Biodiversity and biogeography of recent benthic foraminiferal assemblages in the south-western South China Sea (Sunda Shelf)

Diversität und Biogeographie rezenter benthischer
Foraminiferengemainschaften im südwestlichen Südchinesischen Meer
(Sunda Schelf)

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ABSTRACT

Species composition and spatial distribution patterns of modern shallow-water and bathyal benthic foraminifera were studied on the Vietnam Shelf and Sunda Shelf of the south-western South China Sea (R/V SONNE 115 cruise, Stattegger *et al.*, 1997). The investigation is based on the analyses of Rose Bengal stained benthic foraminifera from 75 sites. The material revealed more than 800 taxa, 745 of which were identified on the species level. Eighteen surface sediment samples from the Vietnam Shelf comprise 530 taxa (including 218 stained). Fifty seven sites located on the Sunda Shelf and its continental slope contain 749 taxa (incl. 590 stained).

The 'living' and 'dead' benthic foraminiferal faunas of both areas studied are highly diverse and exhibit high absolute abundances. Most of the species are rare and species dominance is generally low. Although, several species occur at all sites in the entire water depth range (50-2000 m) studied, most of the species exhibit a depth related distribution.

Shallow water (< 200 m) assemblages from the Vietnam and Sunda Shelves exhibit significantly different species composition and distinct distribution patterns. Assemblages from both areas studied are dominated by calcareous species. Large, calcareous, symbiont bearing species are abundant on the Vietnam Shelf. Their presence indicates a nutrient-deficient and high energy environment.

Bathyal faunas exhibit a more uniform species composition. Diversity and abundances are inversely correlated to water depth on the Vietnam and Sunda Shelves. The plankton/benthos ratio, and the ratio between agglutinated and calcareous tests increases with water depth.

The most important environmental factors controlling the distribution of shallow water benthic foraminiferal assemblages are: food availability, the depth of light penetration, substrate and current activity. The bathyal assemblages are strongly influenced by the decreasing rates of organic flux with increasing water depth, resulting in a well pronounced depth-related succession of assemblages.

Six main faunal associations were recognised within the studied depth ranges on the Sunda Shelf area (*Heterolepa* aff. *dutemplei* - *Asterorotalia gaimardii*; *Bulimina marginata* - *Neouvigerina proboscidea*; *Siphotextularia foliosa* - *Bulimina mexicana*; *Uvigerina* ex gr. *auberiana* - *Ehrenbergina undulata*; *Nuttallides rugosus* - *Uvigerina peregrina*; *Astrononion novozealandicum* - *Eggerella bradyi*) and three on the Vietnam Shelf area (*Amphistegina papillosa* - *Nummulites venosus*; *Heterolepa* aff. *dutemplei* - *Cibicidoides pachyderma*; *Parrelloides bradyi* - *Oridorsalis umbonatus*). Dissimilarity in the distribution patterns between the areas studied, revealed from multivariate statistical analyses, strongly suggests that bathymetrical successions of foraminiferal assemblages recognised in one area are only applicable to that area.

Keywords: benthic foraminifera, organic carbon flux, standing stock, species diversity, biogeography, Sunda Shelf, Vietnam Shelf, South China Sea

KURZFASSUNG

Im Gebiet des Vietnam- und Sundaschelfes des Südchinesischen Meeres wurden die Artenzusammensetzung und die räumlichen Verteilungsmuster moderner neritischer und bathyaler benthischer Foraminiferen untersucht (FS SONNE 115-Fahrt, Stattegger *et al.*, 1997). Sowohl mit Bengalrot gefärbte, als auch leere Foraminiferengehäuse von 75 Stationen wurden analysiert. Das Probenmaterial enthält mehr als 800 Taxa, von denen 745 auf Artenebene bestimmt wurden. 18 Oberflächenproben vom Vietnamschelf enthalten 530 Taxa, davon 218 gefärbte. 57 Stationen auf dem Sundaschelf und dessen Kontinentalhang enthalten 749 Taxa, von denen 590 gefärbt sind.

Die benthischen Foraminiferenfaunen beider Regionen sind hochdivers und zeigen hohe Individuenzahlen. Die meisten Arten sind selten, die Artendominanz ist generell niedrig. Zwar kommen einige Arten an allen Stationen des insgesamt untersuchten Tiefenbereichs (50-2000 m Wassertiefe) vor, doch zeigen die meisten Arten eine tiefenabhängige Verteilung.

Die Faunen des Flachwasserbereichs (< 200 m Wassertiefe) von Vietnam- und Sundaschelf zeigen signifikant unterschiedliche Artenzusammensetzungen und klar unterscheidbare Verteilungsmuster. Die Faunen beider Regionen sind hochdivers und werden von kalzitischen Arten dominiert. Auf dem Vietnamschelf sind große, kalzitische, symbiontentragende Formen häufig. Ihr Vorkommen wird auf ein nährstoffarmes Hochenergie-Environment zurückgeführt.

Die bathyalen Faunen sind bezüglich ihrer Artenzusammensetzung einheitlicher. Diversität und Individuenzahl korrelieren in beiden Regionen negativ mit der Wassertiefe. Sowohl das Plankton/Benthos-Verhältnis, als auch das Verhältnis von agglutinierenden zu kalzitischen Gehäusen steigt mit der Wassertiefe.

Die wichtigsten Umweltfaktoren, die Verteilung der Flachwasserfaunen steuern, sind die Tiefe, in der Nahrung zur Verfügung steht, Lichtdurchflutung des Wassers, die Art des Substrats und die Strömungen. Die bathyalen Faunen dagegen werden deutlich von der mit zunehmender Wassertiefe sinkenden Flußrate organischen Kohlenstoffs gesteuert, was zu einer ausgeprägten tiefenabhängigen Abfolge von Faunen führt.

Im Bereich des Sundaschelfes wurden sechs Haupt-Faunenzusammensetzungen innerhalb des untersuchten Tiefenbereichs unterschieden (*Heterolepa* aff. *dutemplei* - *Asterorotalia gaimardii*; *Bulimina marginata* - *Neouvigerina proboscidea*; *Siphotextularia foliosa* - *Bulimina mexicana*; *Uvigerina* ex gr. *auberiana* - *Ehrenbergina undulata*; *Nuttallides rugosus* - *Uvigerina peregrina*; *Astrononion novozealandicum* - *Eggerella bradyi*), im Bereich des Vietnamschelfes drei (*Amphistegina papillosa* - *Nummulites venosus*; *Heterolepa* aff. *dutemplei* - *Cibicidoides pachyderma*; *Parrelloides bradyi* - *Oridorsalis umbonatus*). Die Verschiedenartigkeit der sich durch Multivarianzanalyse ergebenden Verteilungsmuster beider untersuchter Stationen deutet stark darauf hin, daß die in einer gegebenen Region gefundenen tiefenabhängigen Abfolgen von Foraminiferenfaunen nur für diese Region Gültigkeit haben.

1. INTRODUCTION

1.1. Objectives

The main objectives of this study are to document the modern benthic foraminiferal assemblages, to examine their variance in relation to environmental parameters and to develop a model of the bathymetric distribution along the Vietnam and Sunda transects from the south-western part of the South China Sea (Sunda Shelf). The resulting bathymetric distribution model can be applied to reconstruct late Quaternary environments from fossil records of long-cores from the same locations. To meet these objectives a data base of 75 sites and 802 taxa was constructed. The results are analysed and presented in three major sections:

• Faunal analyses: This section presents the results of census counts of modern, highly diverse benthic foraminiferal assemblages related to open marine conditions from two water depth-transects on the Vietnam and Sunda Shelves. The following data are presented: standing stock, absolute abundances of empty tests, frequency of species occurrences, diversity indices and distribution patterns of foraminiferal assemblages.

• Ecological distribution patterns: In this part, the micropaleontological data base resulting from this work and available environmental data such as sediment type and depth related C org-flux were quantitatively analysed using the Correspondence Factor Analysis. Distribution patterns resulting from multivariate statistical analyses were investigated and correlated with environmental factors influencing foraminiferal assemblages. The information obtained from this study can be used for the reconstruction of the organic carbon flux on the sea-floor, and can be applied to paleoenvironmental reconstructions, using census counts of fossil assemblages.

• Taxonomy: A systematic documentation of recent benthic foraminifera from the Sunda Shelf, comprises 745 species of 802 taxa obtained from 86 sediment surface samples. This part of the study complements the previous taxonomic investigations from the central part of the South China Sea (Heß, 1998).

1.2 Study area

The study area was selected in accordance with the main objectives of the SONNE-115 'Sundaflut' project (Stattegger *et al.*, 1997) and included reconstruction of the history of paleoenvironmental changes and sea-level fluctuations on the Sunda Shelf since the last glaciation. The Sunda Shelf occupies an area between the southern part of the Indo-China Peninsula, Malay Peninsula and the large islands of Sumatra, Borneo and Java. Thus, it forms the south-western part of the semi-enclosed, marginal South China Sea (SCS) basin (Fig. 1). Including the Gulf of Thailand and southern part of the Vietnam Shelf it embraces an area of about 1,8 x 106 km^2 enclosed within an isobath of 200 m (Wang, 1999). The Sunda Shelf, through the Gaspar, Karimata and Malacca Straits, forms the only connection between the SCS and the Indian Ocean.

Figure 1.
Location of Sunda Shelf in the South China Sea basin.

