs. 34-35.

Elphidium subarcticum Cushman in Kihle and Løfladli, 1975, Figs A-C.

Elphidium subarcticum Cushman in Scott and others, 2008, p. 244, pl. 4, fig. 5.

Remarks. This species is generally rare and occurs only in the pebbly sand facies from the Norwegian margin. This species differs from *E. albiumbilicatum* in having more marked openings along the sutures and more numerous and slightly developed retral processes.

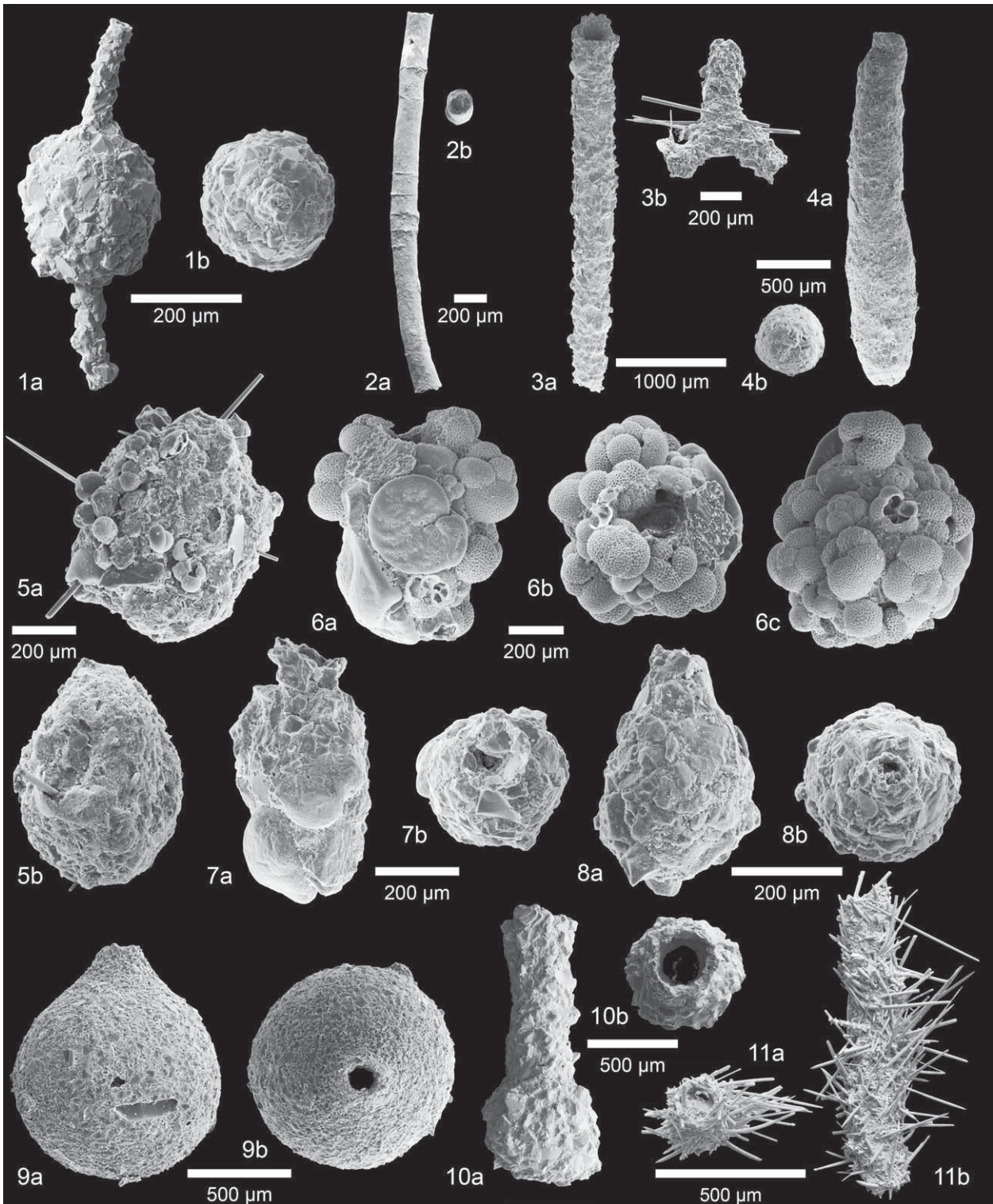


PLATE 1. 1a-b *Astrorhiza* cf. *catenata* Norman, 1877, Hypotype from PS70/038-2 2a-b *Bathysiphon filiformis* M. Sars, 1872, Hypotype from PS70/038-2 3a-b *Rhabdammina abyssorum* M. Sars, 1869, a) Hypotype from AL232 1026; b) Hypotype from PS70/039-2 4a-b *Hippocrepinella hirudinea* Heron-Allen and Earland, 1932, Hypotype from PS70/033-2 5a-b *Psammosphaera fusca* Schulze, 1875, Hypotype from PS70/039-2 6a-b *Psammosphaera fusca* Schulze var. *testacea* Flint, 1899, Hypotype from PS70/037-2 7a-b *Lagenammina fusiformis* (Williamson, 1858), Hypotype from PS70/037-2 8a-b *Lagenammina arenulata* (Williamson, 1858), Hypotype from PS70/039-2 9a-b *Saccamina sphaerica* M. Sars, 1872, Hypotype from AL232 1025 10a-b *Hyperammina elongata* Brady, 1878, Hypotype from POS391 558-1 11a-b *Saccorhiza ramosa* (Brady, 1879), Hypotype from PS70/028-2

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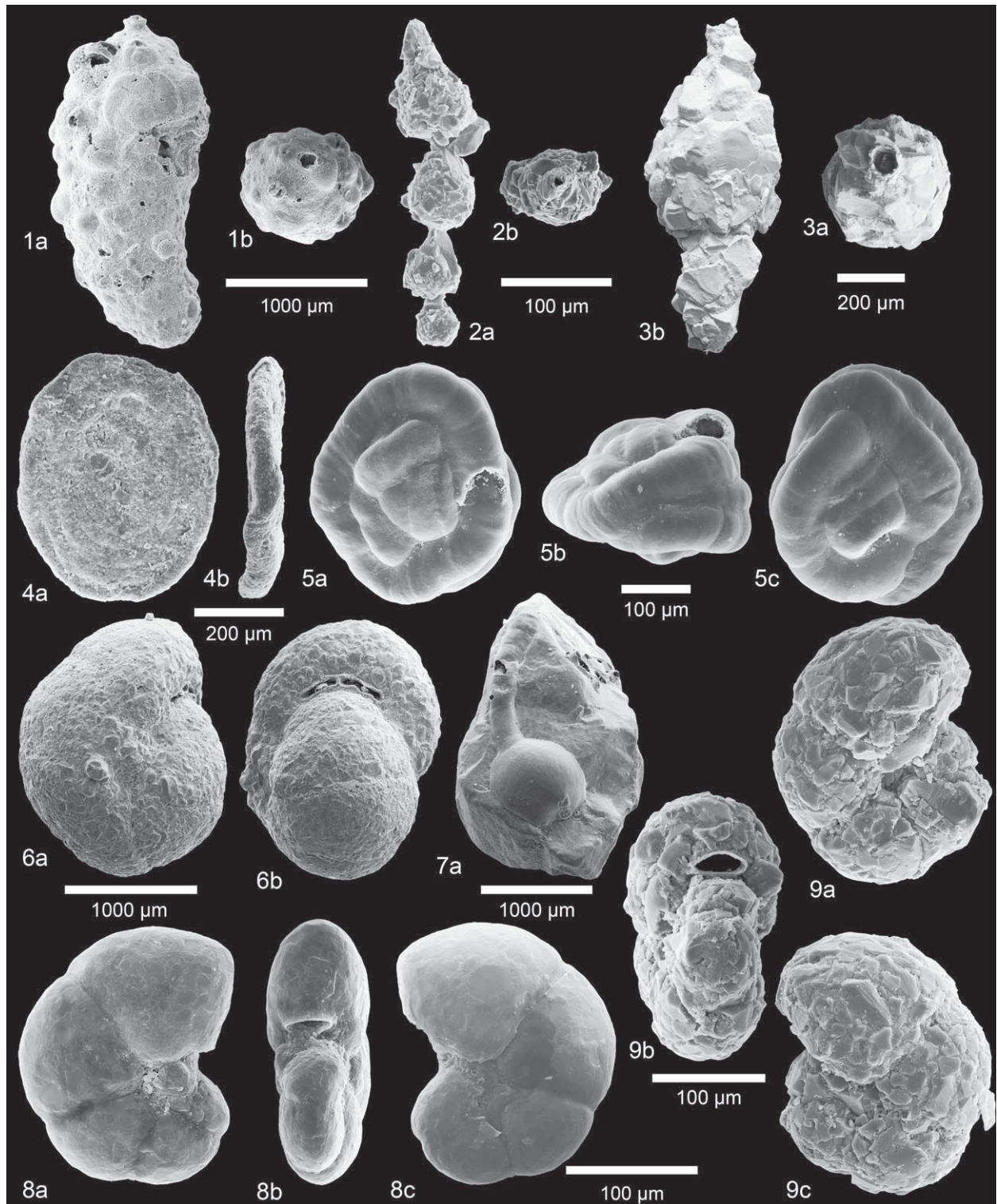


PLATE 2. 1a-b *Reophax agglutinatus* Cushman, 1913, Hypotype from PS70/037-2 2a-b *Hormosinella guttifera* (Brady, 1881), Hypotype from PS70/039-2 3a-b *Reophax scorpiurus* de Montfort, 1808, Hypotype from P292 577-1 4a-b *Ammodiscus incertus* (d'Orbigny, 1839), Hypotype from PS70/011-1 5a-c *Glomospira charoides* (Jones and Parker, 1878), Hypotype from PS70/011-1 6a-b *Cribrostomoides subglobosum* (M. Sars, 1868), Hypotype from PS70/011-1 7a *Ammolagena clavata* (Jones and Parker, 1860), Hypotype from PS70/002-2 8a-c *Labrospira jeffreysii* (Williamson, 1858), Hypotype from PS70/002-2 9a-c *Labrospira jeffreysii* (Williamson, 1858), Hypotype from AL232 1025

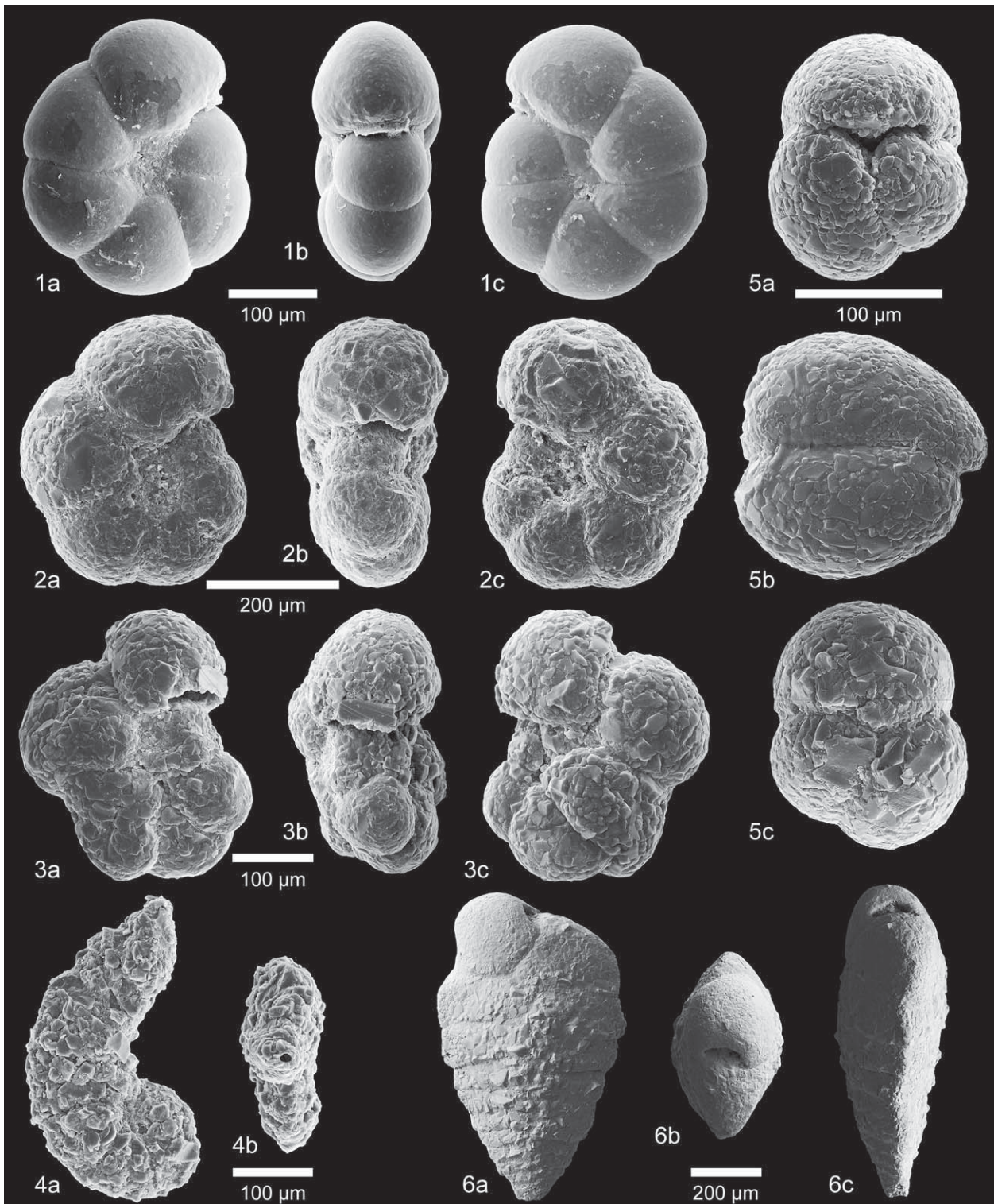


PLATE 3. 1a-c *Haplophragmoides robertsoni* Brady, 1887, Hypotype from POS391 550-1 2a-c *Haplophragmoides robertsoni* Brady, 1887, Hypotype from PS70/011-1 3a-c *Haplophragmoides membranaceum* Höglund, 1947, Hypotype from PS70/029-3 4a-b *Ammobaculites agglutinans* (d'Orbigny, 1846), Hypotype from PS70/032-2 5a-c *Adercotryma wrighti* Brönnimann and Whittaker, 1987, Hypotype from AL232 1022 6a-c *Spiroplectinella wrightii* (Silvestri, 1903), Hypotype from POS391 550-1

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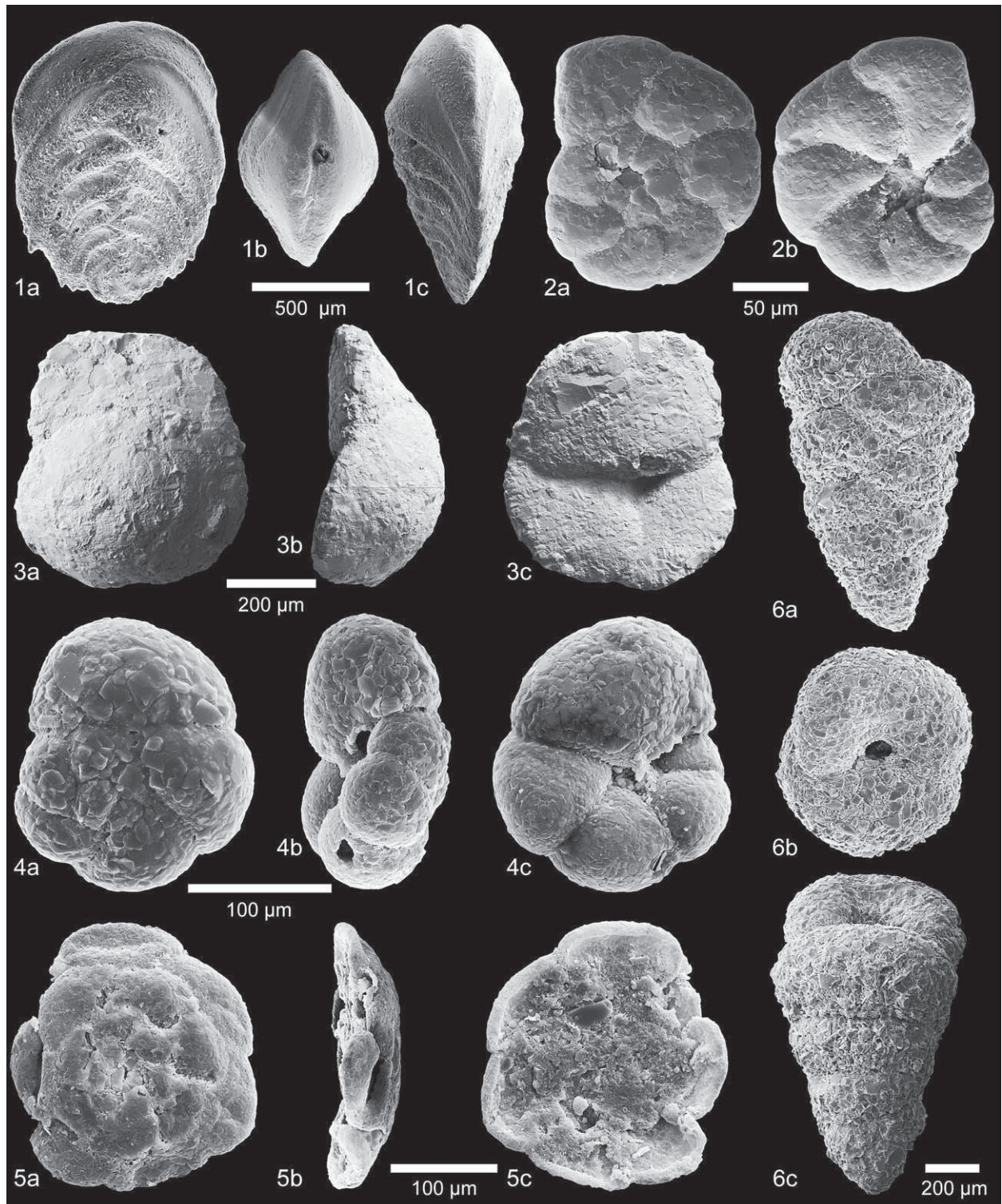


PLATE 4. 1a-c *Vulvulina pennatula* Batsch, 1791, Hypotype from TTR17 MS411G 15 2a-b *Trochammina labiosa* Höglund, 1947, Hypotype from POS391 571-1 3a-c *Tritaxis fusca* (Williamson, 1858), P292 580-1 4a-c *Portatrochammina antarctica* (Parr, 1950), Hypotype from PS70/002-2 5a-c *Lepidodeuterammina ochracea* (Williamson, 1858), POS325 455 6a-c *Gaudryina rudis* Wright, 1900, Hypotype from AL232 1025