The dotted lines indicate the estimated paleo-river drainage systems:

(1) Paleo-Mekong River
(2) North Sunda River
(3) East Sunda River

(redrawn from Tjia, 1980)

The complex bottom topography of the Sunda Shelf was created during periods of rapid sea-level change and its exposure during the last glacial cycles (Hanebuth & Stattegger, 2000). The most significant features observed are drowned deep valleys, formed by the Sunda (paleo-Molengraaff) and Mekong River systems (Molengraaff & Weber, 1921; Dickerson, 1941), paleo-reefs, slope fans near the shelf edge, large bars near the mouths of the rivers and some channels on the shallow shelf (Stattegger *et al.*, 1997; Paulsen, 1998).

The sampling took place in December 1996, at the peak of the winter north-east monsoon activity, when a cyclonic circulation in the surface water layer prevails in this region (see Fig. 6 b). Currents in the near-bottom water layer flow south-eastward over the Vietnam Shelf and north-westward off shore Borneo (Huang *et al.*, 1994). The average sea-surface temperatures in December-January on the Vietnam Shelf are between 26°-27°C and on the Sunda Shelf between 26,5°-28°C. The average salinity at the surface is about 33 ‰ over the entire shelf (Levitus & Boyer, 1994).

The study concentrates on two separate areas of large, drowned paleo-river systems. One of the study areas is located off the modern Mekong Delta on the Vietnam Shelf and traces the northern part of the drowned Pleistocene Mekong Delta over 200 km distance. It extends over the shelf and continental slope between 9°00'N; 107°45'E and 9°45'N; 109°30'E and ranges from 47 to 1479 m water depth (Fig. 2 a).

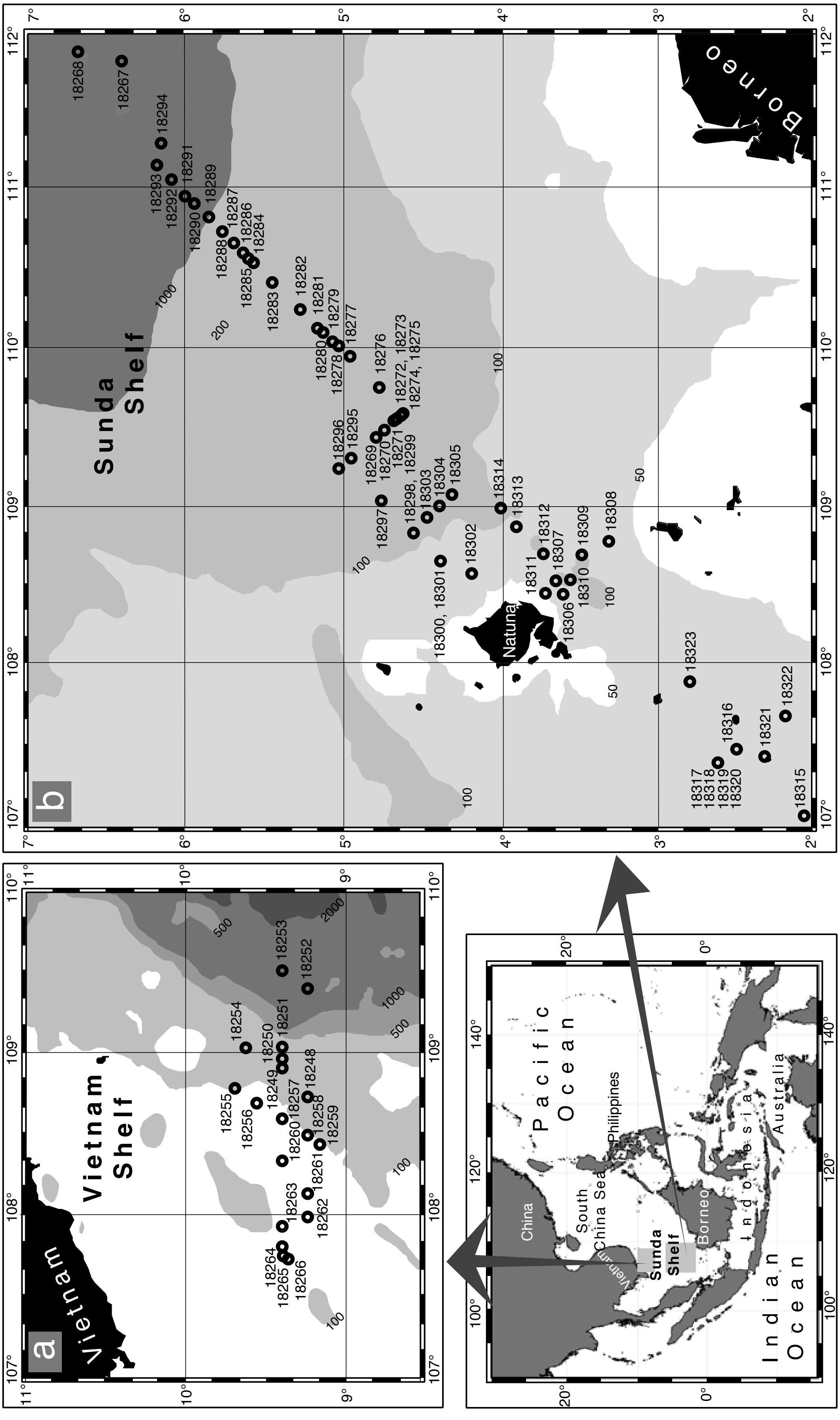


Figure 2. Location of the surface-sediment samples obtained from the south-western part of the South China Sea (Sunda Shelf) during SONNE-115 cruise (13.12.1996 - 25.01. 1997): (**a**) Vietnam Transect (sites 18248-18266); (**b**) Sunda Transect (sites 18267-18323).

The shelf in front of the present Mekong delta is approximately 200 km wide, with a low bottom gradient of approximately 0,06° above the 200 m isobath, increasing on the upper continental slope to 3,6°. Sediments on the shelf consist of sand (~ 85-97 %) and clay (≤8 %). The outer continental slope sediment is dominated by silt (>30 %) and clay (>60 %) (Paulsen, 1998). The organic carbon content varies between 0,2 % and 2,3 % with an average value of 0,5 %.

The second study area is located offshore of Borneo and covers the drowned drainage system of the North Sunda (Molengraaff) River (Molengraaff & Weber, 1921). The main transect runs south-west to north-east across the shelf and continental slope, with water depths ranging from 60 to 1974 m. It extends from 2°01'N; 107°02'E to 6°38'N; 111°52'E covering a distance of 600 km (Fig. 2 b). The central part of the shelf is extremely broad, generally up to 100 m deep and with a bottom gradient of 0,05° within the 200 m isobath. On the upper slope it steepens to about 1°, then slowly decreases to 0,3° on the lower continental slope. Sediments on the inner shelf consist of clay and silt (≥80 %) and sand (≤15 %) with a large amount of biogenic material (Fig. 3). Locally, the sediments consist mainly of coral sand, particularly around Natuna Island. The central part of the shelf is mainly covered with relict sediments of littoral environment, consisting of quartz sand and silt, with about 10 %, but locally up to 70 %, of biogenic material (Su & Wang, 1994). Sediments on the outer shelf are dominated by fine-grained sand and silt (>70 %) with a great amount of biogenic material (shells of gastropods, bivalves, foraminifera, ostracods, sponge spicules *etc.*). The continental slope sediments consist mainly of silt and clay, with an increasing proportion of clay (>66 %) on the outer continental slope (Paulsen, 1998). The organic carbon content on the outer shelf is generally above 0,5 % and on the continental slope above 1 %.

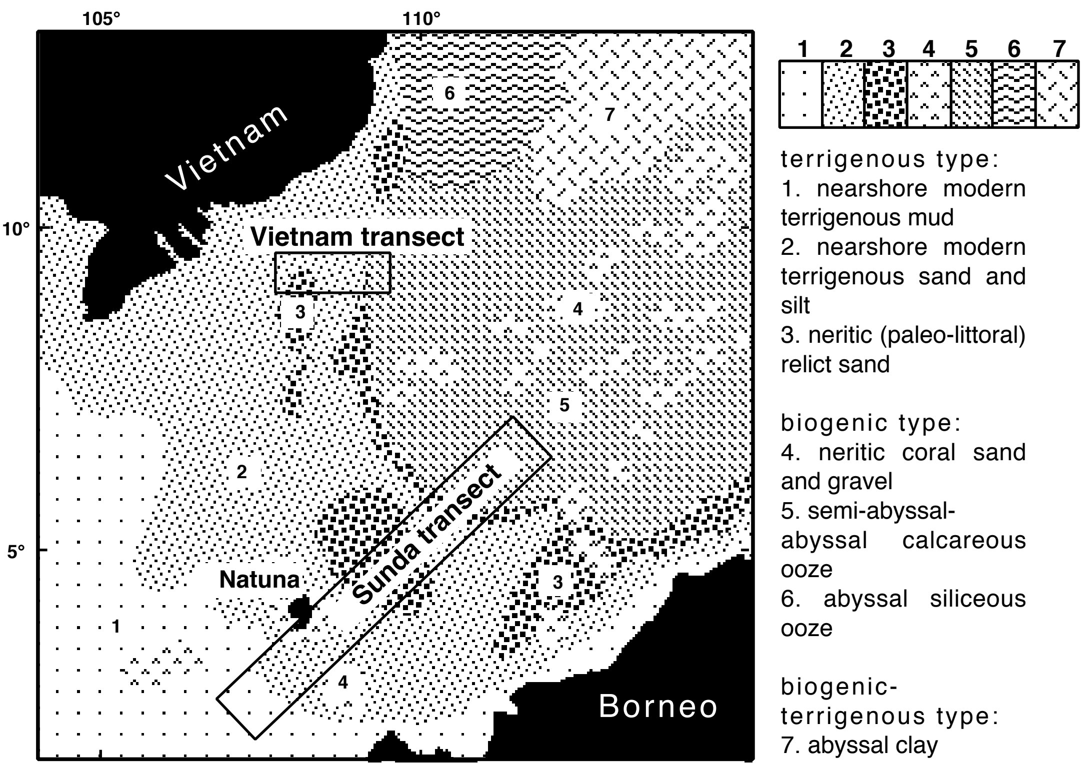


Figure 3. Map of the genetic types of sediments on the northern Sunda Shelf (after Su & Wang, 1994) with marked position of the SONNE-115 transects.