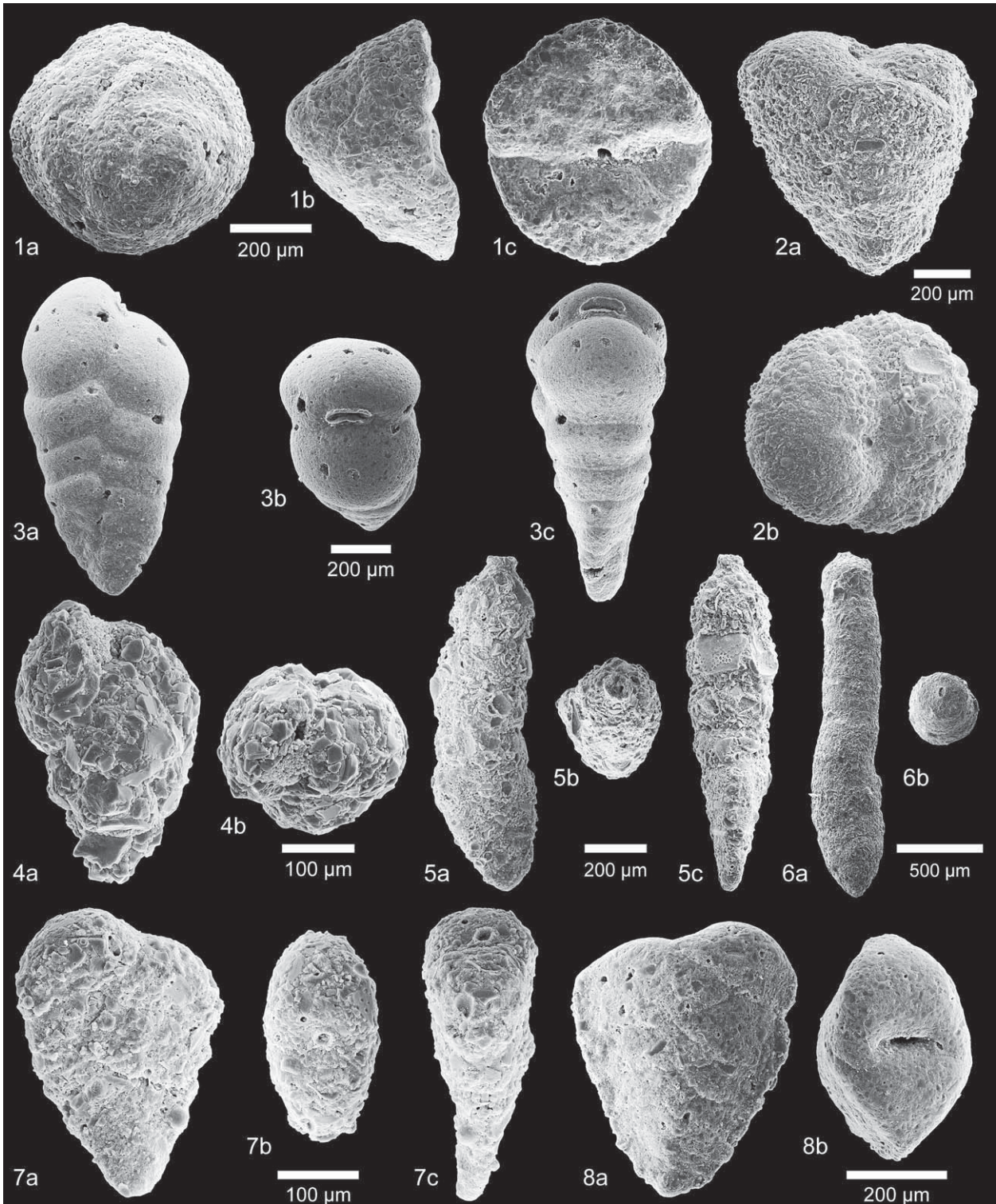


PLATE 5. 1a-c *Gaudryina pseudotrochus* (Cushman, 1922), Hypotype from GeoB 9204-1 2a-b *Eggerella humboldti* Todd and Brönnimann, 1957, Hypotype from M07-21 3a-c *Karreriella bradyi* (Cushman, 1911), Hypotype from M07-23 4a-b *Eggerelloides scaber* (Williamson, 1858), Hypotype from AL232 1025 5a-c *Bigenerina nodosaria* d'Orbigny, 1826, Hypotype from P292 577-1 6a-b *Bigenerina cylindrica* Cushman, 1922, Hypotype from AL232 1025 7a-c *Siphotextularia obesa* Parr, 1950, Hypotype from P292 578-1 8a-b *Textularia lateralis* Laliker, 1935, Hypotype from TTR-17 MS411G 20

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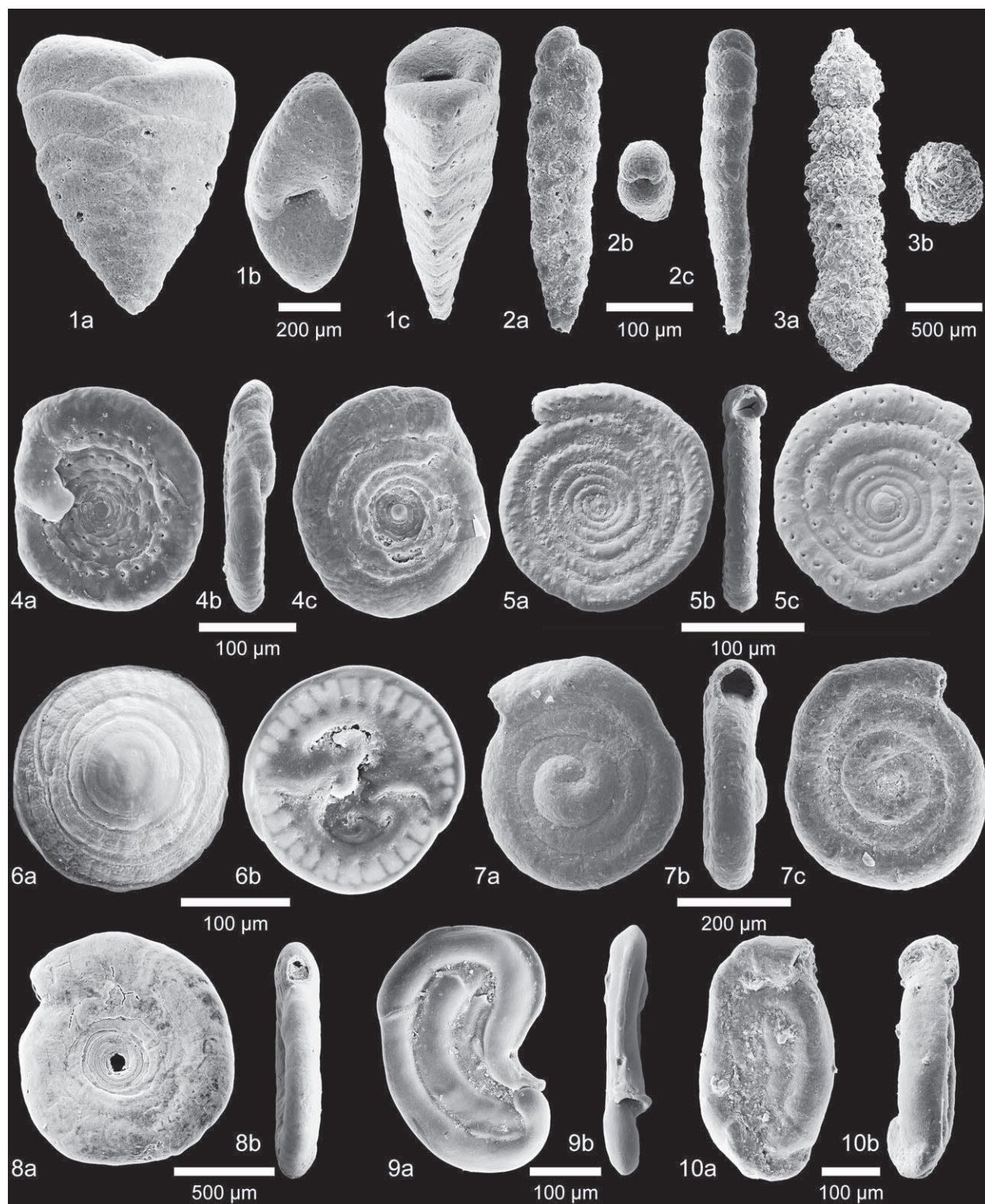


PLATE 6. 1a-c *Textularia truncata* Höglund, 1947, Hypotype from TTR17 MS411G 25 2a-c *Textularia tenuissima* Earland, 1933, Hypotype from AL232 1025 3a-b *Clavulina parisiensis* d'Orbigny, 1826, Hypotype from TTR17 MS411G 0 4a-c *Mychostomina revertens* (Rumbler, 1906), Hypotype from PS70/002-2 5a-c *Spirillina vivipara* Ehrenberg, 1843, Hypotype from POS391 550-1 6a-b *Patellina corrugata* Williamson, 1858, Hypotype from POS391 550-1 7a-c *Cornuspira involvens* (Reuss, 1850), Hypotype from PS70/011-1 8a-b *Cornuspira foliacea* (Philippi, 1844), Hypotype from TTR17 MS411G 15 9a-b *Gordiospira* sp., Hypotype from PS70/028-2 10a-b *Gordiospira elongata* Collins, 1958, Hypotype from TTR17 MS411G45

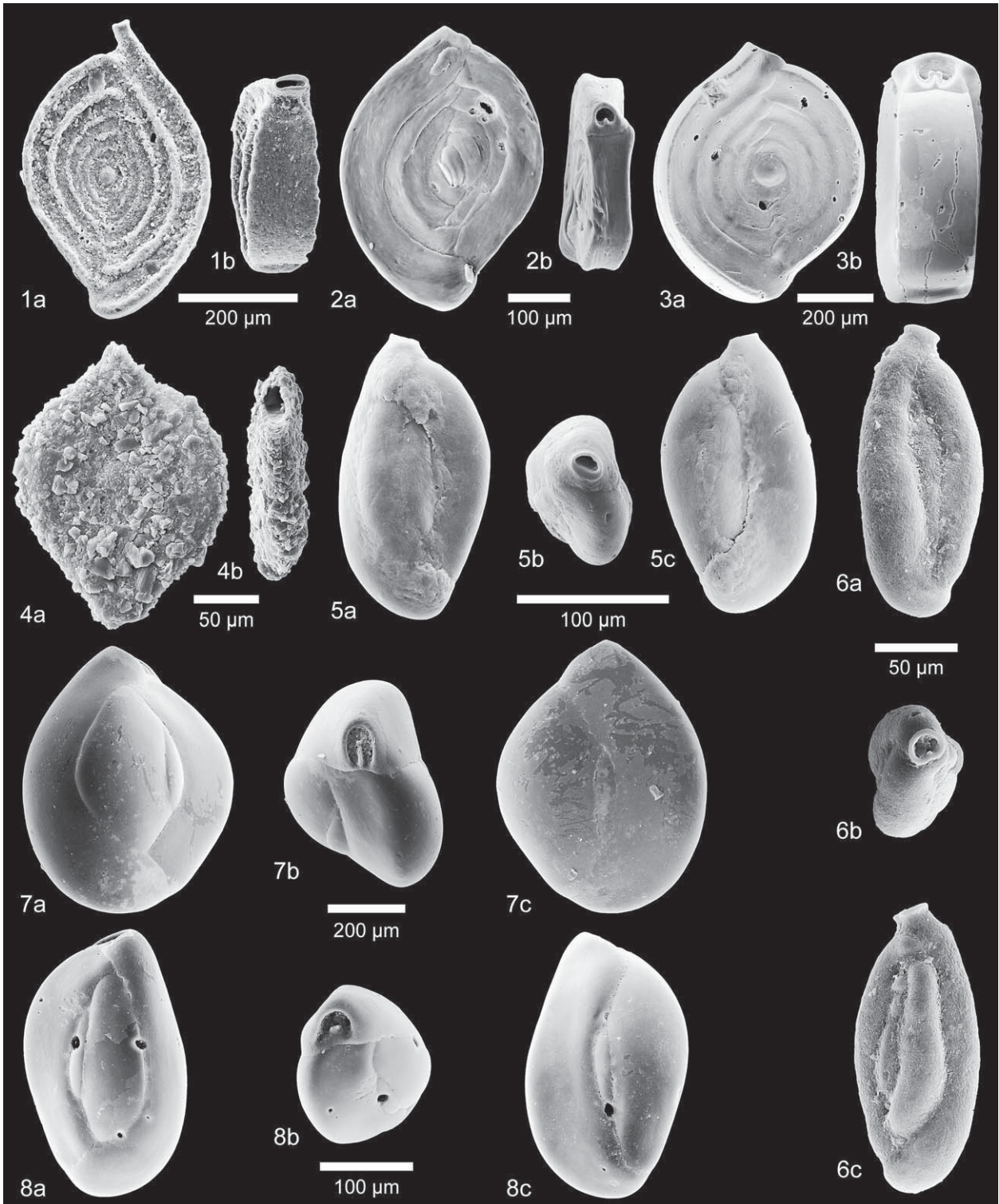


PLATE 7. 1a-b *Spiroloculina tenuiseptata* Brady, 1884, Hypotype from TTR17 MS411G 30 2a-b *Spiroloculina dilatata* d'Orbigny, 1846, Hypotype from TTR17 MS419G 94 3a-b *Spiroloculina excavata* d'Orbigny, 1846, Hypotype from TTR17 MS411G 10 4a-b *Ammomassilina arenaria* (Brady, 1884), Hypotype from TTR17 MS411G 30 5a-c *Cycloforina laevigata* (d'Orbigny, 1839), Hypotype from TTR17 MS411G 0 6a-c *Cycloforina stalkerii* (Loeblich and Tappan, 1953), Hypotype from TTR17 MS411G 10 7a-c *Quinqueloculina viennensis* Le Calvez and Le Calvez, 1958, Hypotype from POS391 556-2 8a-c *Quinqueloculina seminula* (Linné, 1758), Hypotype from TTR17 MS411G 15

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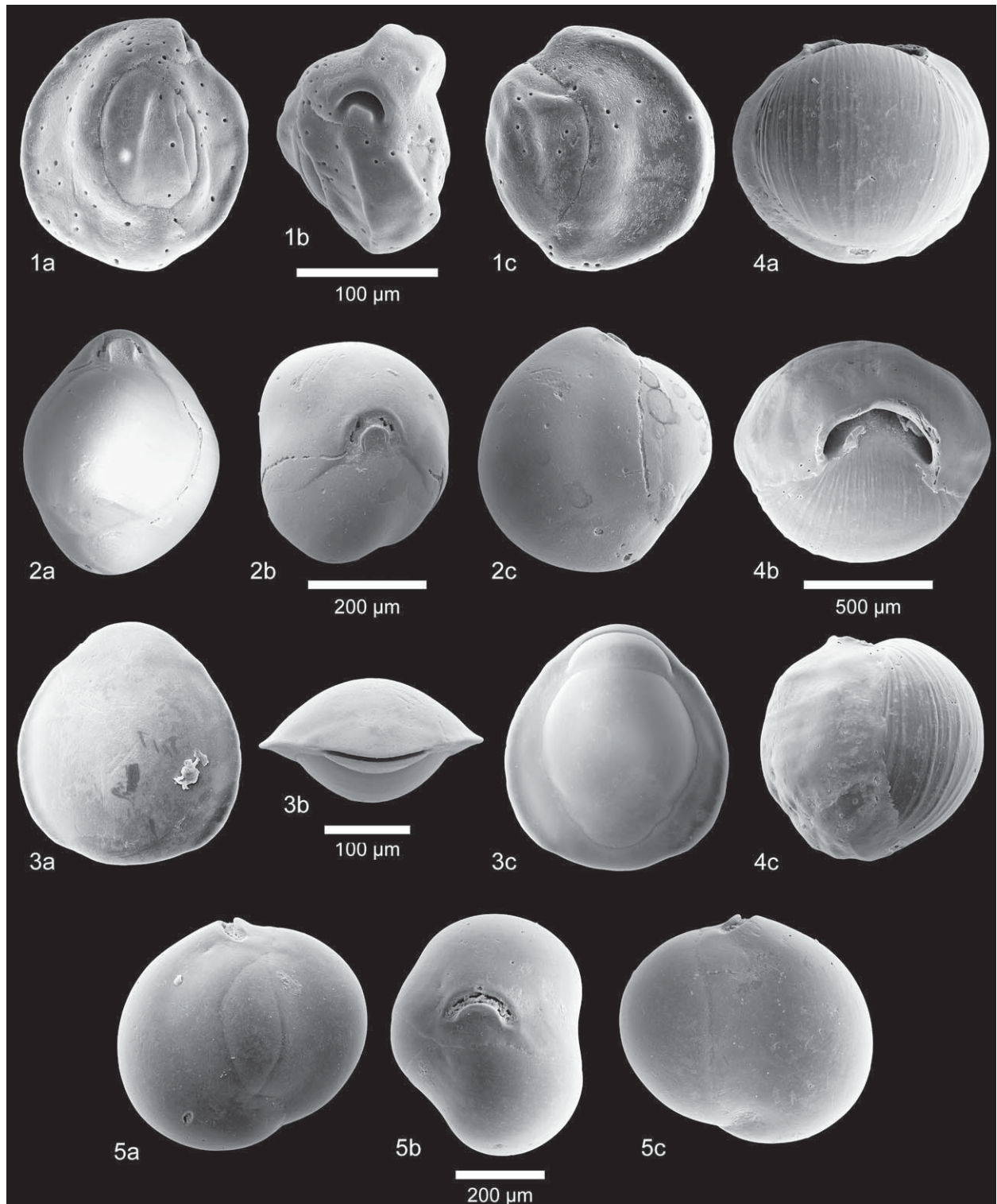


PLATE 8. 1a-c *Quinqueloculina arctica* Cushman, 1933, Hypotype from GeoB9257 2a-c *Biloculinella globula* (Bornemann, 1855), Hypotype from POS391 534-1 3a-c *Biloculinella depressa* (Wiesner, 1923), Hypotype from POS325 455 4a-c *Biloculinella fragilis* Le Calvez and Le Calvez, 1958, Hypotype from TTR17 MS411G 45 5a-c *Miliolinella subrotunda* (Montagu, 1803), Hypotype from POS325 455

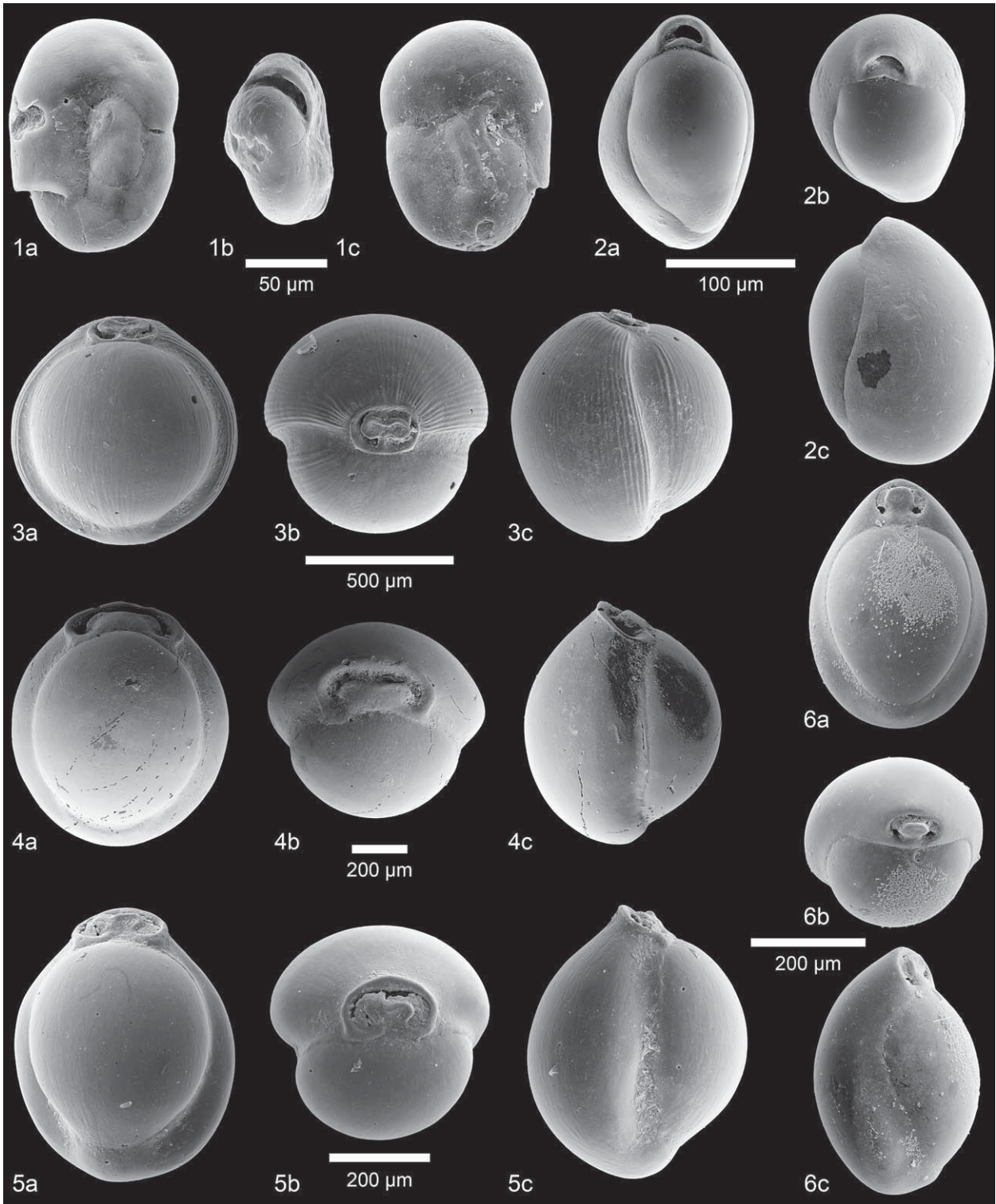


PLATE 9. 1a-c *Miliolinella elongata* Kruit, 1955, Hypotype from TTR17 MS411G 50 2a-c *Pyrgo inornata* (d'Orbigny, 1846), Hypotype from TTR17 MS411G 55 3a-c *Pyrgo comata* (Brady, 1881), Hypotype from Hermi-1_1 4a-c *Pyrgo anomala* (Schlumberger, 1891), Hypotype from M07-15 5a-c *Pyrgo subsphaerica* (d'Orbigny, 1840), Hypotype from POS391 559-1 6a-c *Pyrgo williamsoni* (Silvestri, 1923), Hypotype from AL232 1022

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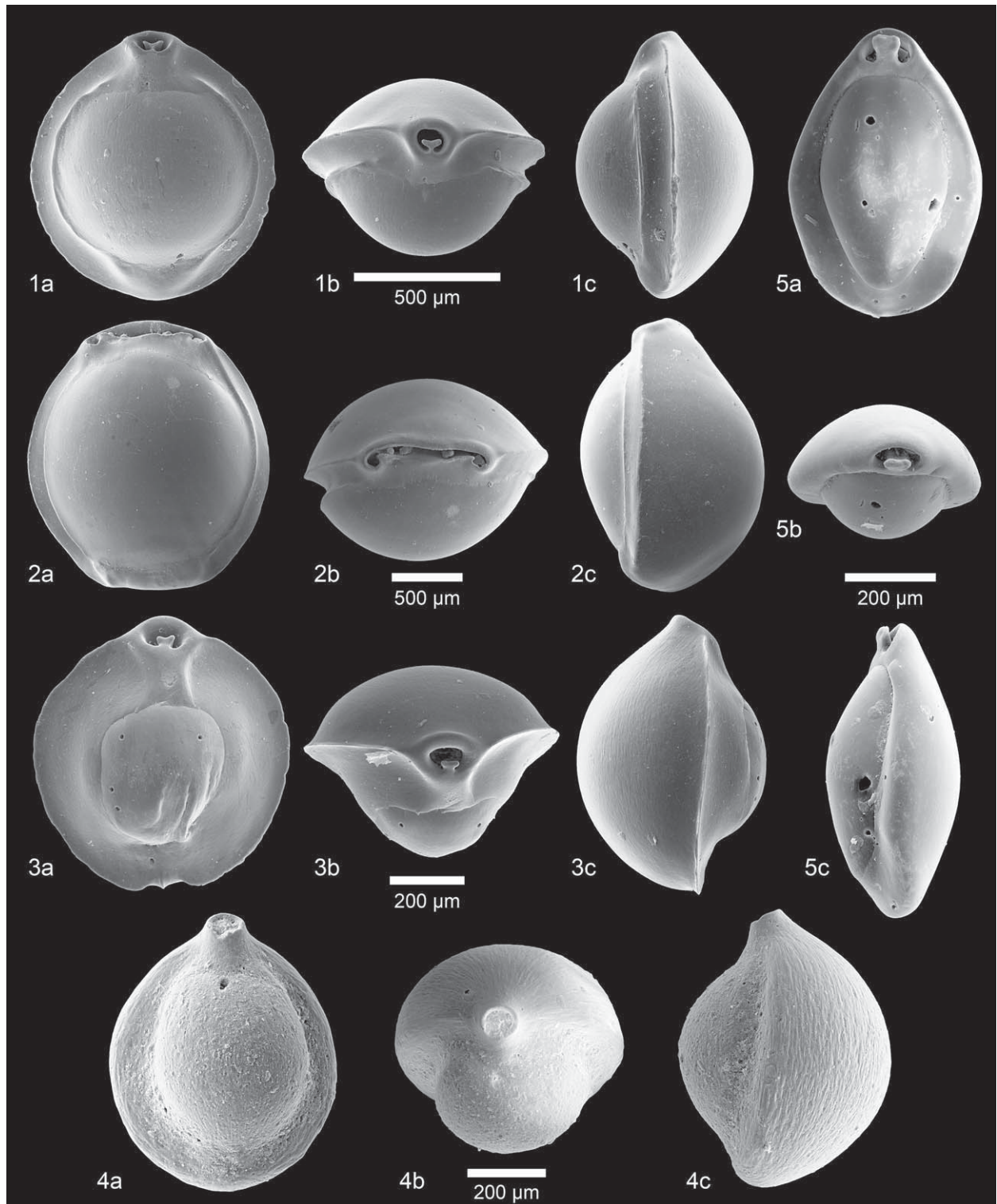


PLATE 10. 1a-c *Pyrgo sarsi* Schlumberger, 1891, Hypotype from PS70/032-2 2a-c *Pyrgo sarsi* Schlumberger, 1891, Hypotype from PS70/032-2 3a-c *Pyrgo murrhina* (Schwager, 1866), Hypotype from PS70/032-2 4a-c *Pyrgo lucernula* (Schwager, 1866), Hypotype from POS391 562-1 5a-c *Pyrgo elongata* (d'Orbigny, 1826), Hypotype from TTR17 MS411G 15

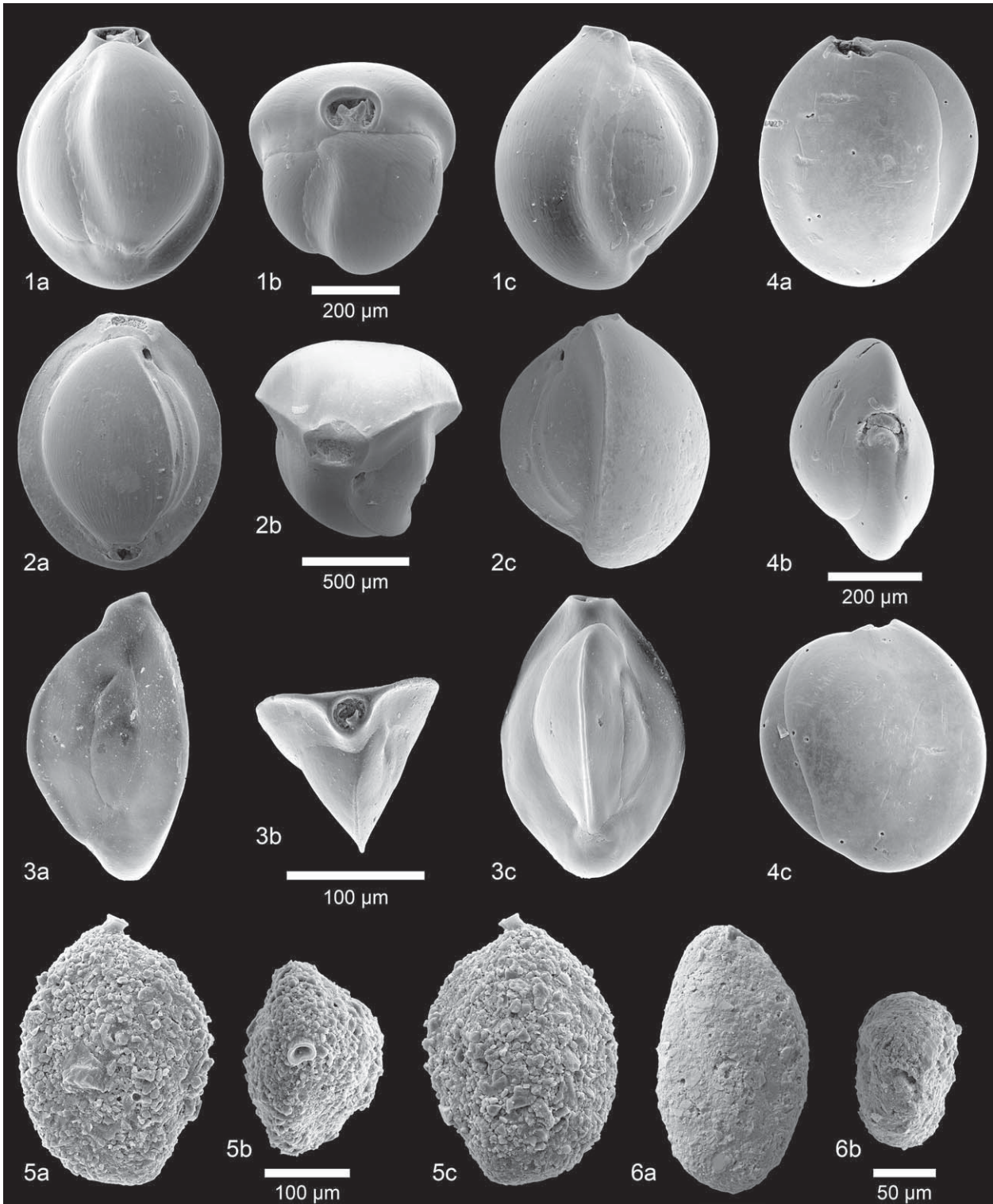


PLATE 11. 1a-c *Triloculina marioni* Schlumberger, 1893, Hypotype from TTR17 MS411G 15 2a-c *Triloculina trigonula* (Lamarck, 1804), Hypotype from PS70/032-2 3a-c *Triloculina tricarinata* d'Orbigny, 1826, Hypotype from TTR17 MS411G 15 4a-c *Sigmoilinella borealis* Saidova, 1975, Hypotype from TTR17 MS411G 25 5a-c *Sigmoilopsis schlumbergeri* (Silvestri, 1904), Hypotype from TTR17 MS411G 0 6a-b *Sigmoilopsis woodi* Atkinson, 1968, Hypotype from POS391 570-2

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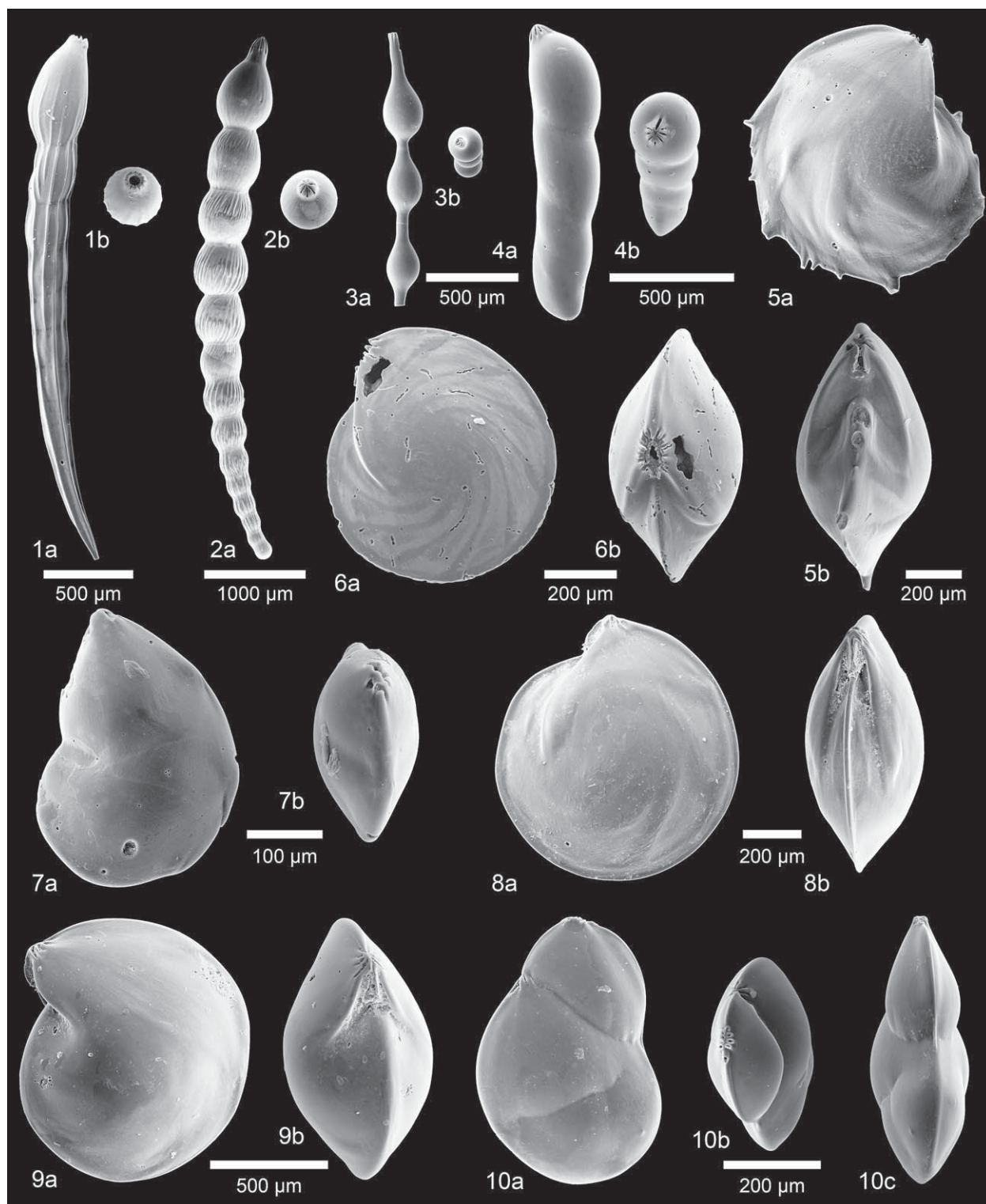


PLATE 12. 1a-b *Dentalina cuvieri* (d'Orbigny, 1826), Hypotype from P292 574-1 2a-b *Dentalina lamarcki* Neugeboren, 1856, Hypotype from TTR17 MS411G 30 3a-b *Grigelis orectus* (Loeblich and Tappan, 1994), Hypotype from TTR17 MS419G 65 4a-b *Laevidentalina sidebottoni* (Cushman, 1933), Hypotype from TTR17 MS411G 0 5a-b *Lenticulina calcar* (Linné, 1758), Hypotype from TTR17 MS411G 50 6a-b *Lenticulina vortex* (Fichtel and Moll, 1798), Hypotype from TTR17 MS411G 10 7a-b *Lenticulina gibba* (d'Orbigny, 1826), Hypotype from TTR17 MS411G 10 8a-b *Lenticulina orbicularis* (d'Orbigny, 1846), Hypotype from GeoB 6721-1 9a-b *Lenticulina inornata* (d'Orbigny, 1846), Hypotype from M07-23 10a-c *Neolenticulina peregrina* (Schwager, 1866), Hypotype from GeoB 12721-1

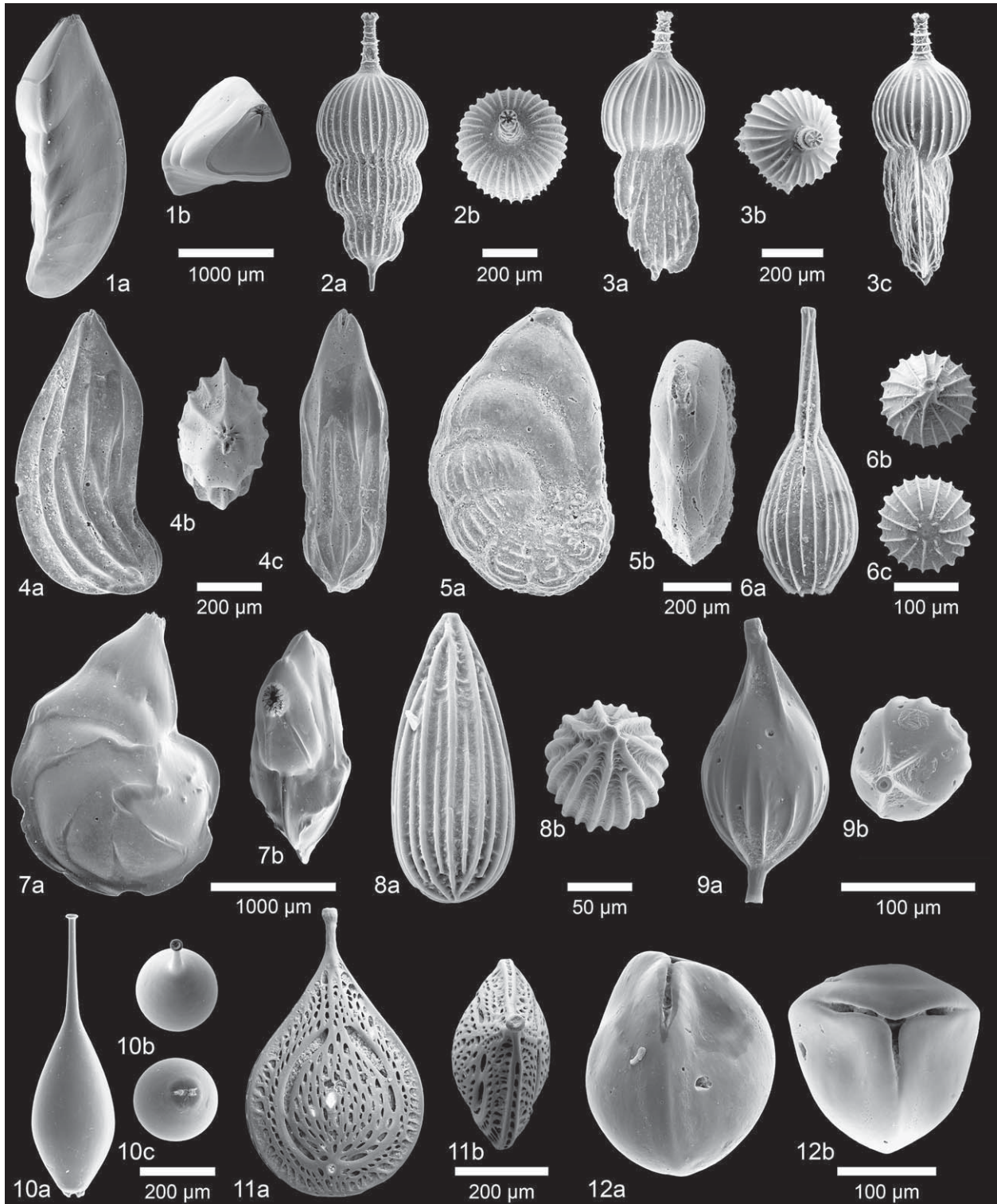


PLATE 13. 1a-b *Saracenaria caribbeana* Hofker, 1976, Hypotype from GeoB 12729-1 2a-b *Amphicoryna scalaris* (Batsch, 1791), Hypotype from TTR17 MS411G 0 3a-c *Amphicoryna scalaris* (Batsch, 1791), Hypotype from TTR17 MS411G 10 4a-c *Astacolus beerae* Brenner and McMillan, 1976, Hypotype from PS70/028-2 5a-b *Planularia perculata* McCulloch, 1977, Hypotype from TTR17 MS419G 35 6a-c *Lagena substriata* Williamson, 1848, Hypotype from PS70/033-2 7a-b *Planularia costata* (d'Orbigny, 1902), Hypotype from GeoB12722-1 8a-b *Lagena meridionalis* Wiesner, 1931, Hypotype from TTR17 MS411G 55 9a-b *Lagena semilineata* var. *spinigera* Earland, 1934, Hypotype from POS391 556-1 10a-c *Pygmaeosestron laevis ovalis* (Williamson, 1848), Hypotype from M07-21 11a-b *Lagena squamosaalata* Brady, 1881, Hypotype from GeoB 9271 12a-b *Lagena trigonolaevigata* Balkwill and Millett, 1884, Hypotype from PS70/029-3