1.3 Previous work

Our understanding of the late Quaternary history of the SCS has increased significantly in the past few years owing to multidisciplinary paleoceanographic and micropaleontological investigations. Substantial amounts of literature have already been published on the paleoceanography of the SCS (*e.g.* Jin *et al.*, 1990; Zhou Di *et al.*, 1994). A first synthesis of results from several cruises of R/V SONNE (*i.e.* SO 95, SO 114, SO 115, SO 132 and SO 140) was presented in a special issue of Marine Geology (*eds.* Sarnthein & Wang, 1999). Both planktic and benthic foraminifera were used as tools for paleoenvironmental, paleoecological and paleoceanographical investigations.

During the last few decades the deep-water assemblages of the north-western and central parts of the SCS were successively investigated (*e.g.* Waller, 1960; Cheng & Zheng, 1978; Zheng, 1979, 1980; Cai & Tu, 1983; Wang, Min & Bian, 1985; Miao & Thunell, 1993, 1996; Heß, 1998). Initial studies of benthic foraminifera in the China Seas were presented in taxonomic monographs by Brady (1884) and Millett (1898-1904), and by Cushman (1921) and Graham & Militante (1959) in the Philippine area. The first analyses of benthic assemblages from the SCS focused on the shelf areas. Waller (1960) analysed surface samples along the south China coast and distinguished four assemblages related to water depth. Biswas (1976) examined the depth-related distribution of recent benthic foraminifera from the Sunda Shelf. He distinguished four depth zones and listed around 200 species from offshore Sabah (north of Borneo). The middle part of the northern shelf was a subject of detailed investigations by Wang *et al.* (1985). They established five depth related foraminiferal assemblages corresponding to different water masses. The work of Tu & Zheng (1991) on foraminiferal distribution patterns from surface sediments of the Nansha Sea area documented 580 species of benthic foraminifera. They described three depth related assemblages. The synthesis of the foraminiferal study provided by Zheng & Fu (1994) summarised results of the research carried out by Chinese micropaleontologists in the China Seas. The water depth zone divisions proposed by these authors are compiled in Table 1.

More recent studies use benthic foraminifera as proxies of oxygen content and organic carbon flux. Miao & Thunell (1993, 1996) studied the recent, deep-sea benthic foraminiferal distribution patterns along two transects from the eastern and southern margins of the SCS. They concluded that the organic carbon flux and the pore-water oxygen penetration depth in sediments are more important factors than bottom water properties in controlling deep-sea benthic foraminiferal assemblages. Heß (1998) in a study of assemblages from central and northern parts of the SCS, emphasised the use of benthic foraminifera as proxy-indicators for organic carbon flux rates to the sea floor. The examination by Heß of the living–dead assemblages is the most detail analyses of modern deep-sea benthic foraminifera performed in this area. Kuhnt *et al.* (1999) used the modern benthic foraminiferal assemblages from northern and southern parts of the SCS to estimate C-flux rates during the Last Glacial Maximum. Jian *et al.* (1999) also considered changes in the organic carbon flux and chemical and/or physical properties of the water masses to be the primary limiting factors controlling the benthic foraminiferal fauna on southern and northern slopes of the SCS. In contrast, Jian & Wang (1997) who worked on deep-sea benthic foraminifera from the northern continental slope and abyssal basin of the SCS concluded that water depth and water mass properties may influence the distribution patterns of foraminiferal fauna. Five assemblages were recognised by Huang & Yim (1998) in the Pearl River estuary. The environmental stability, sediment type, water masses and their movements were found to have a significant influence on the shallow water fauna.

Although the Sunda Shelf occupies more than half of the SCS, to date no research has been undertaken on the distribution of the foraminiferal faunas there. Thus, this work initiates the studies of the modern benthic foraminifera in this area.

Table 1. The bathymetric distribution of modern benthic foraminiferal assemblages from different locations of the South China Sea (with original taxonomy of cited authors).

	Benthic foraminiferal assemblages from shelf areas of the SCS
Waller, 1960	Northern Shelf
inner shelf (~20-45 m)	*Elphidium advenum, E. panamense, E. sagrum, Nonion japonicus*
central shelf (~46-85 m)	*Streblus tepidus, Amphistegina lessonii, Elphidium craticulatum, Hanzawaia nipponica, Loxostomum mayori*
outer shelf (~86-120 m)	*Biloculinella labiata, Cassidulina neocarinata, Spiroloculina communis*
upper bathyal (~121-200 m)	*Bolivina spathulata, Uvigerina auberiana, U. schwageri*
Wang, Min & Bian, 1985	Northern Shelf
inner shelf (0-50 m)	*Hanzawaia nipponica* assemblage: *Elphidium advenum, E. hispidulum, Ammonia globosa, A. beccarii, Brizalina striatula, Florius japonicus*
middle shelf (50-80 m)	*Bigenerina taiwanica-Heterolepa dutemplei* assemblage: *Textularia conica, Ammonia compressiuscula, Pseudorotalia indopacifica, Cellanthus* spp.
outer shelf (80-150/200 m)	*Siphouvigerina proboscidea-Textularia pseudocarinata* assemblage: *Spiroplectammina fistulosa, Cibicides margaritiferus, Hoeglundina elegans, Ammonia compressiuscula, Heterolepa dutemplei, Uvigerina schwageri, Planularia gemmata*
Biswas, 1976	Sunda Shelf
high-energy shelf (0-20 m)	*Quinqueloculina lamarckiana, Q. seminulum, Elphidium advena, Ammonia beccarii, Bulimina marginata, Cibicides lobatulus, C. pseudoungerianus, E. cribrorepandus*
intermediate shelf (20-60 m)	*Q. seminulum, Spiroloculina communis, Cellanthus craticulatus, Ammonia beccarii, Amphistegina lessonii, Operculina ammonoides, Operculinella venosa*
deep shelf (60-120 m)	*Spiroplectammina carinata, Bigenerina nodosaria, Loxostomum amygdalaeformis, Proemassilina arenaria, Spiroloculina communis, Siphouvigerina ampullacea, S. interrupta, Cibicides margaritiferus, C. praecinctus*
very deep shelf (120-200 m)	*Spiroplectammina carinata, Textularia sagittula, Clavulina servantyi, Pyrgo depressa, Bolivina spathulata, B. subreticulata, Rectobolivina raphanus, Bulimina marginata, Siphouvigerina ampullacea, Uvigerina peregrina, Pseudorotalia gaimardii, Calcarina calcar, Cibicides margaritiferus*
Tu & Zheng, 1991	Nansha Sea area
coral reef (< 50 m)	*Amphistegina radiata, Textularia foliacea, T. conica, Nummulites ammonoides, N. venosa, Pseudorotalia gaimardii*
inner/middle shelf (50-100 m)	*Bigenerina nodosaria, Cibicides praecinctus, C. subhaidingeri, C. pseudoungeriana, Textularia foliacea, Nummulites venosa, Pseudorotalia gaimardii, Elphidium advenum, Robulus calcar*
outer shelf (100-200 m)	*Uvigerina porrecta, U. schwageri, Bulimina marginata, Sigmoilopsis asperula, Robulus calcar, Spirorutilus fistulus*

1.4 Geological setting

The Sunda Shelf together with the surrounding land masses of western Borneo and peninsular Malaysia belong to the geological ‘Sundaland’ province. The history of development of the Cenozoic basins (Fig. 4) from the northern Sunda Shelf area was outlined by Tjia & Liew (1996). However, for the present study, only two of these basins are essential and are briefly introduced here (summarised after Tjia & Liew, 1996).

Vietnam Shelf area: The Nam Con Son basin also known as Saigon or Ho Chi Minh basin, lies south of the Mekong basin. The Nam Con Son basin is divided into east and west by a north-trending basement high. The north-trending Vietnam Shear, which extends along the entire edge of the Sunda Shelf basement is a major fault zone in this basin. It is hypothesised, that the Nam Con Son basin could have been formed by right-lateral wrenching along this fault, as a result of the north-south spreading of the SCS. The basin is filled with seven kilometres thick sediments. The dominant stress regime in the Paleogene, middle Miocene and late Miocene was extensional. Lower Miocene sediments show a regional thermal subsidence. The last pulse of extension occurred in the late Miocene and caused rapid flooding of the basin during the Miocene and Plio-Pleistocene. The Nam Con Son basin is separated from the Mekong basin by the NE-striking horst called Con Son Swell, built of Cretaceous granites.

Sunda Shelf area: The East Natuna basin also known as Sokang/Soikang basin, lies east of the Natuna Arch and occupies the eastern margin of the Sunda Shelf. The East Natuna basin is covered by relatively thin Oligocene (<1 km) and thick Miocene sediments. The north part of the basin is occupied by an Oligocene half-graben, filled with non-marine sediments. In the early Miocene extensional faults with NNW and NE-striking fractures developed.