TAXONOMY AND ILLUSTRATION OF BENTHIC FORAMINIFERA

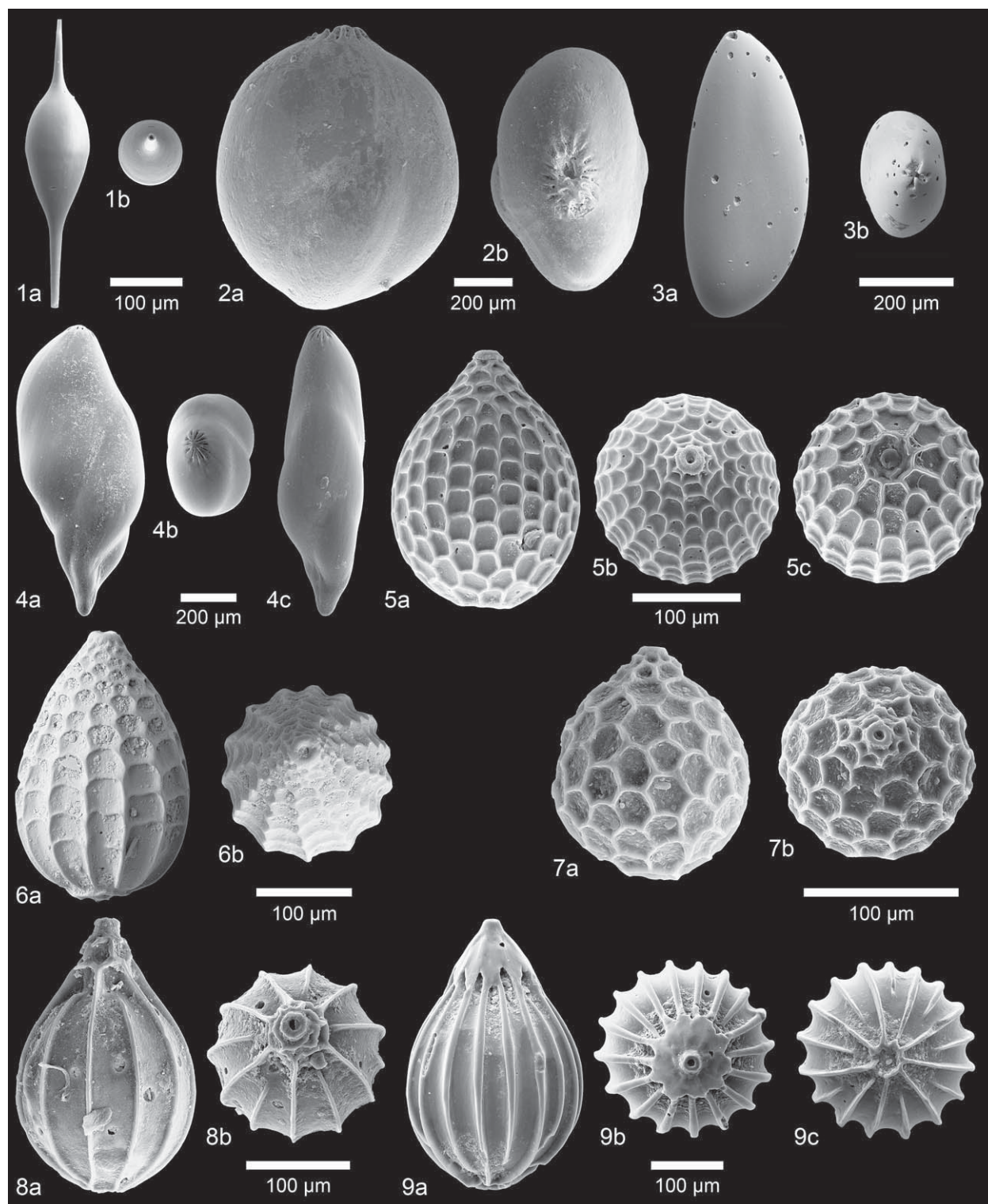


PLATE 14. 1a-b *Hyalinonetrion gracillimum* (Costa, 1856), Hypotype from PS70/011-1 2a-b *Globulina aequalis* d'Orbigny, 1846, Hypotype from AL232 1022 3a-b *Pseudopolymorphina* sp., Hypotype from GeoB 9219 4a-c *Pyrulina cylindroides* (Roemer, 1930), Hypotype from POS391 550-1 5a-c *Favulina squamosa* (Montagu, 1803), Hypotype from TTR17 MS419G 65 6a-b *Favulina melo* (d'Orbigny, 1839), Hypotype from TTR17 MS419G 35 7a-b *Favulina hexagona* (Williamson, 1858), Hypotype from TTR17 MS411G 0 8a-b *Homalohedra williamsoni* (Alcock, 1865), Hypotype from POS391 550-1 9a-c *Homalohedra apiopleura* (Loeblich and Tappan, 1953), Hypotype from TTR17 MS411G 45

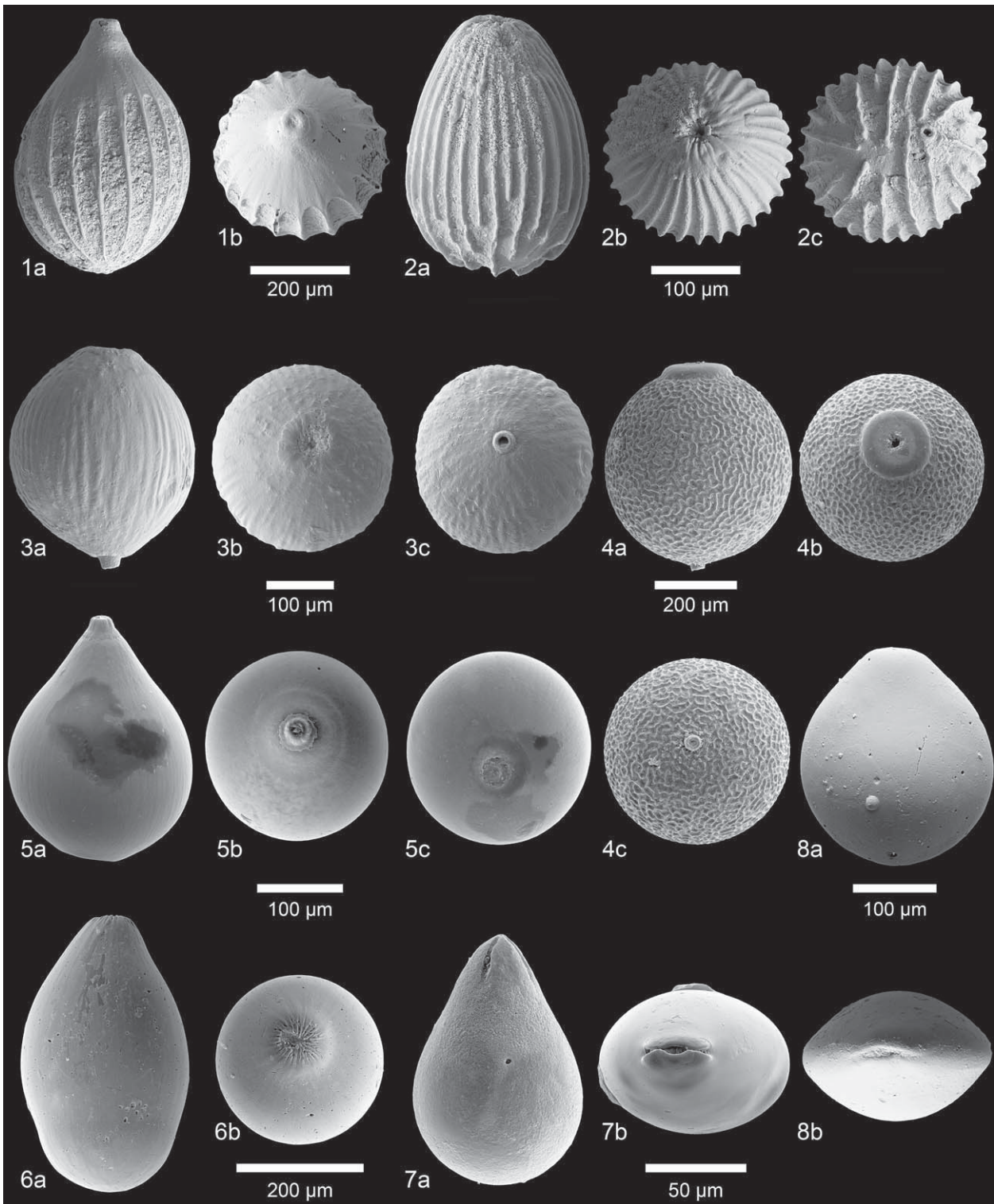


PLATE 15. 1a-b *Homalohedra borealis* (Loeblich and Tappan, 1954), Hypotype from POS391 550-1 2a-c *Homalohedra eucostata* (McCulloch, 1977), Hypotype from POS391 562-1 3a-c *Oolina lineata* subsp. *communis* McCulloch, 1977, Hypotype from POS391 534-1 4a-c *Oolina ampulladistoma* (Jones, 1874), Hypotype from POS391 558-1 5a-c *Oolina globosa* (Montagu, 1803), Hypotype from POS391 571-1 6a-b *Oolina laevigata* d'Orbigny, 1839, Hypotype from AL232 1022 7a-b *Fissurina agassizi* Todd and Bronnimann, 1957, Hypotype from TTR17 MS419G 45 8a-b *Fissurina circularis* Todd, 1954, Hypotype from GeoB 9271

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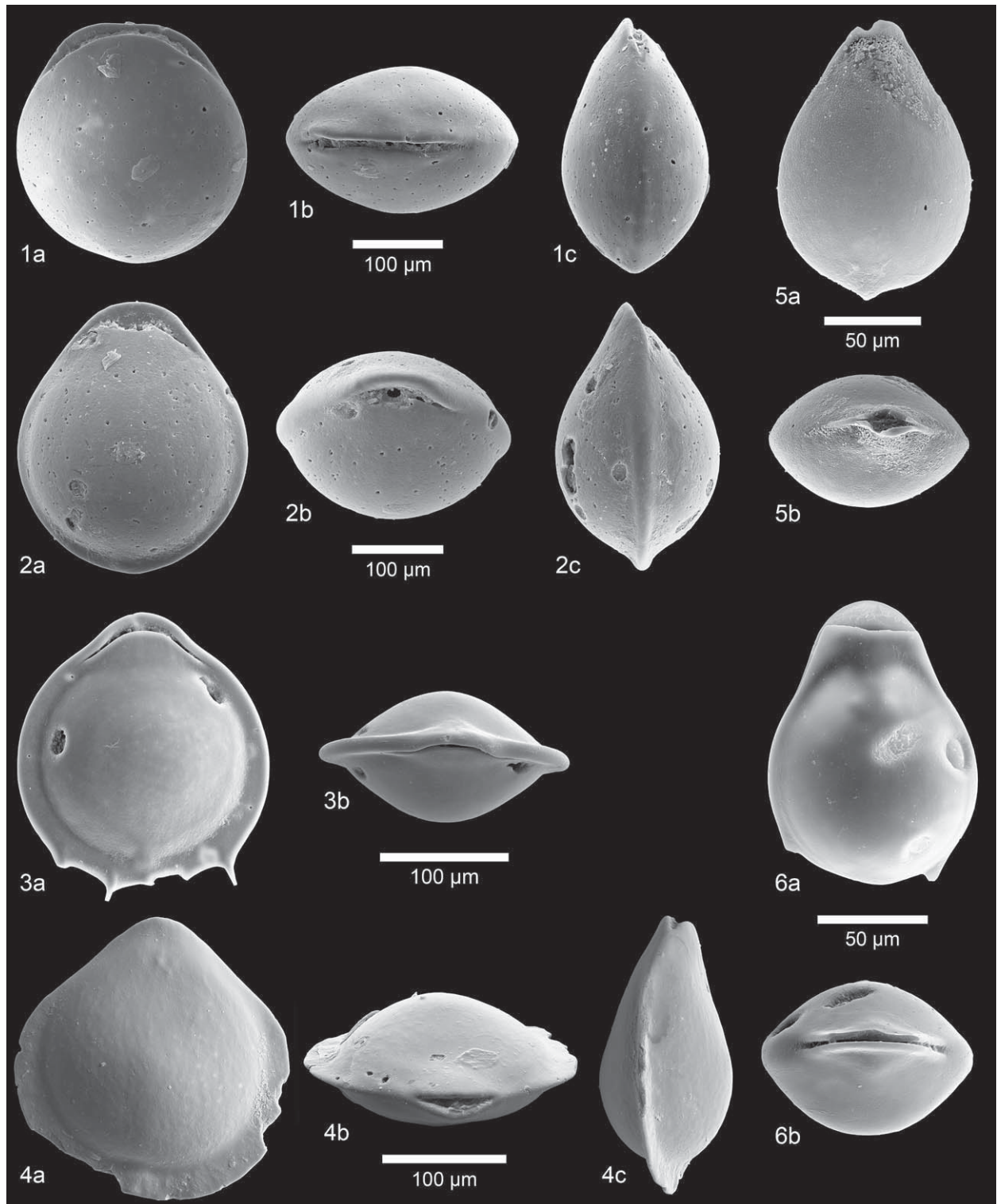


PLATE 16. 1a-c *Fissurina lucida* (Williamson, 1848), Hypotype from PS70/033-2 2a-c *Fissurina eburnea* Buchner, 1940, Hypotype from POS391 550-1 3a-b *Fissurina kerguelensis* Parr, 1950, Hypotype from TTR17 MS419G 35 4a-c *Fissurina annectens* (Burrows and Holland, 1895), Hypotype from POS391 555-1 5a-b *Fissurina crassiporosa* McCulloch, 1977, Hypotype from TTR17 MS411G 10 6a-b *Fissurina longpointensis* McCulloch, 1977, Hypotype from TTR17 MS411 40

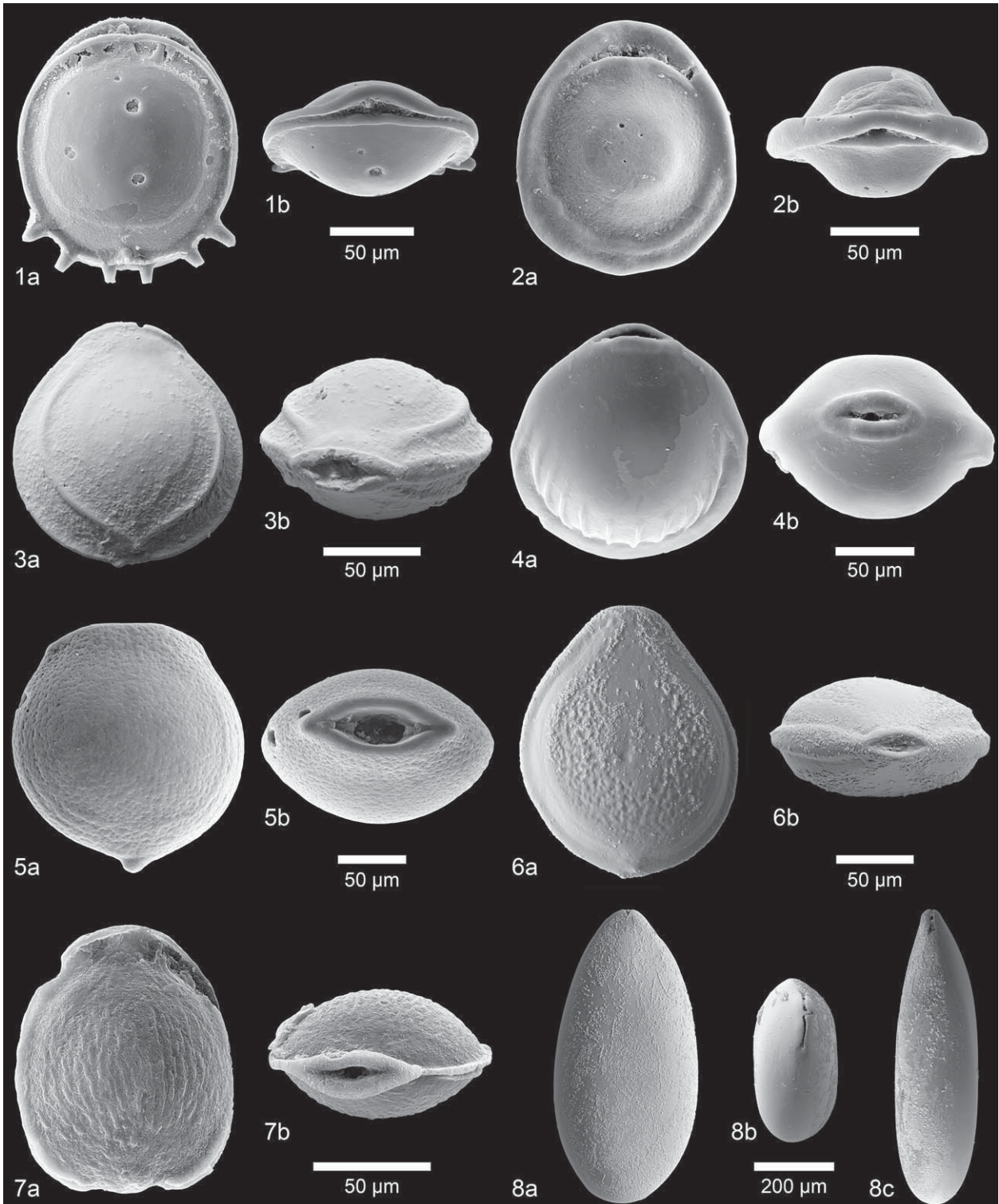


PLATE 17. 1a-b *Parafissurina basispinata* McCulloch, 1977, Hypotype from TTR17 MS419G 84 2a-b *Parafissurina marginata* (Walker and Boys, 1803), Hypotype from TTR17 MS411G 60 3a-b *Fissurina pseudoorbignyana* (Buchner, 1940), Hypotype from TTR17 MS411G 10 4a-b *Fissurina dublini* McCulloch, 1977, Hypotype from P292 578-1 5a-b *Fissurina derogata* McCulloch, 1977, Hypotype from TTR17 MS411G 35 6a-b *Fissurina lacunata* (Burrows and Holland, 1895), Hypotype from PS70/028-2 7a-b *Fissurina nucelloides* (Buchner, 1940), Hypotype from GeoB9209-2 8a-c *Fissurina pseudolucida* Zheng, 1979, Hypotype from POS391 544-2

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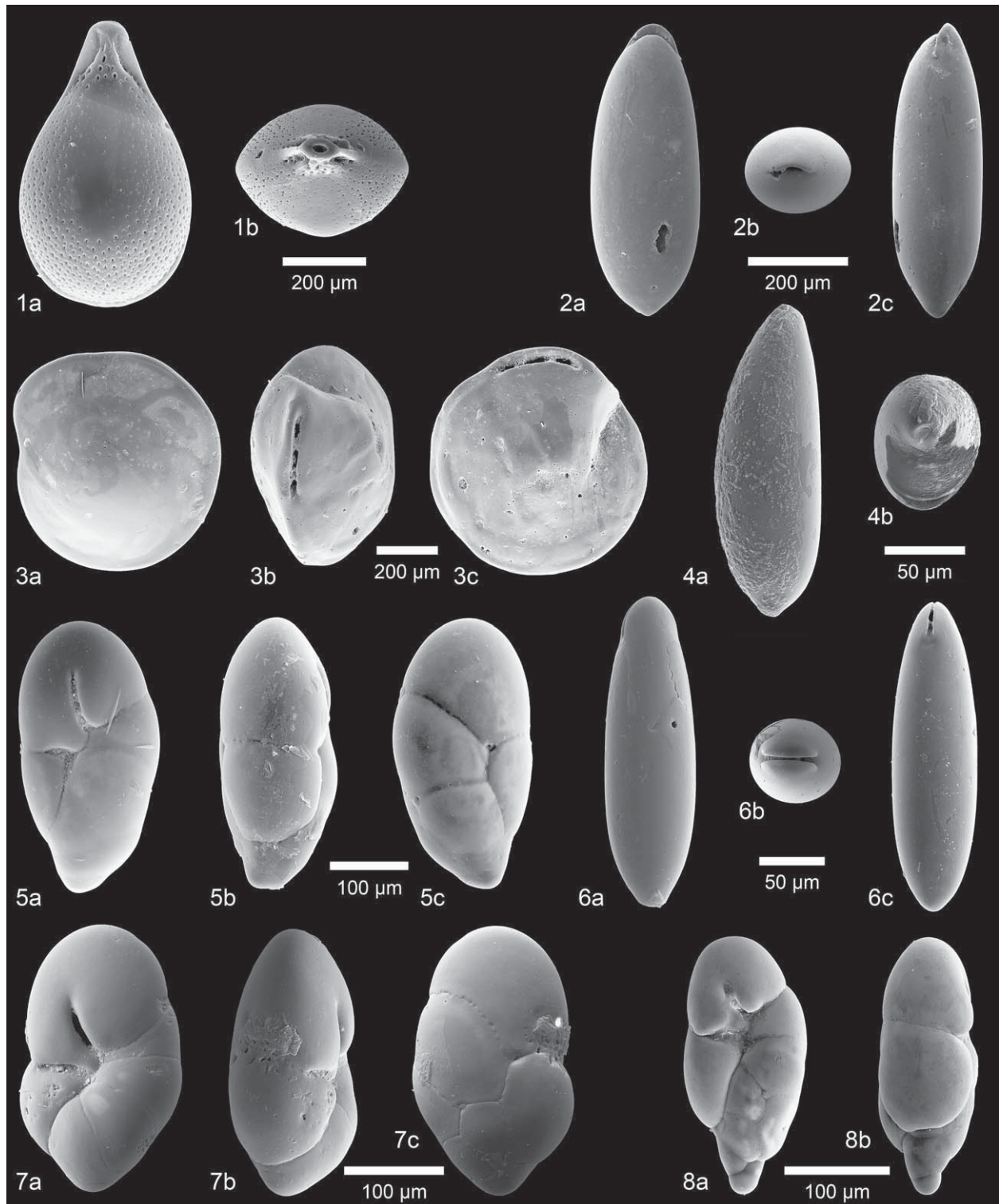


PLATE 18. 1a-b *Palliolatella semimarginata* (Reuss, 1870), Hypotype from P292 578-1 2a-c *Parafissurina lateralis* (Cushman, 1913), Hypotype from PS70/033-2 3a-c *Hoeglundina elegans* (d'Orbigny, 1826), Hypotype from P292 581-1 4a-b *Parafissurina felsinea* (Fornasini, 1894), Hypotype from PS70/038-2 5a-c *Robertinoides bradyi* (Cushman and Parker, 1936), Hypotype from M07-15 6a-c *Parafissurina robusta* (Zheng, 1979), Hypotype from POS326 455 7a-c *Robertinoides bradyi* d'Orbigny, 1826, Hypotype from PS70/029-3 8a-b *Robertinoides pumilum* Höglund, 1947, Hypotype from TTR17 MS411G 40