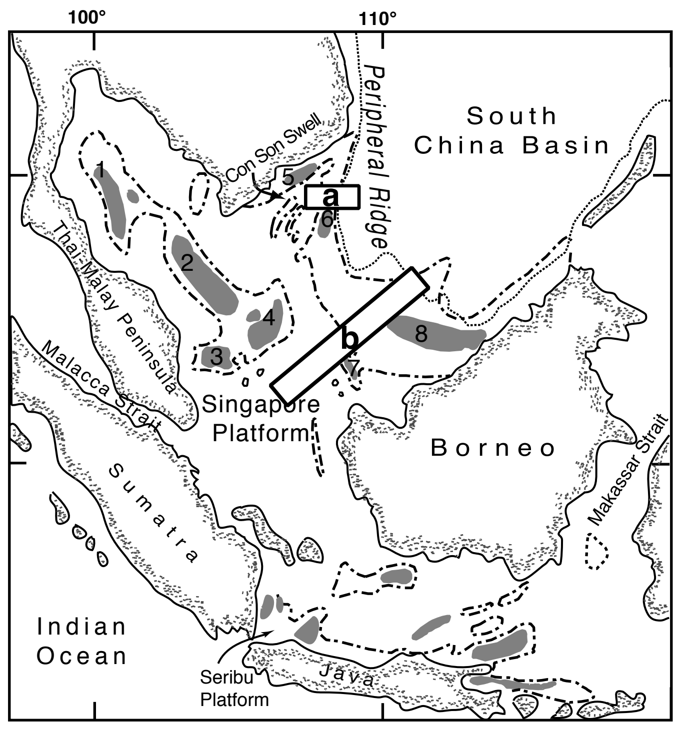


Figure 4. The major Cenozoic basins of the Sunda Shelf with position of the study area:
(a) Vietnam transect
(b) Sunda transect

Cenozoic basins:
(1) Pattani Basin
(2) Malay Basin
(3) Penyu Basin
(4) West Natuna Basin
(5) Mekong Basin
(6) Nam Con Son Basin
(7) East Natuna Basin
(8) Sarawak Basin

Isopachs of Cenozoic sediments in some of the northern Sunda Shelf basins.

(redrawn from Tjia, 1980 and Tjia & Liew, 1996)

During the Plio-Pleistocene the East Natuna basin was tectonically inactive, except for the faulting possibly caused by rapid subsidence that occurred during the Pliocene in its southern part. The boundary with the West Natuna basin is marked by two, north-striking normal faults.

1.5 Tectonic evolution

The present tectonic realms (Fig. 5) of the Sunda Shelf area originated in the Mesozoic. The age of collision of Indochina (including Sundaland) with the South China is still controversial. Some authors suggest that the collision and amalgamation took place in the Late Devonian-Early Carboniferous (Hutchison, 1989; Metcalfe, 1996), while others propose the Late Triassic age (Taylor & Hayes, 1983).

From mid-Jurassic to mid-Cretaceous the proto-southeast Asian margin was an Andean-type arc with the Indochina subduction zone beneath the continent. A few microcontinental blocks like Palawan, Reed Bank and Luconia Shoals were forearc areas of this margin (Taylor & Hayes, 1983). The volcanism south of Vietnam along Natuna arch and southwest of Borneo continued from the mid-Cretaceous to earliest Palaeocene. The subduction of Mesozoic oceanic crust beneath west Borneo continued through the late Cretaceous to early Tertiary, as a result of counter clockwise rotation of the Sundaland with respect to Indochina.

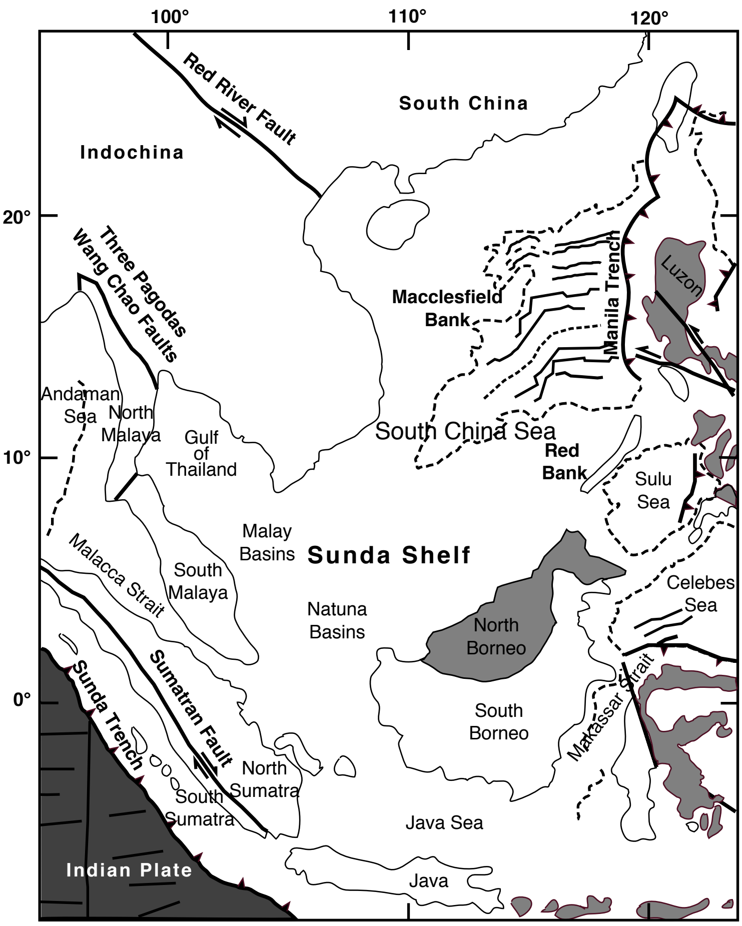


Figure 5. The simplified present-day tectonic configuration of the South China Sea (redrawn from Hall, 1996).

Legend:

shaded area represents ophiolitic, arc and other accreted material added to Eurasian margins during the Tertiary

double lines represent active spreading centres

dashed lines represent the principal bathymetric features and the margins of oceanic parts of the seas

In the Eocene the Thai, Malay and West Natuna basins were formed (Taylor & Hayes, 1983). The formation of the basins resulted from collision of the Indian plate with the Eurasian plate. This collision began 45 Ma ago and forced Indochina and Borneo to the southeast, leading to the opening of the SCS as a pull-apart basin. The opening of the SCS was linked with the propagation of the large left lateral strike-slip fault called Red River Fault (Briais *et al.*, 1993). Spreading of the seafloor by the early Miocene created a basin over two thirds its final size (Taylor & Hayes, 1983). Opening of the South China Basin separated the north Palawan, Reed Bank and Luconia Shoals blocks from the Asian mainland. In the Thai, Malay, West Natuna and Mekong basins on the Sunda Shelf fault-controlled subsidence led to accumulation of the continental clastic material.
In the middle Miocene the West Natuna Basin opened, leading to its marine environment following the development of the oceanic rift, that reached the edge of the Sunda Shelf. The subsidence of the South China Basin began in the late Miocene, while deltas of large rivers advanced on the northern Sunda Shelf, filling the former trench (Taylor & Hayes, 1983). During the Quaternary the Sundaland craton was tectonically stable (Tjia & Liew, 1996).

1.6 Modern environmental setting

Although this study concentrates on the Sunda Shelf, a brief overview of the general oceanographic conditions of the South China Sea is necessary to understand the processes occurring in the studied area.

Surface-water circulation: The climate of the SCS is mainly affected by the East Asian Monsoon, driven by the differential heating of the Asian land masses and Pacific Ocean (Wyrtki, 1961; Xiao *et al.*, 1995). The seasonally reversing monsoonal regime controls hydrological, chemical and sedimentological patterns, as well as the sea-surface circulation and productivity patterns of the SCS and its large shelf areas (Wang *et al.*, 1999). The surface Pacific waters, during the Winter (October to March) north-east monsoon (Fig. 6 b), moves south-west into the SCS through the Bashi and Taiwan Straits and then across the Sunda Shelf into the Indian Ocean (Wyrtki, 1961; Wang *et al.*, 1995). The north-east monsoon reaches its maximum strength and covers the entire SCS in December (Shaw & Chao, 1994). Water enters from the Java Sea through the Sunda Shelf during the Summer (May to August) south-west monsoon (Fig. 6 a). It expands over the entire basin in July and August (Shaw & Chao, 1994). The north-eastern current moves along the coast of Vietnam, while in the southern part of the basin the north-west current moves approximately parallel to the coasts of Borneo and the Philippines. It then flows through the Bashi Strait into the Pacific. In April a counter clockwise eddy is formed in the central part of the SCS. In September a clockwise eddy is formed off the Natuna Island. A counter clockwise eddy is formed off Vietnam in October (Wyrtki, 1961; Pflaumann & Jian, 1999). In the SCS basin two regions of deep upwelling were identified through experiments with releasing a passive tracer in a three dimensional model, these are - the winter monsoonal upwelling off the north-western edge of Luzon and the summer monsoonal upwelling off the coast of Vietnam. Additionally, shallow upwelling occurs on the edge of the Sunda Shelf from October to December (Chao *et al.*, 1996).

Water-mass properties: The average annual depth of the thermocline ranges from approximately 25 m in the inner shelf area to ~200-250 m towards the Bashi Strait, with temperatures gradually decreasing from 20°C to 11°C (Miao & Thunell, 1996; Jian *et al.* 2000).