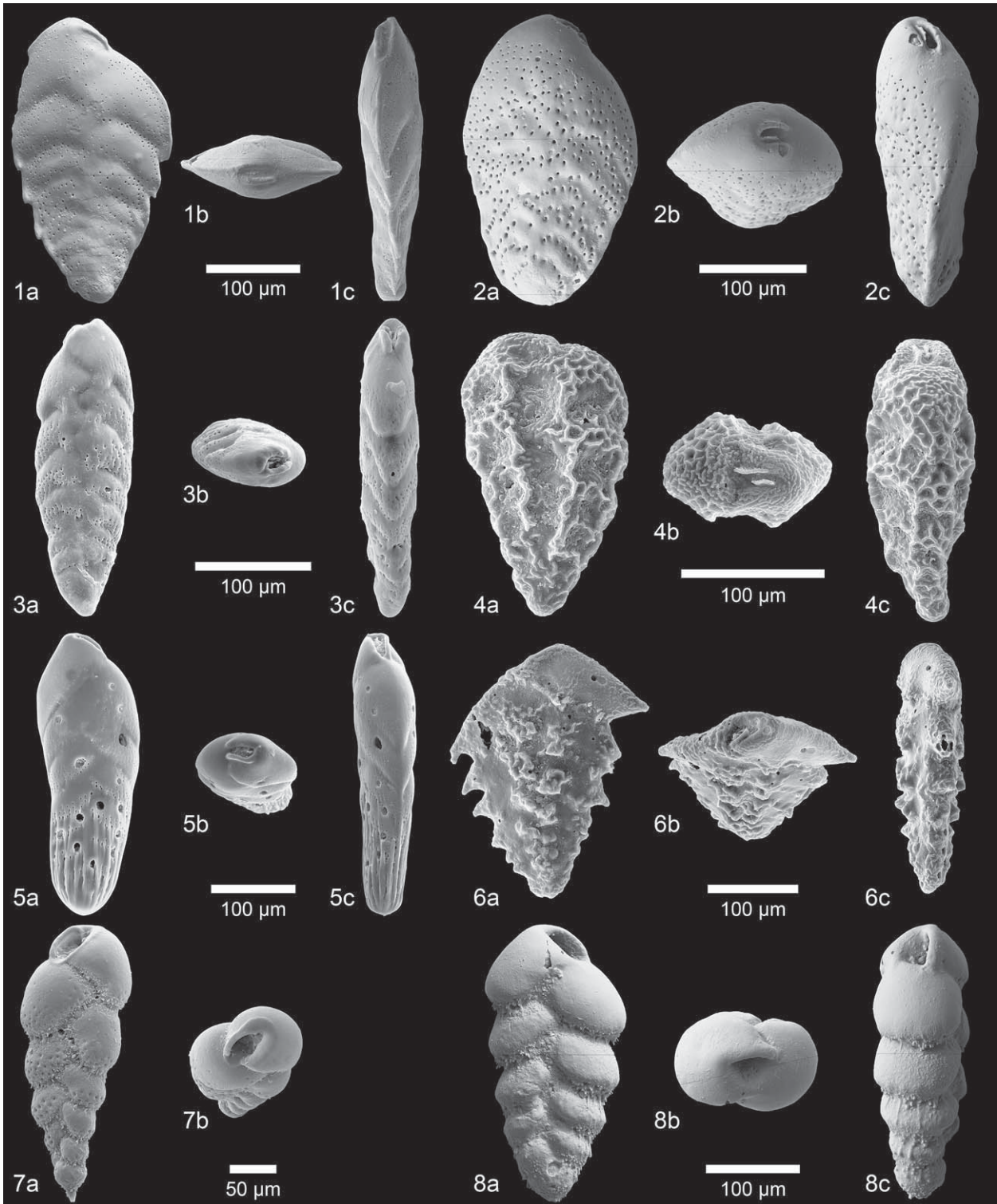


PLATE 19. 1a-c *Bolivina alata* (Seguenza, 1862), Hypotype from TTR17 MS419G 25 2a-c *Bolivina dilatata* (Reuss, 1850), Hypotype from P292 577-1 3a-c *Bolivinellina pseudopunctata* (Höglund, 1947), Hypotype from GeoB9204-1 4a-c *Bolivina pseudoplicata* Heron-Allen and Earland, 1930, Hypotype from TTR17 MS411G 25 5a-c *Bolivinellina striatula* (Cushman, 1922), Hypotype from TTR17 MS411G 0 6a-c *Bolivina difformis* (Williamson, 1858), Hypotype from P292 576-1 7a-b *Bolivina spinescens* Cushman, 1911, Hypotype from POS391 555-1 8a-c *Bolivina subspinescens* Cushman, 1922, Hypotype from P292 580-1

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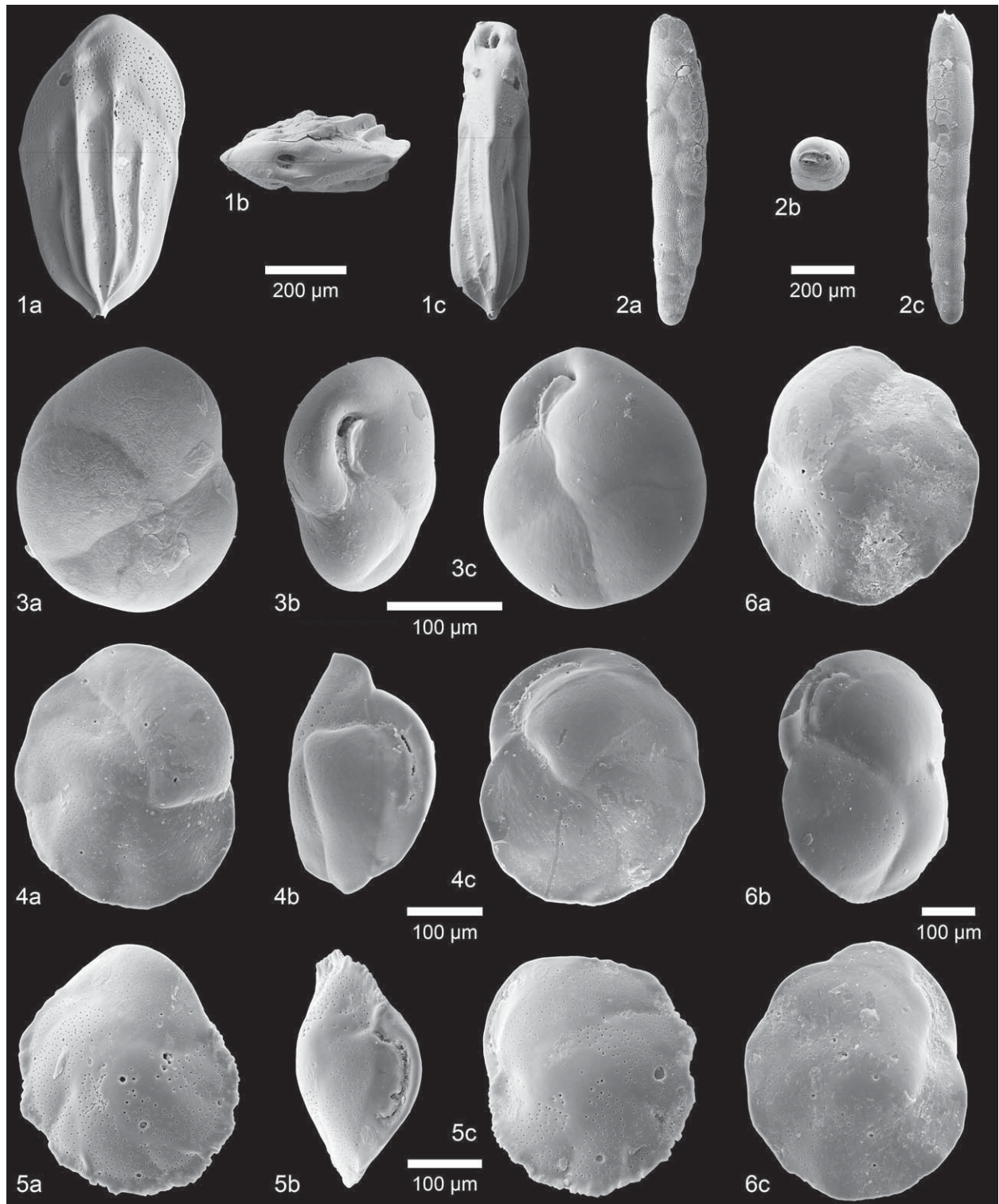


PLATE 20. 1a-b *Brizalina subaenariensis* (Cushman, 1922), Hypotype from P292 580-1 2a-c *Parabrizalina porrectum* (Brady, 1881), Hypotype from AL232 1025 3a-c *Cassidulina reniforme* Nörvang, 1945, Hypotype from POS391 555-1 4a-c *Cassidulina laevigata* d'Orbigny, 1826, Hypotype from PS70/028-2 5a-c *Cassidulina carinata* Silvestri, 1896, Hypotype from PS70/011-1 6a-c *Cassidulina teretis* Tappan, 1951, Hypotype from PS70/038-2

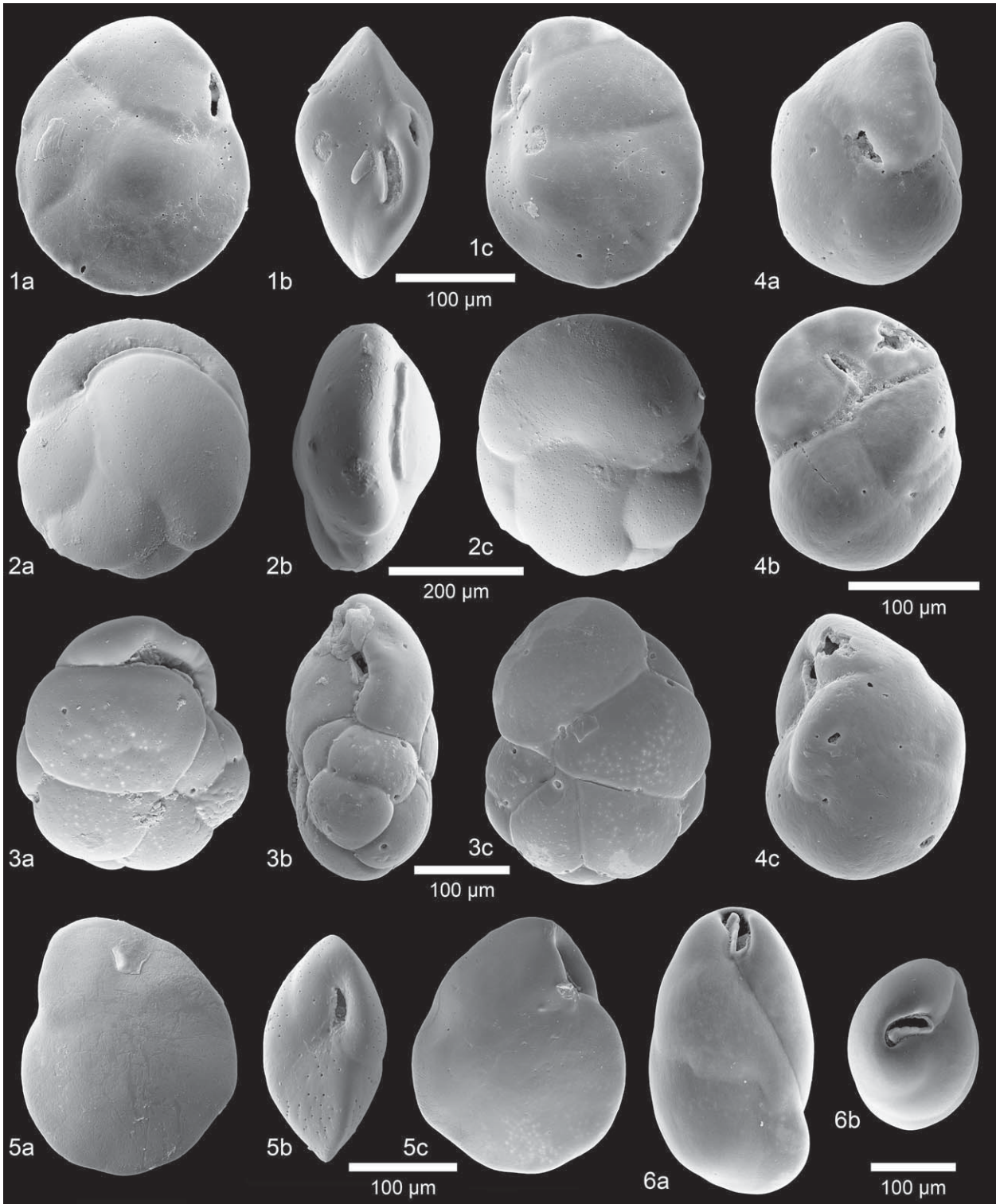


PLATE 21. 1a-c *Cassidulina neoteretis* Seidenkrantz, 1995, Hypotype from POS391 558-1 2a-c *Takayanagia delicata* (Cushman, 1927), Hypotype from PS292 576-1 3a-c *Cassidulina crassa* d'Orbigny, 1839, Hypotype from PS70/028-2 4a-c *Globocassidulina subglobosa* (Brady, 1881), Hypotype from TTR17 MS411G 0 5a-c *Islandiella norcrossi* (Cushman, 1933), Hypotype from POS391 555-1 6a-b *Cassidulinoides bradyi* (Norman, 1881), Hypotype from TTR17 MS419G 75

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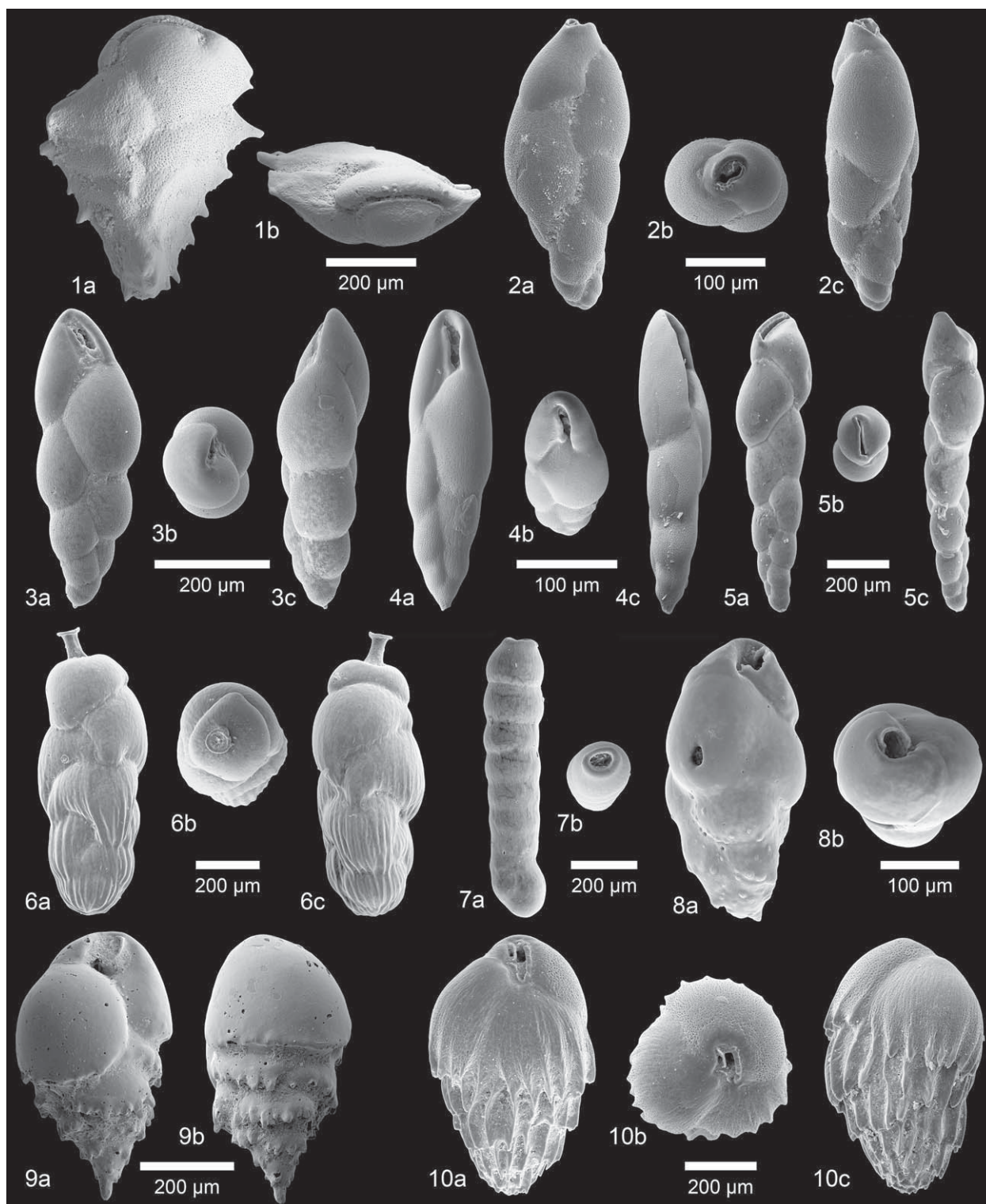


PLATE 22. 1a-b *Ehrenbergina trigona* Goës, 1896, Hypotype from GeoB 9256-1 2a-c *Stainforthia fusiformis* (Williamson, 1858), Hypotype from AL232 1025 3a-c *Stainforthia loeblichii* (Feyling-Hanssen, 1954), Hypotype from POS391 555-1 4a-c *Fursenkoina complanata* (Egger, 1893), Hypotype from AL232 1025 5a-c *Stainforthia skagerakensis* (Höglund, 1947), Hypotype from AL232 1025 6a-c *Rectuvigerina elongatastriata* (Colom, 1952), Hypotype from TTR17 MS411G 10 7a-b *Siphogenerina columellaris* (Brady, 1881), Hypotype from TTR17 MS411G 15 8a-b *Bulimina aculeata* d'Orbigny, 1826, Hypotype from TTR17 MS419G 94 9a-b *Bulimina marginata* d'Orbigny, 1826, Hypotype from TTR17 MS411G 10 10a-c *Bulimina striata* d'Orbigny, 1826, Hypotype from TTR17 MS411G 15

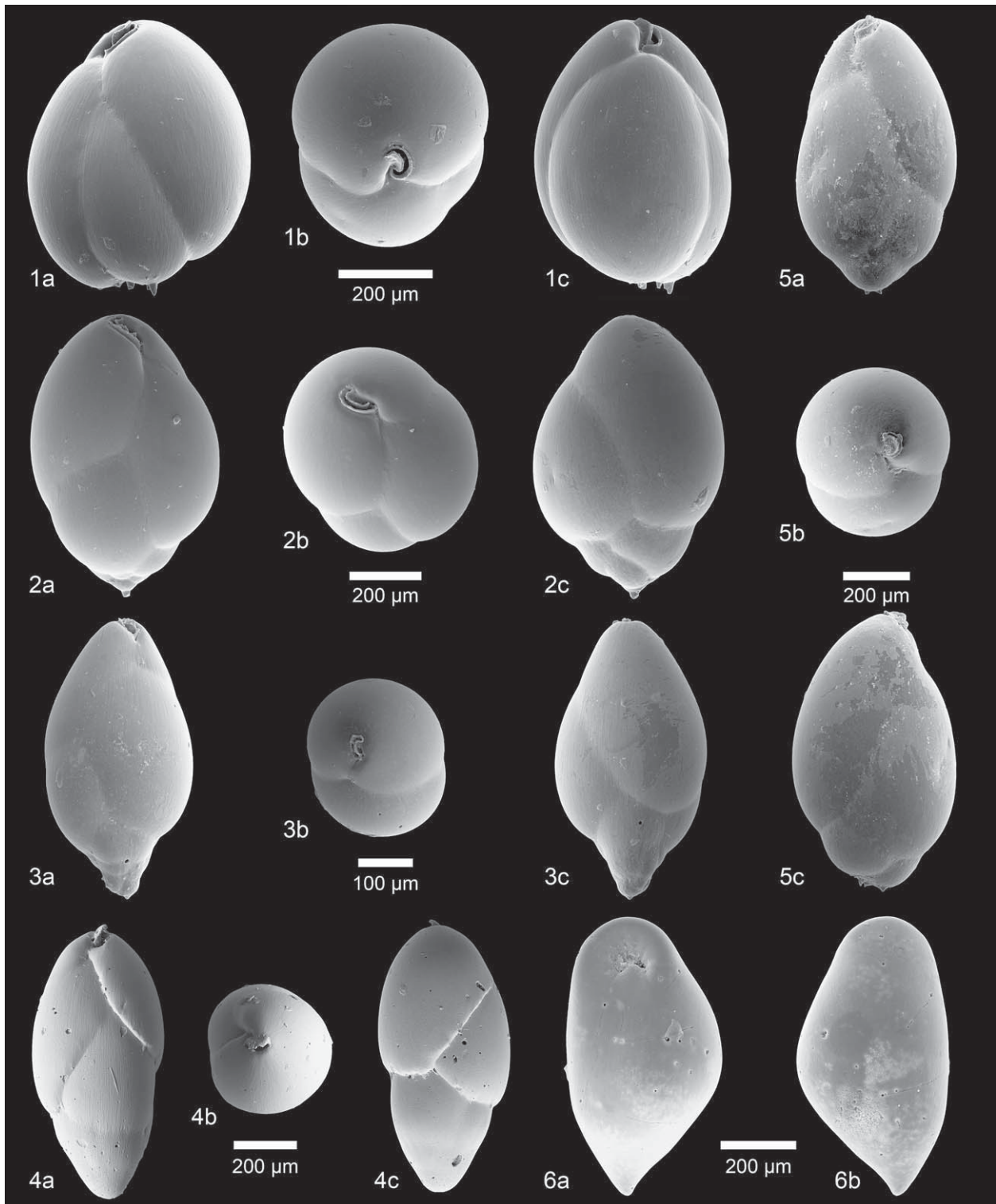


PLATE 23. 1a-c *Globobulimina turgida* (Bailey, 1851), Hypotype from AL232 1025 2a-c *Globobulimina affinis* (d'Orbigny, 1839), Hypotype from AL232 1025 3a-c *Globobulimina affinis* (d'Orbigny, 1839), Hypotype from AL232 1026 4a-c *Praeglobobulimina ovata* (d'Orbigny, 1846), Hypotype from P292 580-1 5a-c *Globobulimina doliolum* (Terquem and Terquem, 1886), Hypotype from POS391 550-1 6a-b *Buliminella spinigera* Cushman, 1922, Hypotype from GeoB12722-1