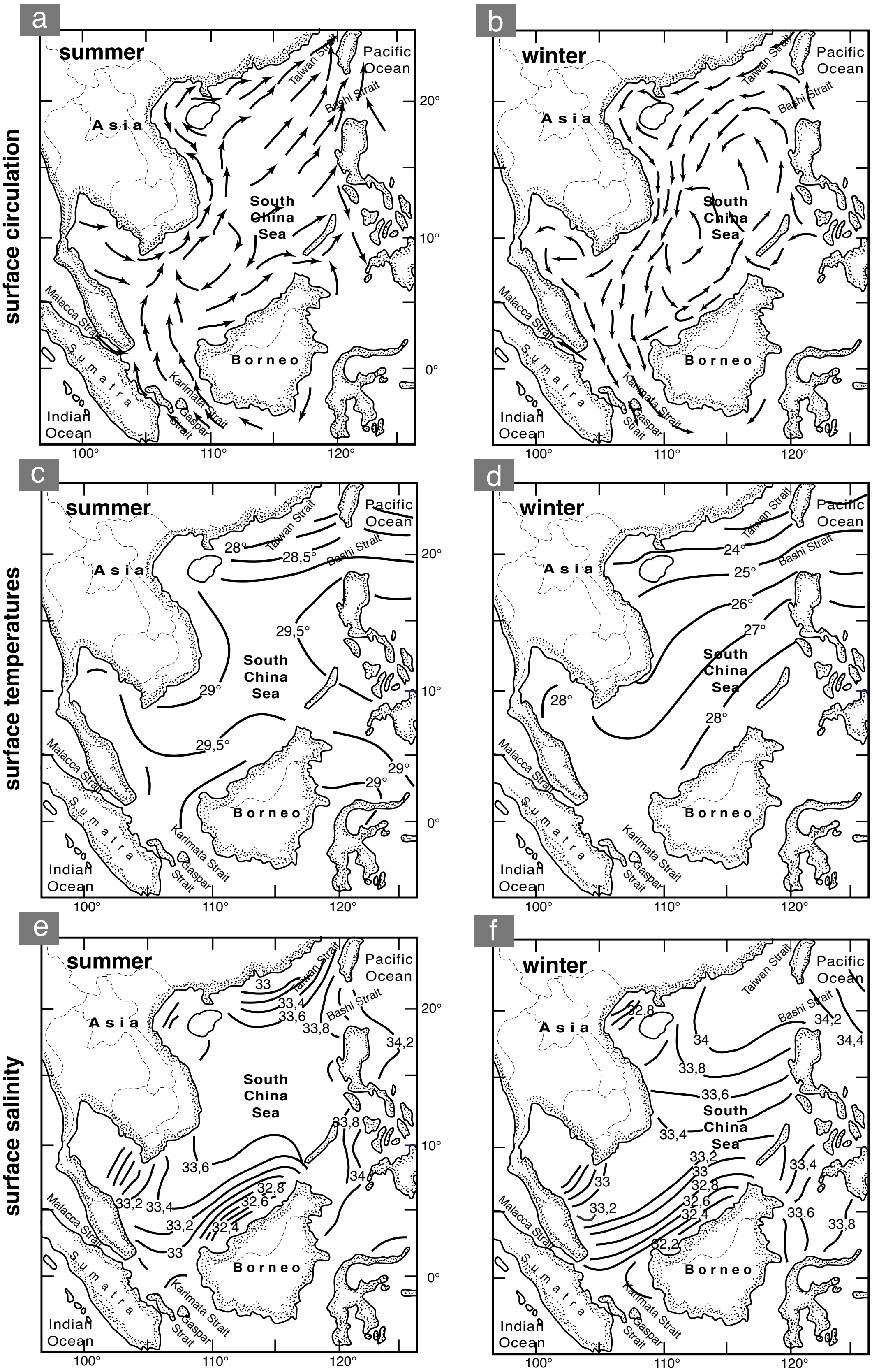


Figure 6. Present hydrographic conditions in the SCS during Summer and Winter: (**a -b**) surface circulation after Wang (1994); (**c - d**) sea-surface temperatures; (**e - f**) sea-surface salinity. Plots of temperatures and salinity were downloaded and redrawn from http://ingrid.ldeo.columbia.edu/SOURCES/.LEVITUS94.

In the SCS the intermediate water masses extend from ~250 (300)-1000 m, with temperatures decreasing from 11°C to 5°C and salinity increasing slightly from 34,4 ‰ to 34,5 ‰. The oxygen minimum zone with the lowest noted value of 1,25 ml/L extends between approximately 500-800 m water depth (Miao & Thunell, 1993). The SCS deep-water masses (<1000 m) have a fairly uniform salinity of 34,6 ‰. The temperature drops to reach its minimum value of 2,4°C at the depth of 2500 m (Jian & Wang, 1997). The inflow of the cold (2°C) bottom waters from western Pacific through the Bashi Strait has a positive influence on the ventilation of the SCS. The deep-water oxygen content increases to ~2,0 ml/L (Miao & Thunell, 1993).

Water temperatures: The sea surface temperatures (SST) of the SCS (Figs. 6 c-d) range from 20°C to 28,8°C during the winter monsoon and from 27°C to 29°C during summer monsoon (Pflaumann & Jian, 1999). The bottom waters of the SCS come through the Bashi Strait from the Western Pacific and their temperature is 2°C (Chen *et al.*, 1998; Wang, 1999).

Salinity: The sea surface salinity values (Figs. 6 e-f) are between 32,8 ‰ and 34,6 ‰ in Winter and between 33 ‰ and 33,8 ‰ in Summer (Levitus & Boyer, 1994). Values below 33 ‰ are recorded near river deltas throughout the year irrespective of the season (*e.g.* in the Gulf of Tonkin, off the Mekong Delta). Salinity near the mouth of the big rivers off Borneo is reduced to 30 ‰ at the end of the rainy season (Wyrtki, 1961). Highest values over 33,8 ‰ are recorded close to the Bashi Strait (Pflaumann & Jian, 1999). The inflow of water through the Bashi Strait is the only salinity source for surface waters in the SCS (Shaw & Chao, 1994).

Productivity: Sea-surface primary productivity in the SCS is relatively high off the continental margins of Vietnam and China and off the Borneo coastal area (>400 g C $m^{-2}yr^{-1}$). In the deeper parts however, it decrease to values between 90 g C $m^{-2}yr^{-1}$ and 160 g C $m^{-2}yr^{-1}$ (Platt *et al.*, 1995).

Sedimentation rates: The Holocene sedimentation rate ranges from 1,67 to 66,67 cm/ka, with an average of 8,0 cm/ka (Wang, 1999). According to Jennerjahn *et al.* (1992) and Wang (1999), the sedimentation rate in the north-eastern part of the SCS is enhanced when the water currents driven by the winter monsoon bring terrigenous material through the Bashi Strait from the East China Sea or the eastern coast of Taiwan. At present, the terrigenous material deposited in the SCS originates mainly from big rivers such as Rejang, Mekong, Hung Ho and Pearl River, with an annually estimated load of 460 x 106 tons (Schönfeld & Kudrass, 1993). To a lesser, but considerable extent, there is an input of dust brought by monsoons from China (Wiesner *et al.*, 1996). Carbonate content in the SCS is estimated at more than 10 % of surface sediments, except for the central basin below the CCD. In the reef areas carbonate becomes a dominant component of the surface sediments (Wang, 1999). In the SCS the depth of the calcite lysocline and CCD is at about 3000 m (Miao *et al.*, 1994) or 3500 m (Wang *et al.*, 1995).

2. METHODS

2.1 Material and sampling

The present investigation is based on the analyses of 'stained' and 'dead' benthic foraminifera from 75 sites. The sediment material was collected on the Vietnam and Sunda Shelves in the South China Sea (SCS) in December 1996 - January 1997 on board R/V SONNE (Stattegger *et al.*, 1997). The sediment surface samples were collected by a spade box-core device (GBC; 50 x 50 x 60 cm) and multiple-core device (MUC; plastic tube 65 cm long with inner diameter of 9,5 cm). In the area of the Vietnam Shelf 19 box-cores were obtained, 5 from the inner shelf, 12 from the outer shelf and 2 from the continental slope. Water depth ranges from 46 to 1479 m. In the area of the Sunda Shelf, 47 box-cores and 10 multi-cores were obtained, out of which 44 are from the shelf and 13 from the continental slope, with a water depth ranging from 60 to 1974 m. The precise location of sites, water depths and surface descriptions are given in Table 2.

The quality of the surface sediment was examined and described immediately after the coring device was placed on deck. The temperature of the sediment was measured using a digital thermometer with a 0,1°C precision (AMA-digit AD 30 TH). The sea water was filtered over a sieve with 63 µm mesh to collect floating epifaunal organisms. Larger fragile agglutinated foraminifera, living at the water-sediment interface, were picked with tweezers and stored in micropaleontological slides. For the study of benthic foraminifera the samples were stored in plastic bottles and preserved in a methanol - Rose Bengal solution (2 g/L).

The uppermost centimetre of the GBC surface was sampled using four metal frames of 100 cm^2 size. The frames were placed on the surface, preferably in undisturbed areas, according to morphological and sedimentological features to obtain a variety of substrates. The samples were carefully scraped with a sampling 'Lutze's-spoon' to obtain sample volumes of 100 cc.