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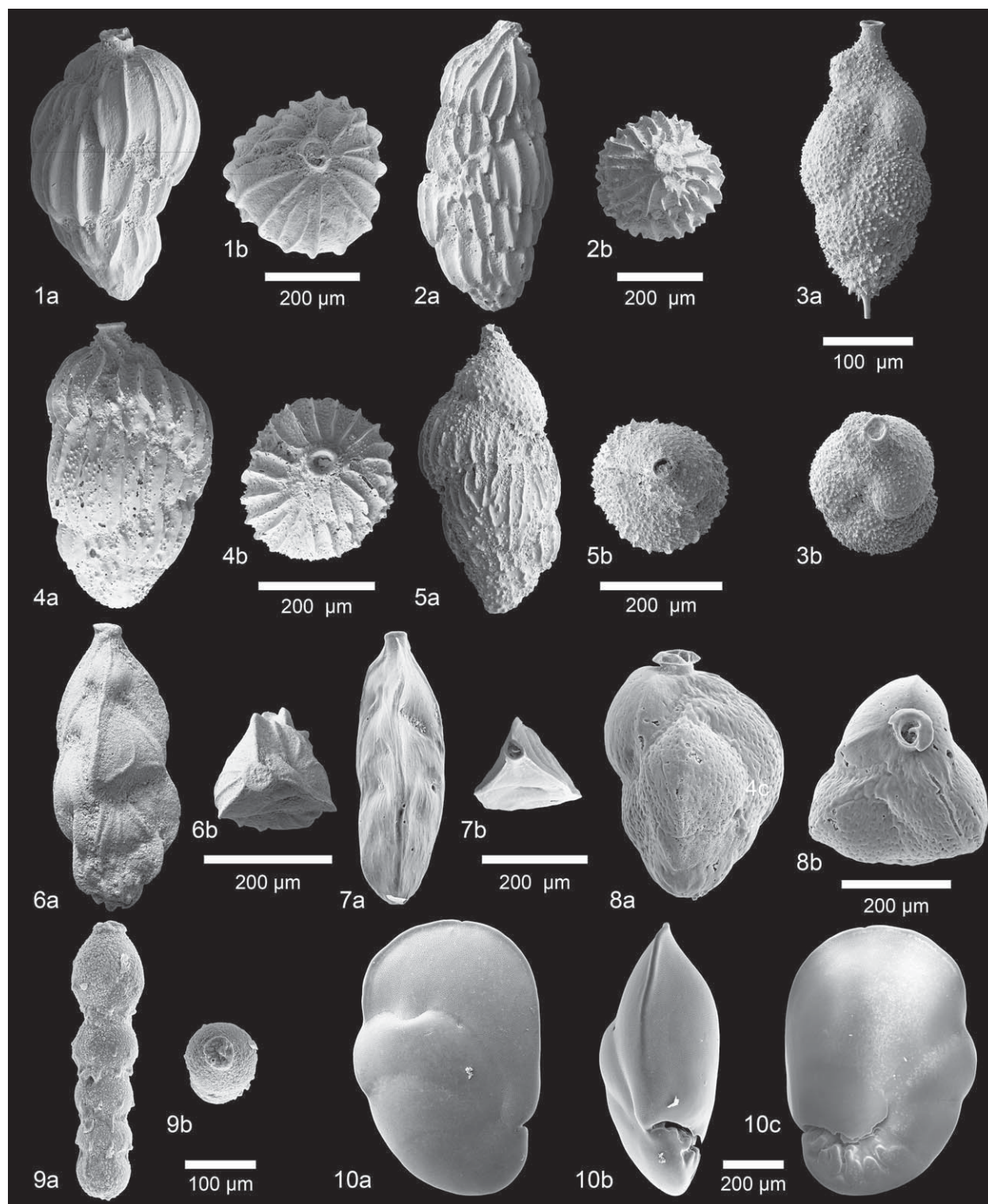


PLATE 24. 1a-b *Uvigerina mediterranea* Hofker, 1932, Hypotype from P292 580-1 2a-b *Uvigerina peregrina* Cushman, 1923, Hypotype from P292 580-1 3a-b *Uvigerina auberiana* d'Orbigny, 1839, Hypotype from GeoB 6721-1 4a-b *Uvigerina peregrina parva* Lutze, 1986, Hypotype from GeoB 6721-1 5a-b *Uvigerina pigmaea* d'Orbigny, 1826, Hypotype from P292 576-1 6a-b *Angulogerina angulosa* (Williamson, 1858), Hypotype from P292 577-1 7a-b *Trifarina bradyi* (Cushman, 1923), Hypotype from TTR17 MS419G 107 8a-b *Trifarina fornasini* (Selli, 1948), Hypotype from TTR17 MS411G 25 9a-b *Nodogenerina virgula* (Brady, 1884), Hypotype from PS70/033-2 10a-c *Cancris auriculus* (Fichtel and Moll, 1798), Hypotype from TTR17 MS411G 40

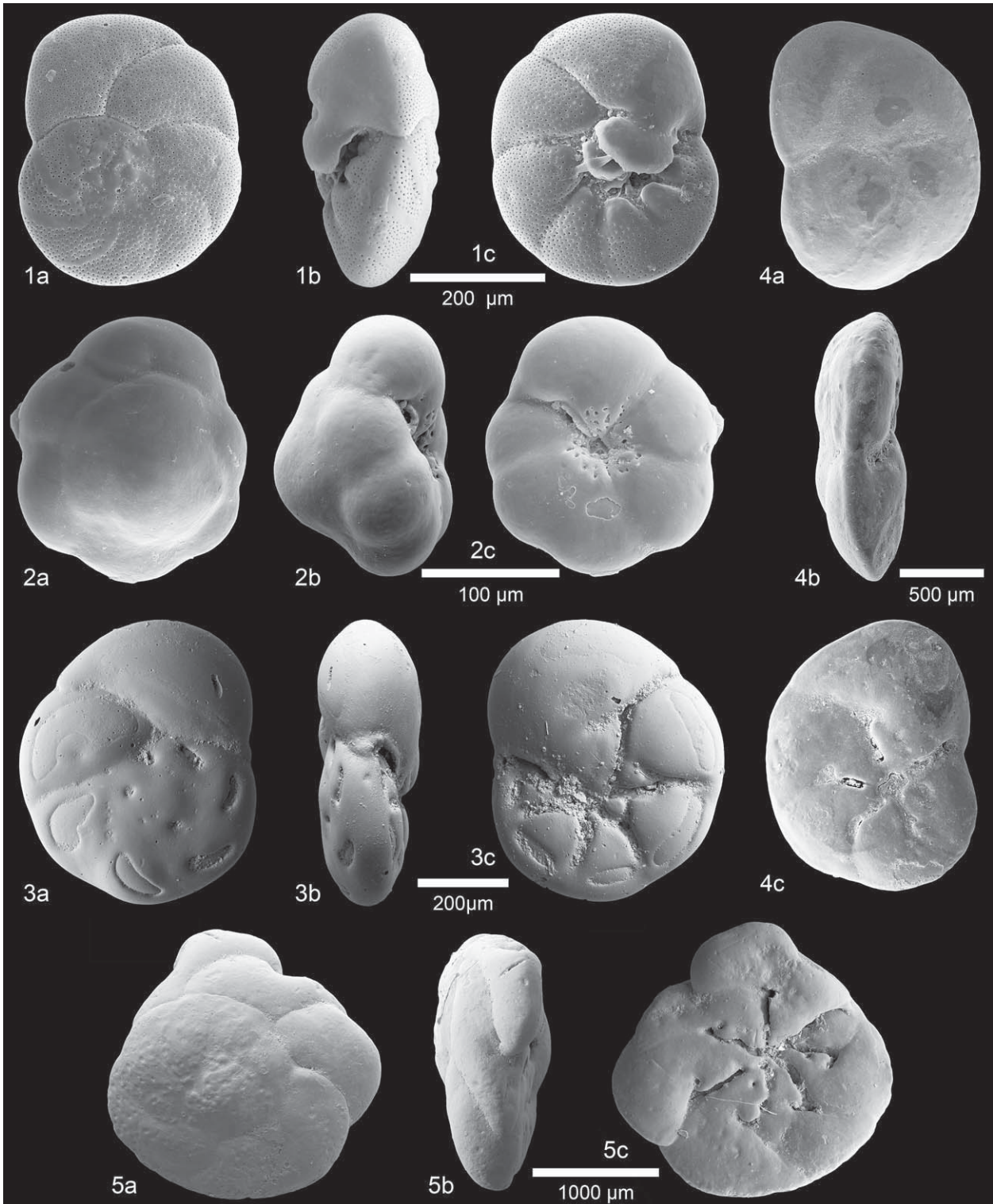


PLATE 25. 1a-c *Valvulineria bradyana* (Fornasini, 1900), Hypotype from TTR17 MS411G 15 2a-c *Ioanella tumidula* (Brady, 1884), Hypotype from PS70/033-2 3a-c *Stomatorbina concentrica* (Parker and Jones, 1864), Hypotype from Geob9256-1 4a-c *Hyrrokkin sarcophaga* Cedhagen, 1994, Hypotype from POS391 562-1 5a-c *Hyrrokkin sarcophaga* Cedhagen, 1994, Hypotype from POS391 550-1

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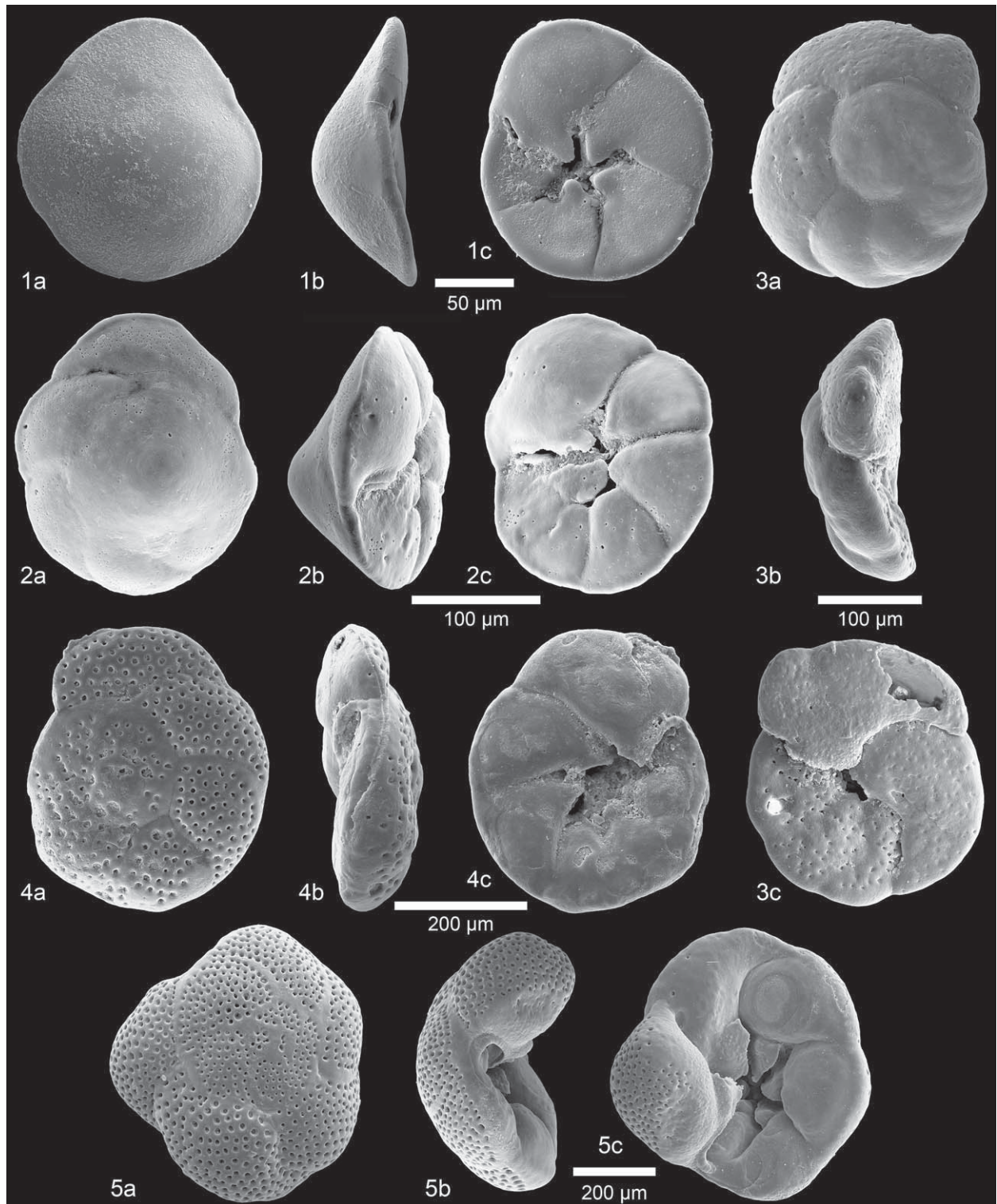


PLATE 26. 1a-c *Gavelinopsis nitida* (Williamson, 1858), Hypotype from POS391 555-1 2a-c *Gavelinopsis praegeri* (Heron-Allen and Earland, 1913), Hypotype from TTR17 MS411G 0 3a-c *Gavelinopsis caledonia* Murray and Whittaker, 2001, Hypotype from POS325 455 4a-c *Rosalina globularis* d'Orbigny, 1826, Hypotype from PS70/011-1 5a-c *Rosalina brady* (Cushman, 1915), Hypotype from PS70/011-1

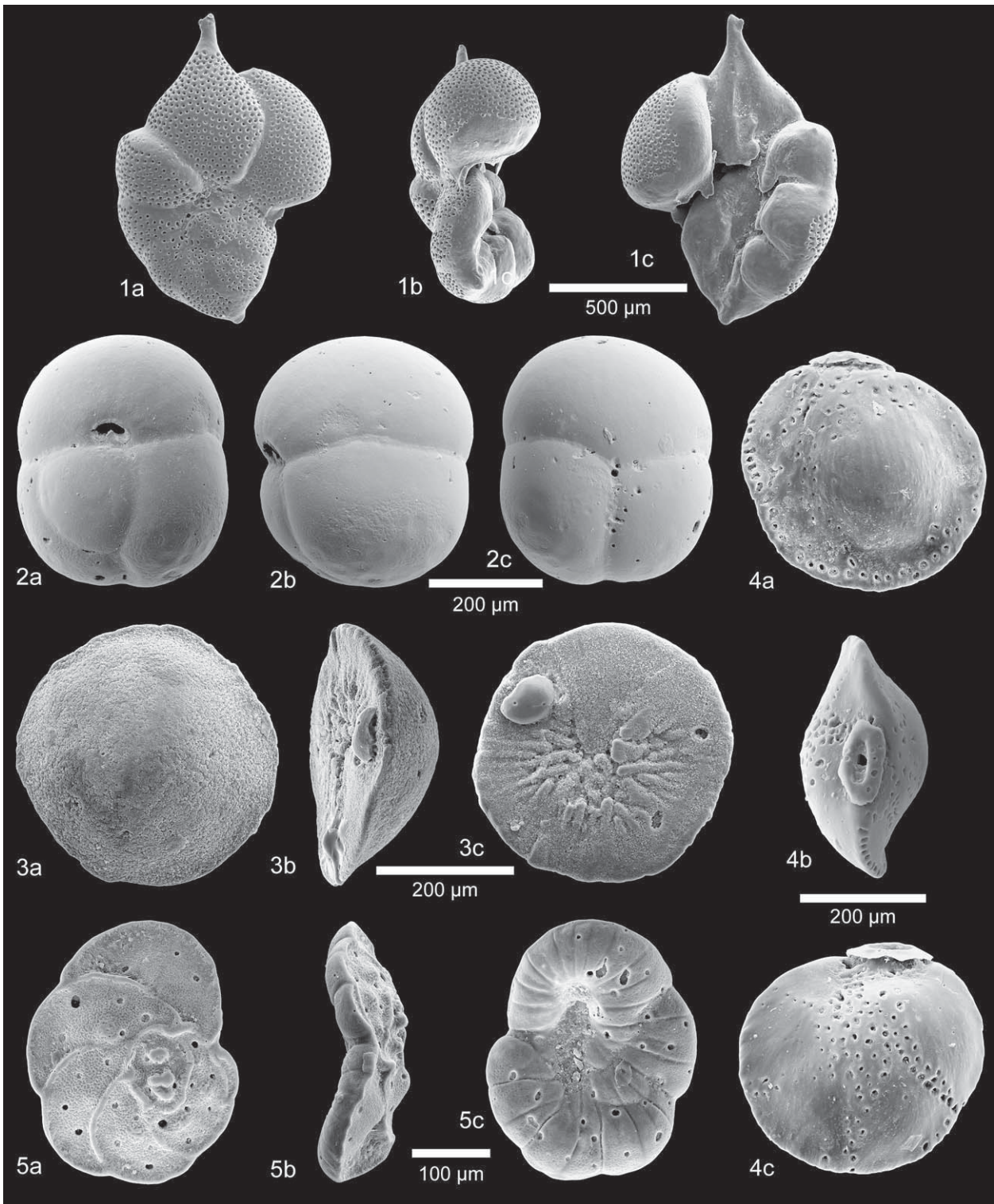


PLATE 27. 1a-c *Rosalina semipunctata* (Bailey, 1851), Hypotype from GeoB9205-1 2a-c *Sphaeroidina bulloides* d'Orbigny, 1826, Hypotype from TTR17 MS411G 0 3a-c *Glabratella patelliformis* (Brady, 1884), Hypotype from TTR17 MS411G 0 4a-c *Siphonina reticulata* (Czjzek, 1848), Hypotype from TTR17 MS411G 15 5a-c *Heronallenita lingulata* (Burrows and Holland, 1895), Hypotype from TTR17 MS411G 25

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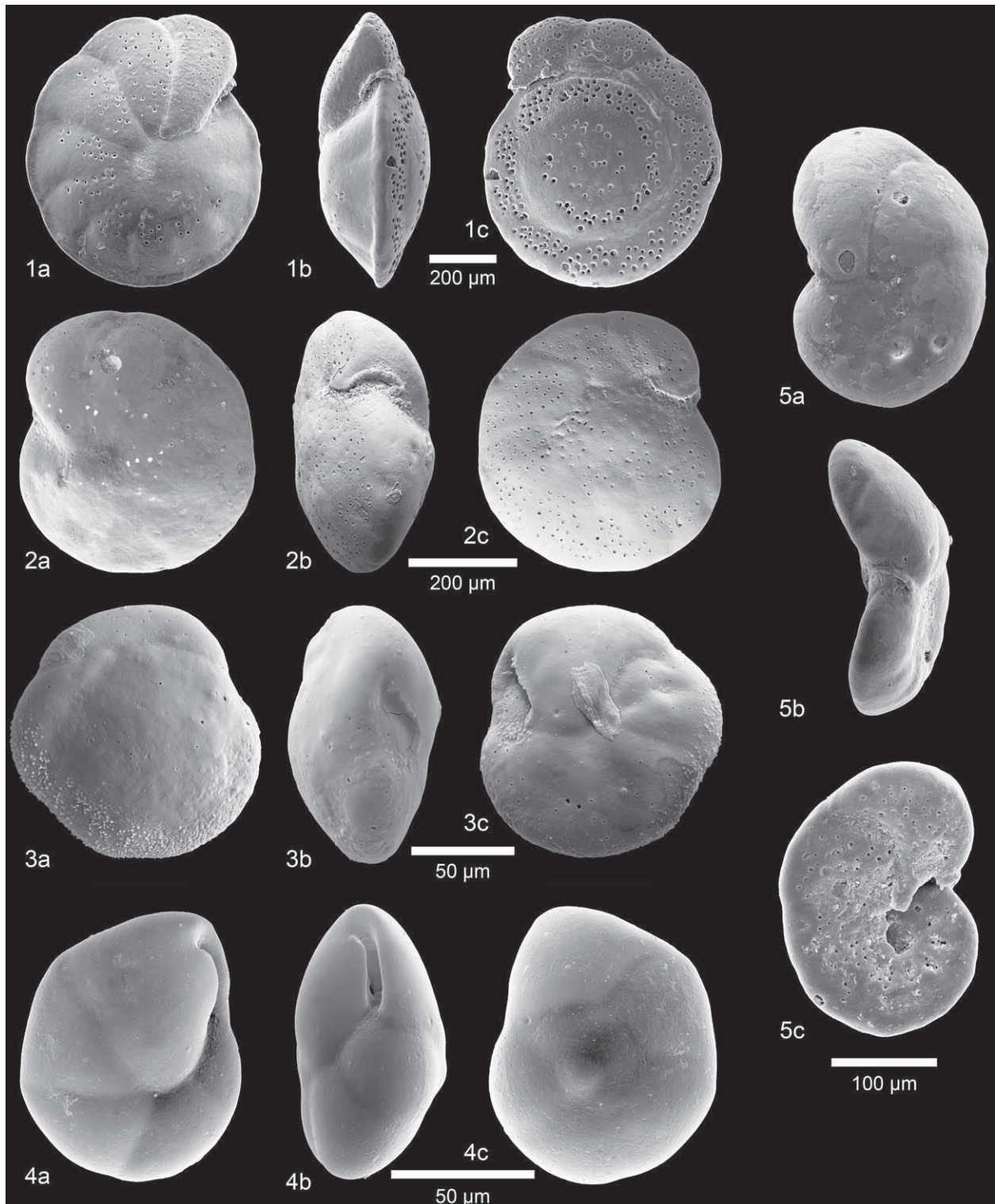


PLATE 28. 1a-c *Cibicidoides mundulus* (Parker, 1953), Hypotype from TTR17 MS411G 0 2a-c *Cibicidoides pachyderma* (Rzehak, 1886), Hypotype from TTR17 MS411G 0 3a-c *Epistominella vitrea* Parker, 1953, Hypotype from AL316 321 4a-c *Epistominella exigua* (Brady, 1884), Hypotype from TTR17 MS411G 15 5a-c *Discorbinella bertheloti* (d'Orbigny, 1839), Hypotype from POS391 550-1

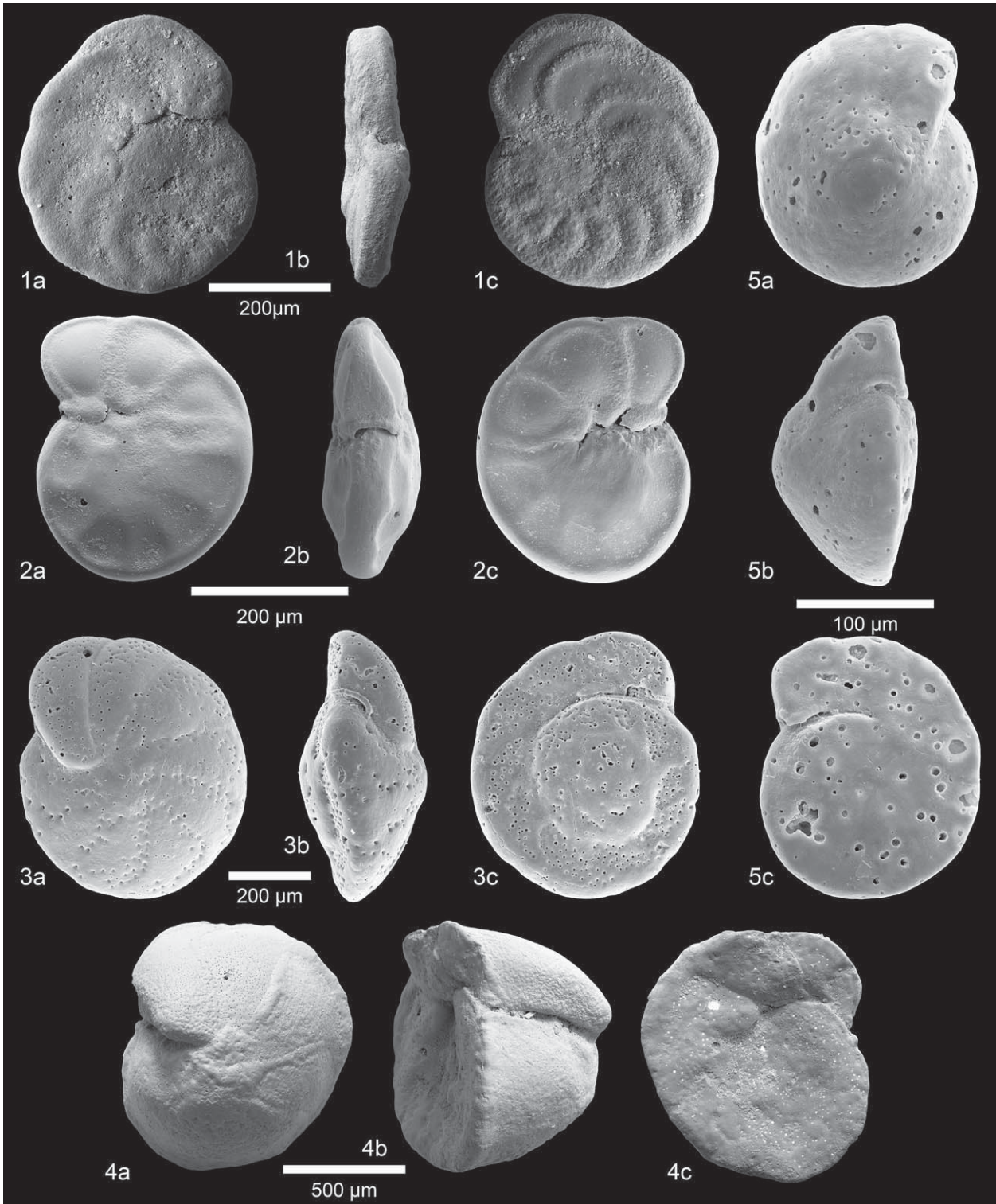


PLATE 29. 1a-c *Planulina ariminensis* d'Orbigny, 1826, Hypotype from M07-15 2a-c *Hyalineina balthica* (d'Orbigny, 1826), Hypotype from P292 576-1 3a-c *Cibicides ungerianus* (d'Orbigny, 1826), Hypotype from POS391 534-1 4a-c *Cibicides refulgens* de Montfort, 1808, Hypotype from P292 574-1 5a-c *Cibicides aravaensis* Perelis and Reiss, 1976, Hypotype from TTR17 MS411G 50

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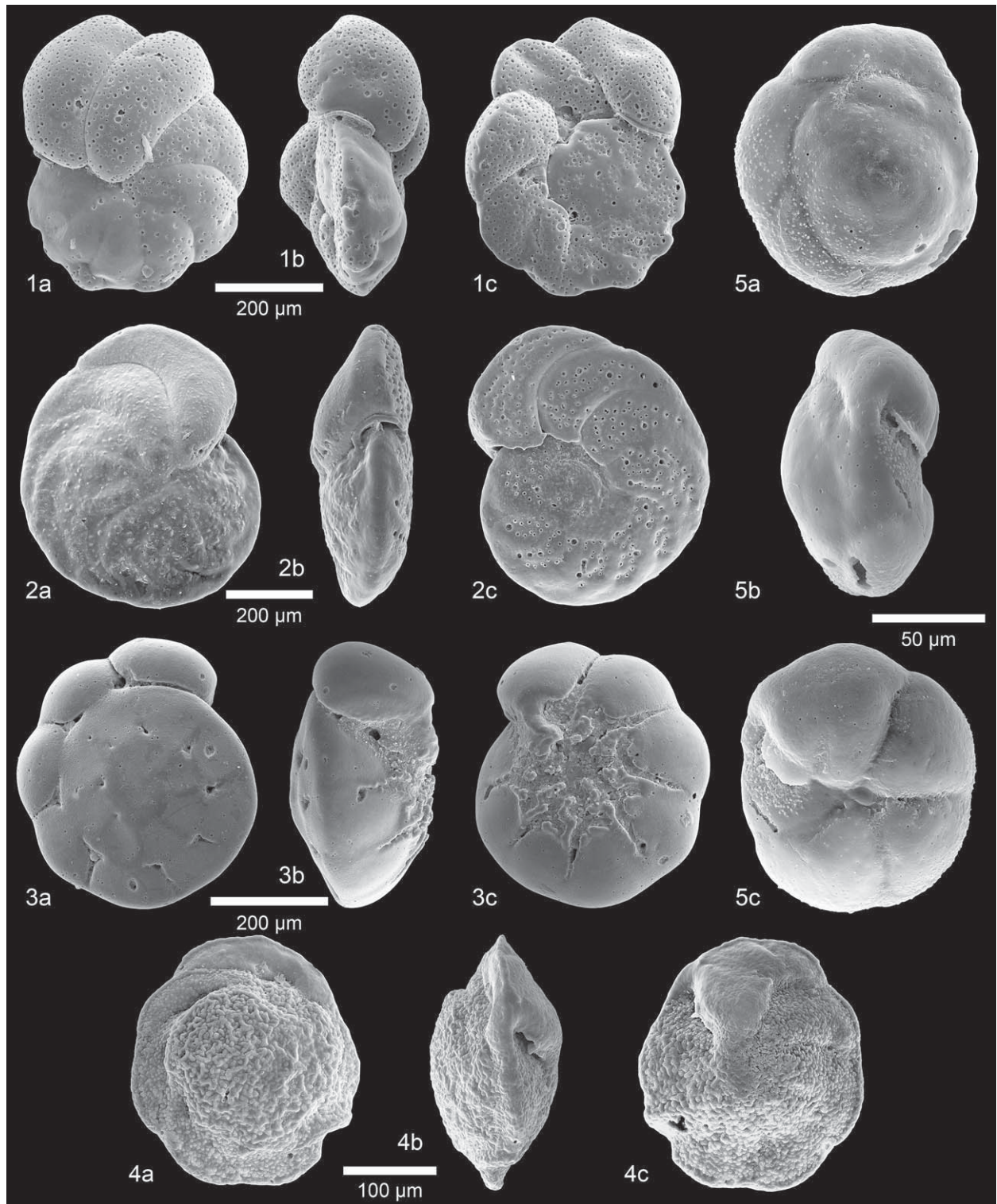


PLATE 30. 1a-c *Lobatula lobatula* (Walker and Jacob, 1798), Hypotype from TTR17 MS411G 35 2a-c *Fontbotia wuellerstorfi* (Schwager, 1866), Hypotype from PS70/032-2 3a-c *Pseudoepionides falsobeccarii* Rouvillois, 1974, Hypotype from TTR17 MS419G 126 4a-c *Nuttallides umbonifera* (Rouvillois, 1974), Hypotype from TTR17 MS411G 20 5a-c *Nuttallides decorata* (Phleger and Parker, 1951), Hypotype from TTR17 MS411G 10

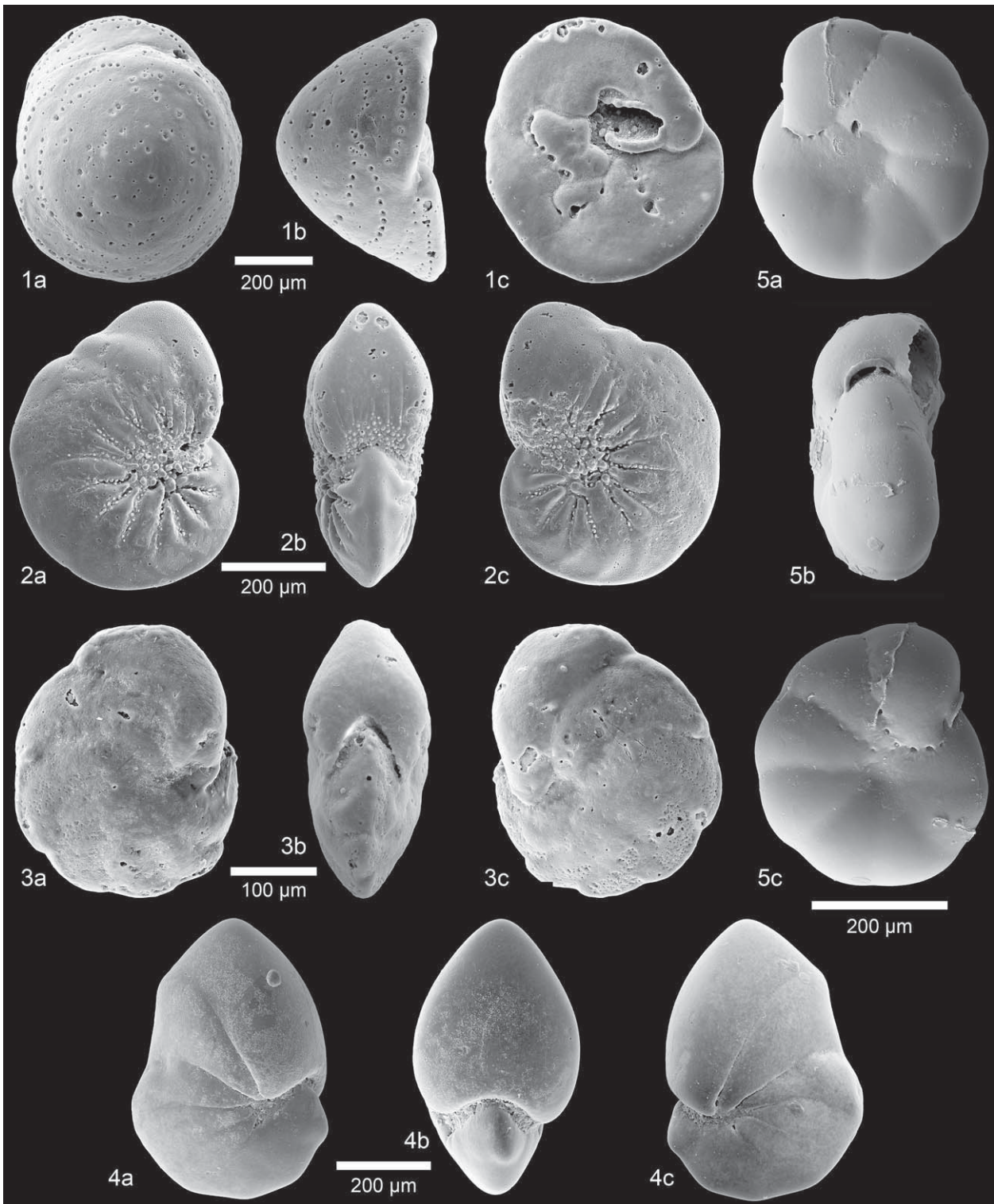


PLATE 31. 1a-c *Astigerinata mamilla* (Williamson, 1858), Hypotype from TTR17 MS419G 25 2a-c *Nonion fabum* (Fichtel and Moll, 1798), Hypotype from TTR17 MS419G 55 3a-c *Nonion pauperatus* (Balkwill and Wright, 1885), Hypotype from TTR17 MS419G 100 4a-c *Nonionellina labradorica* (Dawson, 1860), Hypotype from AL232 1026 5a-c *Nonion pauciloculum* (Cushman, 1944), Hypotype from PS70/033-2

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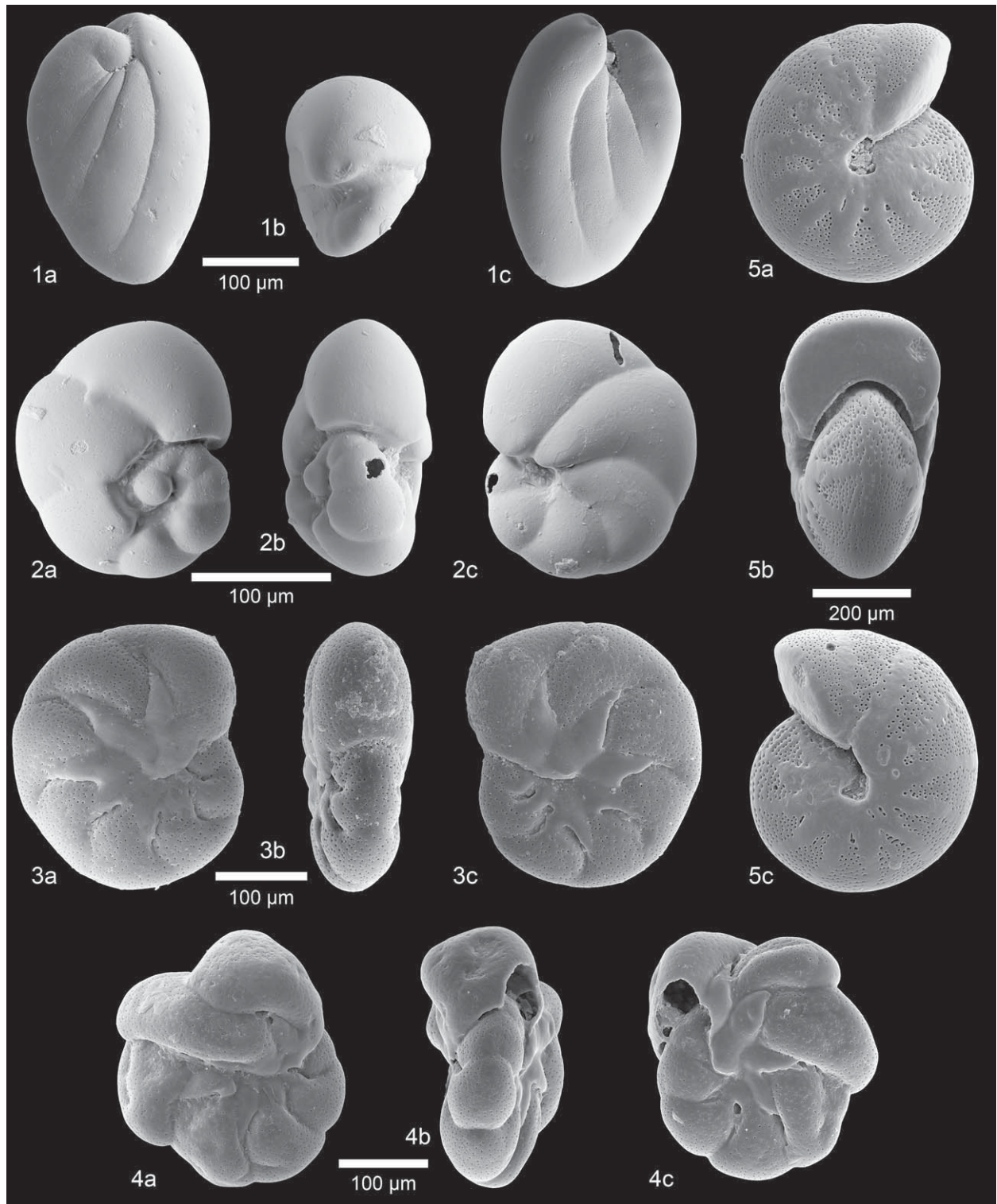


PLATE 32. 1a-c *Nonionella turgida* (Williamson, 1858), Hypotype from TTR17 MS411G 15 2a-c *Nonionella iridea* Heron-Allen and Earland, 1932, Hypotype from TTR17 MS419G 100 3a-c *Astrononion gallowayi* Loeblich and Tappan, 1953, Hypotype from POS325 455 4a-c *Astrononion antarcticus* Parr, 1950, Hypotype from POS325 455 5a-c *Melonis pompilioides* (Fichtel and Moll, 1798), Hypotype from TTR17 MS419G 98