The multi-corer samples have a surface area of 70,9 cm^2. The usually undisturbed surface and precise slicing methods make it possible to subsample the uppermost centimetre of the sediment at 0-0,2 cm and 0,2-1 cm intervals. The surface subsamples have two adequate volumes of 14,2 cc between 0-0,2 cm and 56,7 cc between 0,2-1 cm. The subsequent samples were sliced at one centimetre intervals.

2.2 Laboratory and microscopic examination

In the laboratory, the volume of wet sediment of each sample was measured. Samples were rinsed over a sieve with 63 µm mesh to remove the methanol, excess stain and fine sediments. The 2000 µm mesh sieve was used to collect fragile foraminifera and soft bodied organisms such as Astrorhizidae and Komokiacea. These were stored separately on slides and immersed in glycerine. Afterwards the residue was oven-dried (50°C) and dry-sieved over 150 µm, 250 µm and 1000 µm meshes. Large residues from each size fraction were divided by a microsplitter. Approximately 300 specimens are regarded as statistically representative of both common and rare species (Buzas, 1990; Murray, 1991). However, when a higher number of species occur in low percentages, the sample requires several thousands of counts to provide reliable statistics (Patterson & Fishbein, 1989). The data sets obtained from studied material may then bear an abundance error. Wherever possible, at least 300 specimens of benthic foraminifera were picked, using a moist brush, from a girded tray and mounted on micropaleontological slides, identified and counted.

The fresh, empty tests considered as recently accumulated and autochthonous were counted as 'dead'. The 'stained' ('living') specimens usually required a greater split and were stored separately. Otherwise, the entire residue was examined to collect a sufficient number of individuals. The specimens with partly mineralised or significantly reworked tests, were counted separately as a 'reworked' and were excluded from the correspondence analyses.

For taxonomic purposes the residual sediment was searched separately from the split and counted for statistical analyses. An inhouse collection of hypotypes was prepared, identified, and later used for comparison. The hypotypes were compared with the Challenger Collection and Kar Nicobar Collection at London's National History Museum to confirm the identification. The catalogue numbers of holotypes are mentioned along any references to Brady (1884) or Schwager (1866) if specimens from the studied material closely resemble those in the collections (*e.g.* ZF no. - for 'Challenger Collection'; KN no. - for 'Kar Nicobar Collection'). The deep-water taxa were compared with the South China Sea Collection of Heß, housed at the University of Kiel (partly illustrated in Heß, 1998).

The material used for this study is housed in the Micropaleontology Department at the Institut für Geowissenschaften, Kiel University. The collection of the hypotypes with the list of references provides a documentary evidence for the taxonomic work (see Appendix A for taxonomic references and notes). Compiled data for particular species, such as collection number, number of picked tests, and occurrences are given in Appendix B.1. Observed depth ranges and abundances of the common benthic foraminiferal species along the Vietnam and Sunda transects, arranged in order of the upper limit of occurrence, are given in Appendix B.2.

Scanning Electron Micrographs were produced with Camscan 44 at the Institut für Geowissenschaften, Kiel University. The most common and distinctive species were illustrated, however miscellaneous, infrequently occurring unilocular forms (*e.g. Lagena*, *Oolina*) were ignored.

All samples used for this study were preserved in a solution of methanol and the 'Rose Bengal' protein stain. The 'living' specimens were identified by the presence of stained protoplasm in their test. This method of protoplasm staining for living organisms was introduced by Walton (1952). However, it is known that Rose Bengal can stain the protoplasm of 'dead' specimens (Bernhard, 1988). Nonetheless, despite its limits, this method of marking benthos collected *in situ* is most frequently used (Boltovskoy & Wright, 1976; Corliss & Emerson, 1990). The protoplasm in tests of the different taxa varies in grade of absorbed stain. The pink string of protoplasm in lagenids usually sticks to the wall of the last chambers. Rotaliids were considered as 'stained' when they were filled with vividly pink stain throughout more than half of the chambers. Opaque calcareous or agglutinated tests were wetted or broken with a dissection needle if difficulties in recognising stained protoplasm occurred.

Table 2. List of the box-cores (GBC) and multi-cores (MUC) used for this study with: location, water depth, sediment temperatures and sediment surface description.

station	coring device	latitude	longitude	water depth	temp. (°C)	sediment type	surface morphology
18248-1	GBC	9°14.9' N	108°43.6' E	103 m		sandy mud	disturbed, washed out
18249-1	GBC	9°23.9' N	108°55.4' E	133 m		silty-fine sandy mud	disturbed (by coring), strong relief
18250-1	GBC	9°23.9' N	108°58.4' E	148 m	22,7°	mud	disturbed, irregular, washed out
18252-1	GBC	9°14.9' N	109°23.4' E	1277 m	3,4°	mud	slightly disturbed, small relief
18253-1	GBC	9°23.7' N	109°30.0' E	1479 m		mud	
18254-1	GBC	9°37.9' N	109°02.1' E	145 m		mud	disturbed (tilted by coring), strong relief, washed out
18255-1	GBC	9°41.8' N	108°46.5' E	102 m		sandy mud	smooth (partly tilted)
18256-1	GBC	9°34.5' N	108°41.9' E	92 m		sandy-silty mud	oscillation ripples (amp. 1-2 cm)
18257-2	GBC	9°23.9' N	108°35.4' E	88 m		silty sand	oscillation ripples (amp. 1 cm)
18258-1	GBC	9°14.7' N	108°29.6' E	88 m		sandy-silty mud	smooth
18259-2	GBC	9°10.4' N	108°26.9' E	88 m		sandy mud	flat, some fluff
18260-1	GBC	9°23.9' N	108°20.4' E	74 m		coarse sand	rough (significantly tilted)
18261-3	GBC	9°14.9' N	108°07.0' E	68 m	26,2°	silty-sandy mud	
18262-1	GBC	9°14.9' N	107°59.3' E	56 m	25,5°	sandy-silty mud	
18263-1	GBC	9°24.1' N	107°54.2' E	51 m	25,1°	sandy-silty mud	destroyed
18264-1	GBC	9°24.0' N	107°48.4' E	48 m	24,7°	sandy-silty mud	smooth, flat
18265-1	GBC	9°23.2' N	107°45.0' E	47 m		fine-medium sand	flat, muddy patches (several cm ø)
18266-1	GBC	9°22.7' N	107°44.4' E	47 m		sandy mud-sand	disturbed (strongly tilted), fine material washed out
18267-1	GBC	6°22.4' N	111°49.1' E	1852 m	2,5°	mud	disturbed, some fluff mostly washed out
18268-1	GBC	6°38.7' N	111°52.2' E	1974 m	2,1°	mud	disturbed, washed out
18269-1	GBC	4°46.0' N	109°26.3' E	114 m	25,5°	sandy mud	disturbed, relief
18270-1	GBC	4°43.4' N	109°28.6' E	106 m	20,6°	sand with silt	disturbed, relief
18271-1	GBC	4°38.3' N	109°32.9' E	116 m	20,0°	clayey-silty sand	disturbed (deep penetration)
18272-1	GBC	4°37.6' N	109°33.6' E	121 m	20,8°	clayey sand	irregular with elevations (~2-3 cm)
18273-1	GBC	4°37.2' N	109°33.9' E	127 m	21,0°	sandy mud	slightly disturbed (deep penetration)
18274-1	GBC	4°36.3' N	109°34.8' E	117 m	21,0°	clayey sand	wavy with irregular relief
18275-1	GBC	4°35.6' N	109°35.5' E	109 m	20,8°	clayey sand	smooth
18276-1	GBC	4°44.9' N	109°44.8' E	120 m	20,1°	clayey sand	disturbed, oscillation ripples, fluff
18277-1	GBC	4°56.3' N	109°56.2' E	134 m	19,1°	sandy mud	irregular with strong relief (4-5 cm deep)
18278-1	GBC	5°01.0' N	110°00.9' E	137 m	18,4°	sandy mud	irregular with significant relief
18279-1	GBC	5°02.5' N	110°02.5' E	139 m	18,3°	silty-fine sandy mud	irregular with strong relief, partly washed out
18280-1	GBC	5°05.9' N	110°06.0' E	144 m	21,4°	silty-fine sandy mud	significant relief (caused by current (?))
18281-1	GBC	5°07.7' N	110°07.7' E	145 m	18,8°	silty-fine sandy mud	relief (amp. ~2 cm) (caused by current (?))
18282-1	GBC	5°14.7' N	110°14.6' E	152 m	20,0°	silty-fine sandy mud	strong relief (amp. 3 cm)
18283-1	GBC	5°25.1' N	110°25.0' E	166 m	22,7°	silty-fine sandy mud	strong relief
18284-2	MUC	5°32.4' N	110°32.4' E	226 m		silty-sandy mud	strong relief, some fluff
18285-1	MUC	5°34.4' N	110°34.3' E	291 m		sandy-silty mud	undisturbed, relief, small elevated ridges, fluff
18286-1	MUC	5°36.3' N	110°36.2' E	404 m		mud	flat, fluff
18287-2	MUC	5°39.7' N	110°39.7' E	596 m		mud	flat, small patches, fluff
18288-1	MUC	5°44.4' N	110°44.3' E	790 m		mud	smooth, fluff
18289-1	MUC	5°49.7' N	110°49.7' E	978 m		mud	flat, fluff
18290-1	MUC	5°55.0' N	110°54.9' E	1124 m		mud	smooth, fluff
18291-1	MUC	5°57.9' N	110°57.7' E	1208 m		mud	flat, a lot of fluff
18292-1	MUC	6°03.5' N	111°03.5' E	1309 m		mud	irregular, a lot of fluff, fluff patches and clusters
18293-1	MUC	6°09.4' N	111°09.4' E	1404 m		mud	flat, gently sloped, a lot of fluff
18294-3	GBC	6°07.8' N	111°18.1' E	846 m	13,2°	mud	smooth
18295-1	GBC	4°55.5' N	109°17.8' E	117 m	20,9°	sandy-silty mud	strong relief (amp. 2 cm)
18296-1	GBC	4°59.7' N	109°14.4' E	118 m	22,9°	silty mud	relief
18297-1	GBC	4°44.3' N	109°01.9' E	112 m	23,1°	soft clayey silt	strong relief (2 cm deep, 15 cm ø)
18298-1	GBC	4°31.9' N	108°49.5' E	103 m	23,4°	clayey-silty sand	very strong relief (amp. 7 cm)
18299-2	GBC	4°32.0' N	108°49.5' E	102 m	23,1°	clayey-silty sand	strong relief, some fluff partly washed out
18300-1	GBC	4°21.7' N	108°39.2' E	94 m	24,1°	clayey sand	disturbed (tilted penetration), irregular, strong relief
18301-1	GBC	4°21.3' N	108°38.8' E	92 m	24,0°	silty-clayey sand	relief (amp. ~2 cm), clay partly washed out
18302-1	GBC	4°09.5' N	108°34.5' E	83 m	24,3°	clay-silt	undisturbed, strong relief (deep 5 cm)
18303-1	GBC	4°26.3' N	108°55.5' E	107 m	23,1°	clayey-silty sand	strong relief (amp. ~3 cm)
18304-1	GBC	4°21.7' N	109°00.1' E	104 m	23,2°	silty mud	strong relief (4 cm deep)
18305-1	GBC	4°17.3' N	109°04.5' E	109 m	22,7°	mud	low relief, fine material washed out
18306-1	GBC	3°35.2' N	108°26.5' E	88 m	24,8°	water saturated mud	smooth
18307-1	GBC	3°37.6' N	108°31.6' E	100 m	24,0°	water saturated mud	wavy, significantly washed out
18308-1	GBC	3°17.8' N	108°47.1' E	80 m	25,6°	silt-sand	mild relief
18309-1	GBC	3°27.9' N	108°41.1' E	84 m	25,3°	sandy mud	strong diagonal grooves, layer of biogenic sand
18310-1	GBC	3°32.1' N	108°32.1' E	101 m	23,9°	mud	disturbed (cracked by coring), strongly washed out
18311-1	GBC	3°41.1' N	108°27.1' E	60 m	25,8°	water saturated mud	smooth
18312-1	GBC	3°42.3' N	108°42.3' E	101 m	23,6°	silty mud	disturbed (tilted by coring), fine material washed out
18313-1	GBC	3°52.1' N	108°52.2' E	99 m	23,1°	sandy mud	relief, partly washed out
18314-1	GBC	3°59.4' N	108°59.4' E	100 m	23,1°	clayey sand	relief (amp. ~3 cm)
18315-3	GBC	2°01.6' N	107°02.0' E	69 m	26,2°	water saturated mud	smooth
18316-1	GBC	2°29.2' N	107°22.5' E	71 m	26,0°	sandy-silty mud	smooth
18317-1	GBC	2°36.5' N	107°22.5' E	96 m	26,2°	mud	washed out, small Fe_2O_3 concretions (~1mm ø)
18318-1	GBC	2°36.6' N	107°22.5' E	86 m	26,0°	water saturated mud	strongly disturbed (tilted by coring)
18319-1	GBC	2°36.6' N	107°22.5' E	81 m		water saturated mud	destroyed (tilted by coring), washed out
18320-1	GBC	2°36.7' N	107°22.4' E	76 m	25,7°	water saturated mud	smooth, some fluff
18321-1	GBC	2°18.4' N	107°25.3' E	109 m	25,9°	water saturated mud	initial sedimentary relief (7 cm deep)
18322-1	GBC	2°18.4' N	107°37.9' E	70 m	25,9°	mud	smooth, flat, slightly tilted
18323-1	GBC	2°47.0' N	107°53.1' E	92 m	25,3°	sandy mud	tilted, some fluff