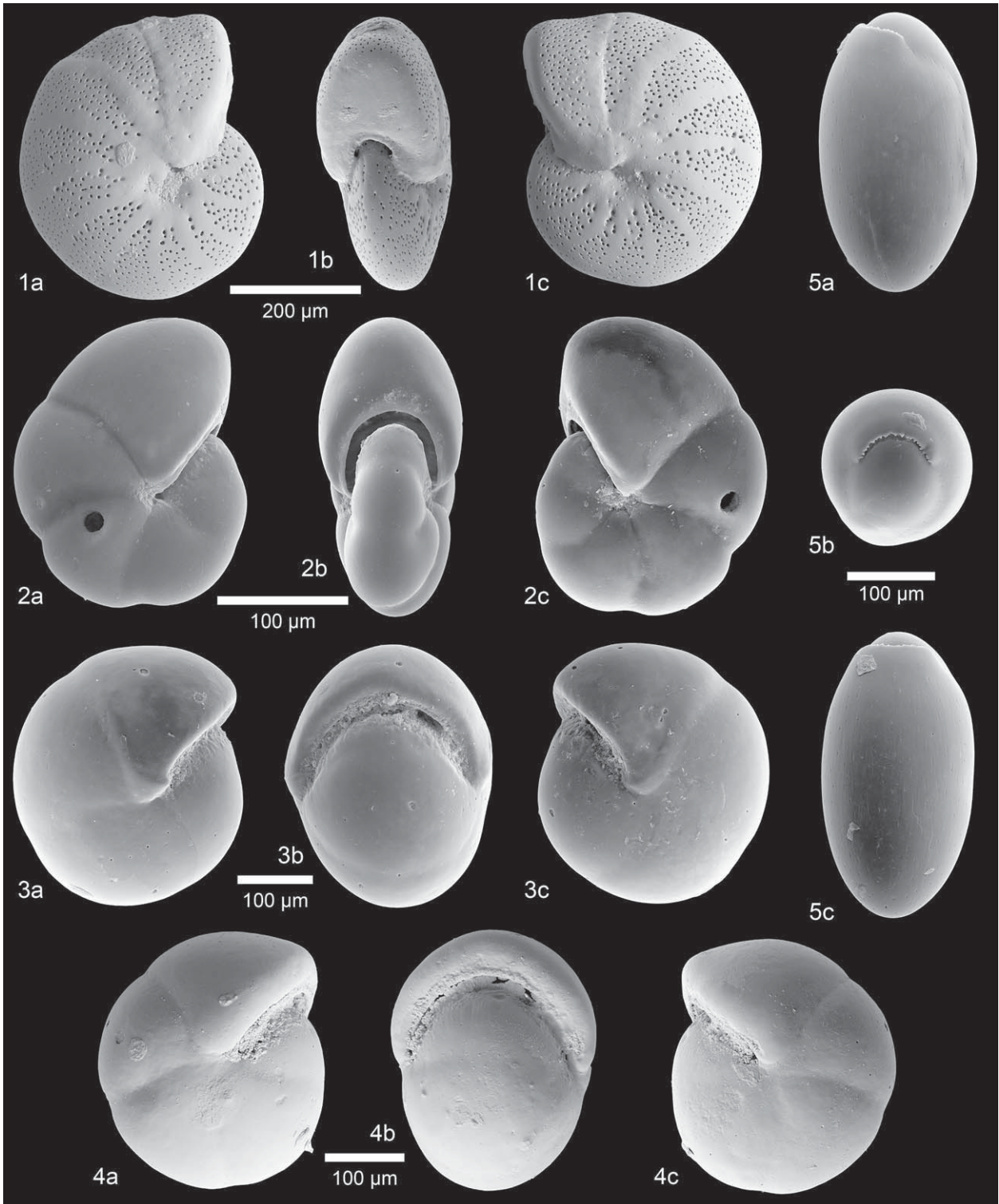


PLATE 33. 1a-c *Melonis barleeanum* (Williamson, 1858), Hypotype from P292 581-1 2a-c *Pullenia subcarinata* (d'Orbigny, 1839), Hypotype from PS70/023-3 3a-c *Pullenia bulloides* (d'Orbigny, 1826), Hypotype from TTR17 MS419G 25 4a-c *Pullenia bulloides* (d'Orbigny, 1826), Hypotype from Hermi1_1 5a-c *Chilostomella oolina* Schwager, 1878, Hypotype from P292 580-1

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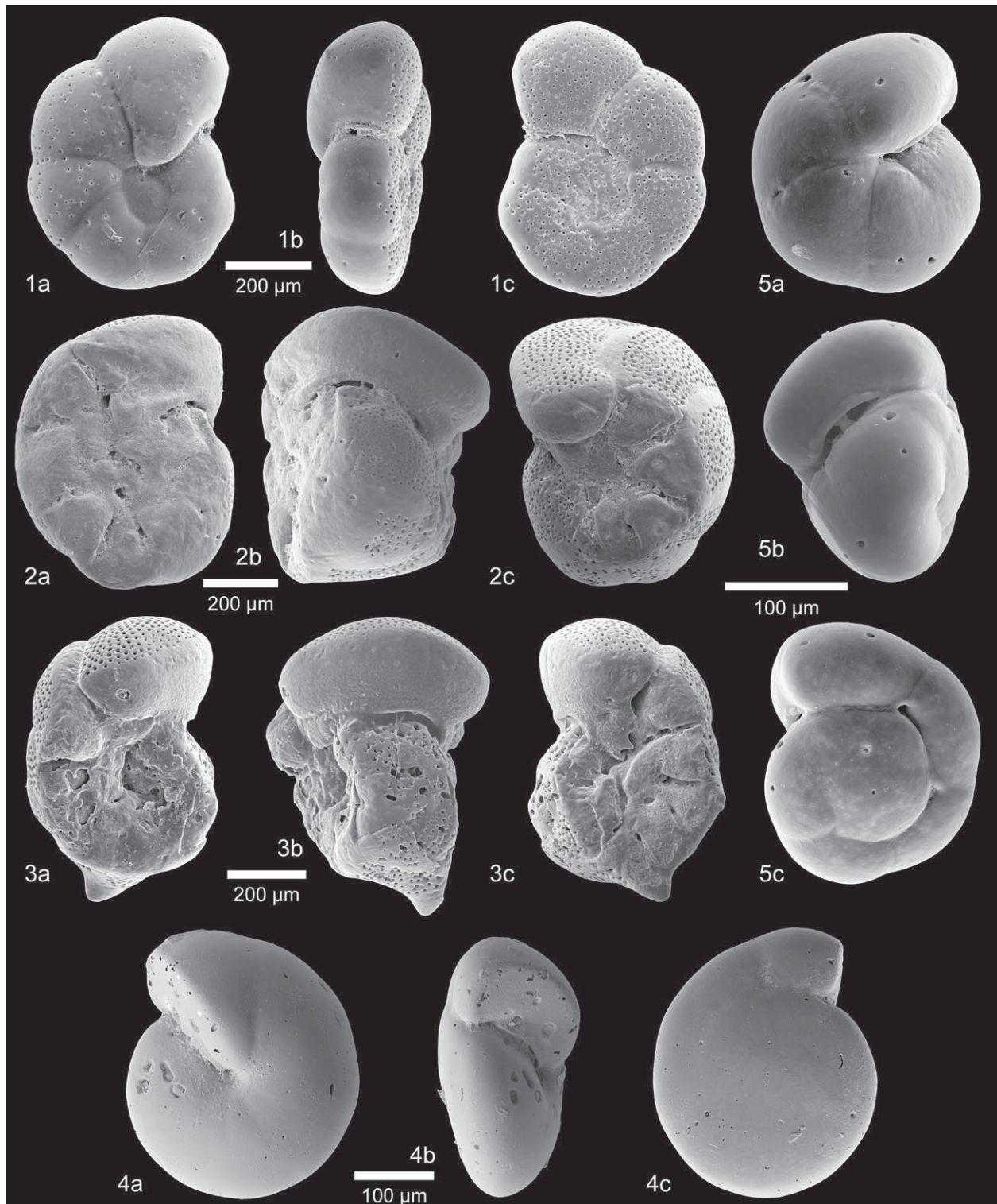


PLATE 34. 1a-c *Anomalinooides globulosa* (Chapman and Parr, 1937), Hypotype from GeoB 9288 2a-c *Discanomalina coronata* (Parker and Jones, 1857), Hypotype from GeoB9204-1 3a-c *Discanomalina japonica* Asano, 1951, Hypotype from GeoB9205-1 4a-c *Gyroidina laevigata* d'Orbigny, 1826, Hypotype from GeoB 6721-1 5a-c *Gyroidina lamarckiana* (d'Orbigny, 1839), Hypotype from TTR17 MS411G 10

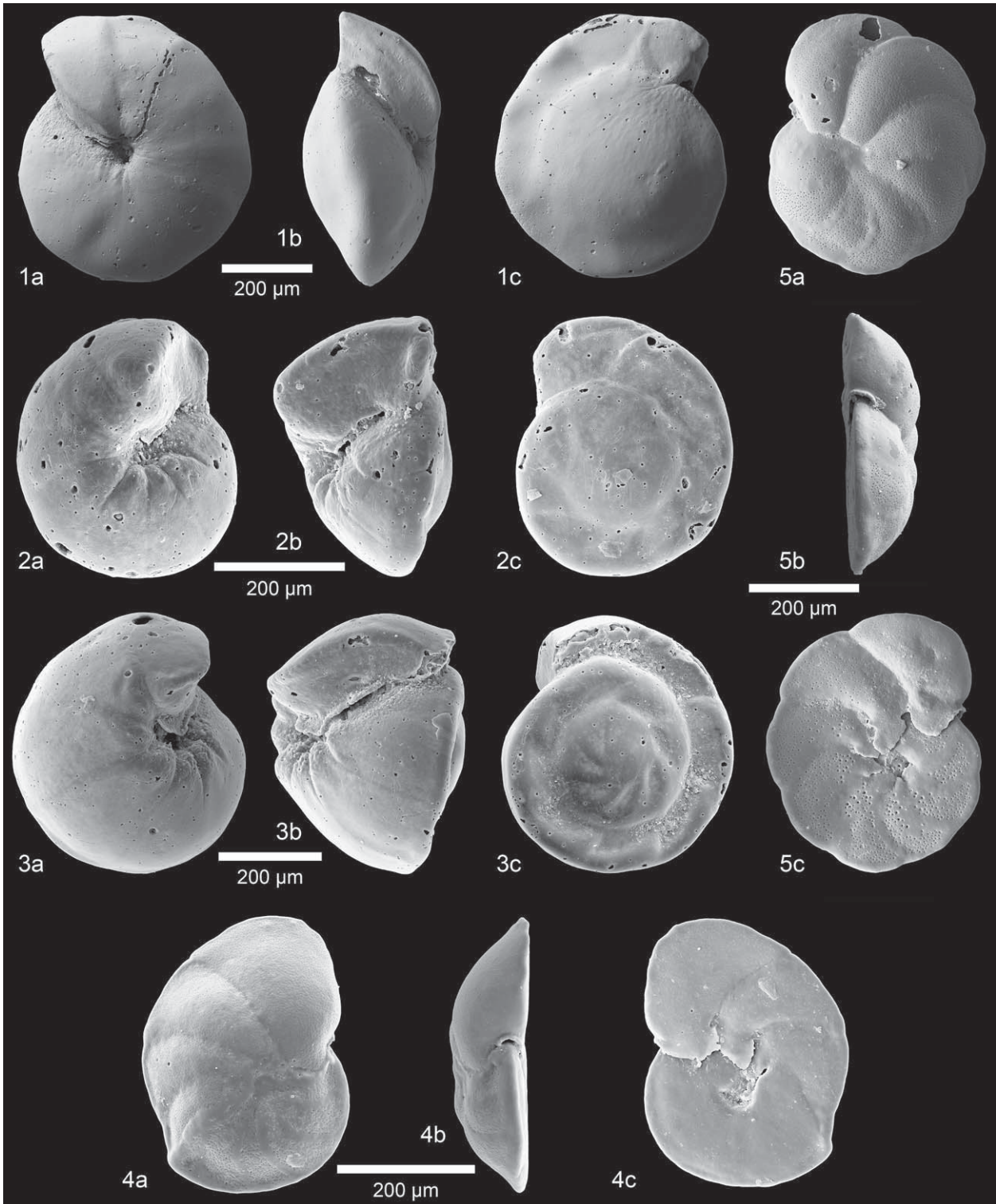


PLATE 35. 1a-c *Gyroidina soldanii* d'Orbigny, 1839, Hypotype from GeoB 9220 2a-c *Gyroidina neosoldanii* Brotzen, 1936, Hypotype from GeoB9220 3a-c *Gyroidina altiformis* Steward and Steward, 1930, Hypotype from TTR17 MS419G 4a-c *Hanzawaia boueana* (d'Orbigny, 1846), Hypotype from GeoB12748-1 5a-c *Hanzawaia boueana* (d'Orbigny, 1846), Hypotype from POS391 558-1

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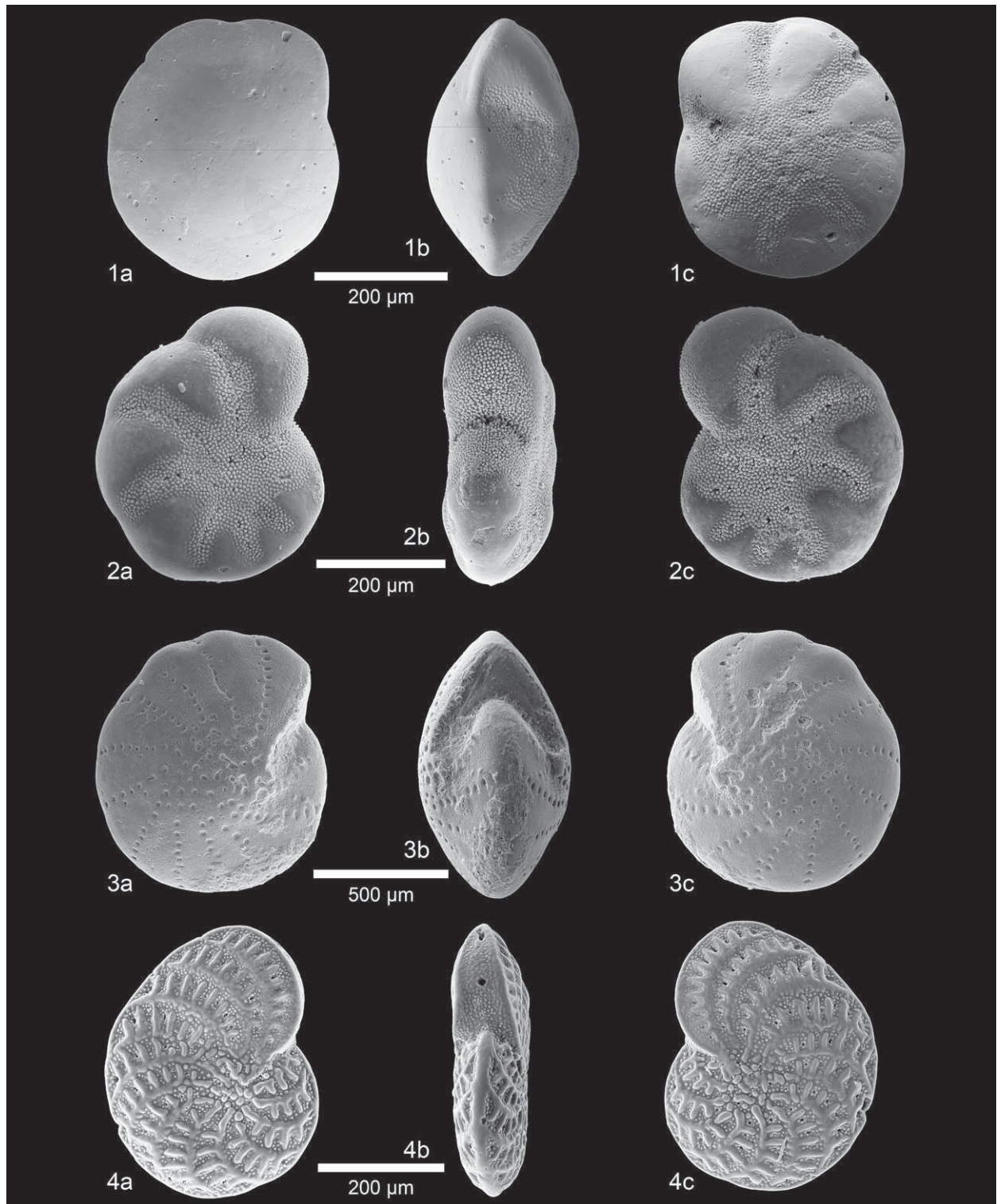


PLATE 36. 1a-c *Buccella frigida* (Cushman, 1922), Hypotype from POS391 558-1 2a-c *Elphidium albiumbilicatum* (Weiss, 1954), Hypotype from POS391 571-1 3a-c *Elphidium groenlandicum* Cushman, 1933, Hypotype from PS70/039-2 4a-c *Elphidium hanzawai* Asano, 1939, Hypotype from TTR17 MS419G 45

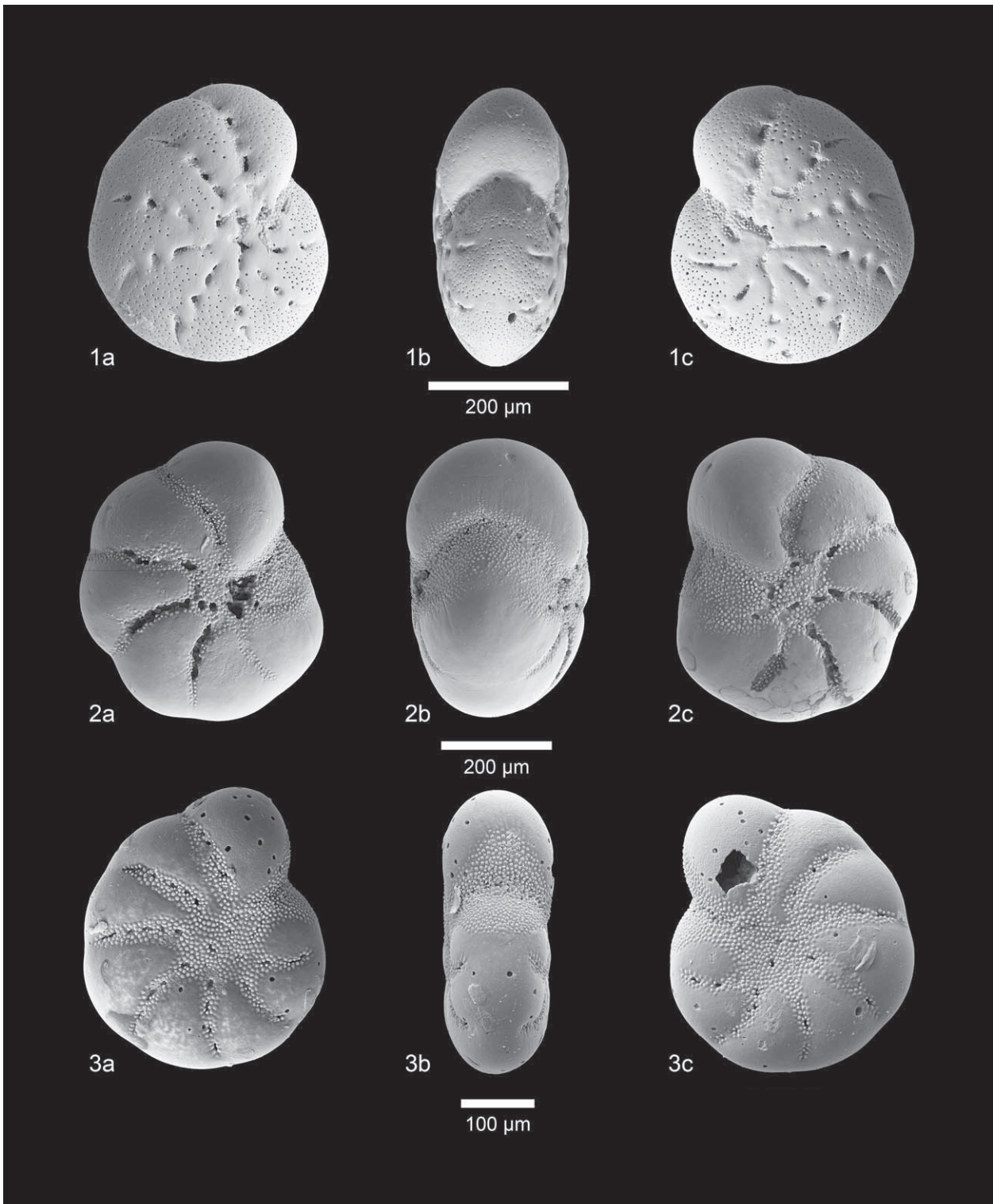


PLATE 37. 1a-c *Elphidium incertum* (Williamson, 1858), Hypotype from P292 578-1 2a-c *Elphidium magellanicum* Heron-Allen and Earland, 1932, Hypotype from POS391 534-1 3a-c *Elphidium subarcticum* Cushman, 1944, Hypotype from POS391 534-1

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