Fragments of Astrorhizidae, so called 'tubular-forms', were picked exclusively from fractions greater than 250 µm. They were usually fragmented during processing of the samples. Only the fragments longer than 1000 µm and those with proloculus, irrespective of length, were counted as single specimens (Heß, 1998). The counts of smaller pieces were related to the length of the fragments, where 1000 µm size approximately represents one individual. The astrorhizida fragments (*i.e.* 'tubular-forms') were excluded from data-sets and are discussed separately.

2.3 Data acquisition and analyses

The entire data base comprises numerical abundances of 'dead' and 'living' foraminifera studied from 86 subsamples. The data used for analyses were combined into 75 single locations. Consequently, for each subsample, the abundance of individuals for each taxa was recalculated and normalised to a volume of 100 cc. This volume was chosen, because although a smaller volume of *e.g.* 10 cc, would give a more reliable estimation for the more numerous occurring species it would lead to the rejection of a great number of rare, nevertheless significant species.

- In this study a unit area of 10 cm^2 from the top centimetre of sea-floor sediment was used to calculate the total abundance of 'living' benthic foraminifera - standing stock.
- The absolute abundance of 'dead' individuals was corrected to the volume of 100 cc collected from the top centimetre of sea-floor sediment.
- The frequency of species occurrence was calculated separately for both studied areas. It is expressed by a number of sites at which the species occurs (Buzas *et al.*, 1982). The number of species occurring at 1, 2,...n sites usually follows the Fisher's log series (Fisher *et al.*, 1943). It shows the number of all listed taxa that occur rarely or are distributed evenly over the study area.
- The ratio live to dead (L-number of living/D-number of dead x 100) was introduced by Walton (1955). It was calculated for both study areas, using the number of 'living' and 'dead' individuals per 100 cc.
- From the 'Sunda' samples (sites 18267-18323), planktonic foraminifera were counted from suitable splits to measure a plankton/benthos ratio (P/B). In addition, the tests of other meiofauna such as radiolarians, pteropods, gastropods *etc.* were counted.

Counts are documented in Appendix B.4. They are expressed by relative abundance in which the number of specific individuals forms a percentage of the total number of individuals present in the sample. The foraminiferal counts were performed on fractions greater than 150 µm, following CLIMAP convention (Climate Long Range Investigation, Mapping and Prediction, see Pflaumann & Jian, 1999). The fraction sizes used for this study allow comparison with results of investigations carried out by Chinese researchers in the South China Sea.

Three indices of species diversity were calculated for each site.

- Fisher's Alpha Index: The α-index (Fisher *et al.* 1943) gives a measure of species richness, where the assemblage size is taken into account, although the species abundance is not.

$\alpha = N(1-x) / x$
N - number of individuals in a sample
x - a constant equal to number of species

Table 3. The grain size percentages for the surface samples (Paulsen, 1998), total carbon (TC), total organic carbon (TOC) and carbonate ($CaCO_3$) (Stattegger et al., 1997), annual primary production (PP) (Platt, unpublished data), C org-flux calculated from equations of Suess (1980) and Sarnthein et al. (1988).

station	water depth	sand %	silt %	mud %	TC %	TOC %	$CaCO_3$ %	PP (g/m^2yr) Platt	C-flux (g/m^2yr) Suess	Sarnthein
18248-1	103 m	88.85						138.23	51.90	20.65
18249-1	133 m				3.403	0.251	26.256	139.07	41.18	18.07
18250-1	148 m				2.625	0.726	15.819	138.44	37.07	16.93
18252-1	1277 m		37.09	59.37	1.981	0.831	9.579	114.28	3.73	3.98
18253-1	1479 m		34.58	60.65	3.051	1.110	16.168	115.12	3.25	3.70
18254-1	145 m	33.38	34.68	31.86	3.231	0.737	20.775	121.72	33.23	14.43
18255-1	102 m	85.69	6.94	7.34	2.582	0.443	17.818	148.38	56.21	22.81
18256-1	92 m	96.36			2.565	2.367	1.649	148.46	61.82	24.17
18257-2	88 m	87.51	5.49	6.93		0.245		146.54	63.53	24.35
18258-1	88 m	90.92	4.48	4.53		0.252		144.42	62.61	23.88
18259-2	88 m	88.78	5.49	5.72	1.499	0.190	10.904	143.46	62.20	23.67
18260-1	74 m	86.18	6.60	7.21	1.358	0.316	8.680	152.09	77.08	28.16
18261-3	68 m	88.53	5.47	5.97	1.574	0.291	10.687	146.84	80.22	28.16
18262-1	56 m	97.03			3.314	0.226	25.723	205.17	132.81	48.92
18263-1	51 m	91.44	3.52	3.97	5.361	0.324	41.958	230.07	161.36	59.99
18264-1	48 m							236.39	174.54	64.32
18265-1	47 m	89.81			6.443	0.260	51.504	240.08	180.43	66.42
18266-1	47 m	92.64	3.34	3.91	3.841	0.239	30.005	240.39	180.66	66.54
18267-1	1852 m		30.20	66.00	3.437		28.630	106.24	2.40	2.94
18268-1	1974 m		28.78	66.39	3.286	1.274	16.760	107.19	2.27	2.87
18269-1	114 m	38.04	42.89	18.60	3.003	0.446	21.300	156.25	53.42	22.97
18270-1	106 m		21.70	13.74	2.631	0.554	17.302	157.86	57.72	24.25
18271-1	116 m	49.48	30.70	19.83	4.115	0.276	31.979	160.99	54.16	23.68
18272-1	121 m	32.93	38.80	28.06	4.758	0.721	33.628	161.40	52.20	23.21
18273-1	127 m		48.76	29.38	4.601	0.633	33.053	161.67	49.98	22.64
18274-1	117 m	68.59	19.49	11.84	3.983	0.333	30.404	162.21	54.13	23.80
18275-1	109 m	71.72			2.525	0.264	18.834	162.63	57.96	24.84
18276-1	120 m	68.60	19.35	11.95	3.347	0.416	24.415	150.47	49.05	21.24
18277-1	134 m	26.34	48.61	24.98	3.676	0.680	24.956	124.04	36.47	15.45
18278-1	137 m	17.98	55.52	26.41	3.617	0.630	24.882	108.95	31.37	12.85
18279-1	139 m	19.39	55.17	25.50	5.949	2.396	29.596	108.87	30.93	12.73
18280-1	144 m		59.58	23.06	3.776	0.659	25.964	108.72	29.88	12.46
18281-1	145 m	22.79	57.05	20.11	3.639	0.527	25.923	108.66	29.66	12.41
18282-1	152 m	26.54	53.44	19.56				108.46	28.32	12.06
18283-1	166 m	38.60	46.82	14.62	3.05	0.466	21.525	108.18	25.99	11.44
18284-2	226 m	48.48	39.46	12.03	2.559	0.418	17.834	107.89	19.30	9.61
18285-1	291 m	47.90	39.25	12.34	2.026	0.460	13.045	107.79	15.10	8.35
18286-1	404 m		47.04	48.20	3.628	1.151	20.633	107.68	10.96	6.95
18287-2	596 m		39.02	57.75	5.115	1.281	31.937	107.44	7.46	5.59
18288-1	790 m		33.92	58.67	3.731	1.066	22.199	107.02	5.63	4.76
18289-1	978 m		32.94	62.25	3.717	1.288	20.233	106.35	4.53	4.19
18290-1	1124 m		31.74	62.72	3.321	1.025	19.126	105.39	3.91	3.83
18291-1	1208 m		32.00	65.66	3.228	1.145	17.351	104.68	3.61	3.65
18292-1	1309 m		29.83	63.62	3.817	1.263	21.275	104.67	3.34	3.49
18293-1	1404 m		30.89	63.49	3.587	1.244	19.517	105.45	3.14	3.39
18294-3	846 m				4.343	1.129	26.773	105.71	5.20	4.50
18295-1	117 m	31.81	49.58	18.52	3.85	0.436	28.439	149.09	49.75	21.28
18296-1	118 m	37.15	43.45	19.41	4.011	0.587	28.523	145.42	48.15	20.49
18297-1	112 m	18.41	58.01	23.45	3.677	0.567	25.906	153.58	53.37	22.67
18298-1	103 m	31.79	43.84	24.07	4.618	0.459	34.644	177.79	66.75	28.85
18299-2	102 m							177.67	67.31	28.98
18300-1	94 m	37.87	35.45	26.02	4.58	0.547	33.595	188.29	76.88	32.76
18301-1	92 m	36.33	36.49	28.51	5.277	0.438	40.309	188.60	78.53	33.22
18302-1	83 m		46.16	32.31	5.486	0.425	42.158	197.11	90.11	37.30
18303-1	107 m		22.59	17.32	5.993	0.460	46.090	185.60	67.28	29.91
18304-1	104 m		52.28	36.91	3.605	1.330	18.951	186.35	69.35	30.55
18305-1	109 m				3.499	0.603	24.124	192.78	68.70	31.14
18306-1	88 m		38.89	54.01	4.689	0.735	32.937	240.69	104.36	47.09
18307-1	100 m	17.10	39.45	43.25	5.066	0.755	35.911	241.97	93.35	44.19
18308-1	80 m	68.71	14.94	16.34	3.907	0.328	29.813	254.92	120.47	53.59
18309-1	84 m	61.83	16.86	21.24	2.198	0.320	15.644	247.28	111.83	50.09
18310-1	101 m	42.41	28.98	28.49	4.064	0.440	30.188	242.96	92.88	44.18
18311-1	60 m	17.34	44.73	37.15	8.48	0.439	66.982	240.27	146.51	58.09
18312-1	101 m		30.54	30.04	4.426	0.484	32.837	243.69	93.16	44.36
18313-1	99 m	61.87	23.03	15.05	2.701	0.237	20.525	242.49	94.42	44.56
18314-1	100 m	68.40	19.62	11.73	3.342	0.412	24.407	240.26	92.69	43.77
18315-3	69 m	0.80	43.43	44.58	3.886	0.630	27.122	240.81	129.87	53.92
18316-1	71 m	23.58	35.98	40.30	4.45	0.579	32.245	237.88	125.08	52.21
18317-1	96 m	0.16	36.17	44.64	3.584	0.671	24.265	236.71	94.81	43.90
18318-1	86 m	20.63	32.84	42.99	3.456	0.741	22.616	236.70	104.79	46.65
18319-1	81 m							236.70	110.62	48.22
18320-1	76 m		37.80	49.10	3.976	0.679	27.464	236.69	117.13	49.95
18321-1	109 m		44.14	51.12	3.3	0.699	21.666	239.71	85.42	41.60
18322-1	70 m		35.09	41.41	4.094	0.599	29.113	240.84	128.24	53.50
18323-1	92 m	24.84	33.95	41.27	3.729	0.587	26.173	226.67	94.38	42.42

Fisher's α is a number close to the number of species represented by only one individual (Hayek & Buzas, 1997). The value of x should be a number close to 1 ($x = N / (N+\alpha)$). When $x<0,5$ the value of α losses its meaning for micropaleontological work. Furthermore, when x is less than 0,63 the value of α is greater than the number of species which is also statistically unacceptable (Hayek & Buzas, 1997). Another way to check if $x<0,5$, is by calculating the N/S ratio (S-number of species) and if $N/S \leq 1,44$, α no longer indicates the number of species with one individual.

• Shannon-Wiener Index: The Shannon-Wiener information function is commonly used as a diversity index. The Shannon-Wiener Index H(S) is a measure of heterogeneity which takes into account the number of species and the distribution of individuals between those species (Gibson & Buzas, 1973; Murray, 1991).

$$H(S) = -\sum_{i=1}^{S} p_i \ln p_i$$

p_i - proportion of the i-th species
S - number of species

The amount each species contributes to the value of H(S) depends on its proportion (p_i) in the assemblage. The species with proportions in the middle range influence the value of H(S) most heavily (Hayek & Buzas, 1997), while individually rare species ($p_i \leq 0,01$) contribute little to the value of this measure. This function, according to Pielou (1966), should only be used when all the individuals have been identified and counted, and according to Buzas (1979), when most of the species in the population have been included. The highest possible value of H(S) is attained when all species have equal abundances. It can be calculated from the equation $H(S)_{max} = \ln(S)$.

• Evenness - Buzas & Gibson's - E
Evenness - E is a measure of equitability or dominance (Buzas & Gibson, 1969). This ratio measures the degree of evenness in populations, irrespective of the number of species present.

$$E = e^{H(S)}/S$$

Correspondence Factor Analysis: The data sets were processed by Correspondence Factor Analysis (AFC) using the software package ECOLOGIX. The correspondence analysis (Benzecri, 1970) is the most suitable statistical technique for treating large matrices of data in large numbers of samples (Davis, 1986). It allows us to recognise the correlation between constants (samples) and variables (*e.g.* species frequency, grain size or other parameters) and to measure their contribution to the total value of each factor (Teil, 1975). Correspondence analysis can represent species, sites and environmental parameters simultaneously on a Cartesian plane. Thus it allows easier evaluation of their similarities and in addition allows discrimination of the influence of environmental variables on benthic assemblages.
This statistical method was introduced in foraminiferal research by Roux (1979) and Benzecri & Benzecri (1984). Recent examples of applying AFC in foraminiferal research include Heß (1998), Kuhnt *et al.* (1999) and Serandrei-Barbero *et al.* (1999).

Data sets used in correspondence analyses were drawn from complete lists of the identified fauna. All studied samples were combined into single locations. For the analyses of faunal trends along the transects the 'tubular forms' and the rare species were excluded on the basis of relative abundances, by rejecting species with less than a 0,2 % proportion. Also, species that occurred in less than 3 locations were ignored for this analysis. The representative species of faunal associations were selected according to their contribution to the factor values and the standing stock values.

The first matrix (AFC 1) used for the correspondence analysis was based on the samples from 75 locations and on 528 species. In the second matrix (AFC 2) all sites located deeper than 300 m water depth were excluded, because their composition strongly obscured the results of the first analysis and masked the differences in the remaining data sets. In the third matrix (AFC 3), the distribution data of 306 species from 75 samples and supplementary data concerning the sediment type were used for analysis. The number of species was reduced, by rejecting species with less than 0,5 % proportion and occurring in less than 3 locations. The proportions of mud, silt and sand for each sample (after Paulsen, 1998), were coded into a 0-9 scale and used as passive parameters. The abundances of each species per 100 cc volume were coded into a 0-9 scale as follow: (0 = 0 specimen per 100 cc, 1 = 0,1-3; 2 = 3,1-9; 3 = 9,1-27; 4 = 27,1-81; 5= 81,1-243; 6 = 243,1-729; 7 = 729,1-2187; 8 = 2187,1-6561; 9 = >6561).

The correspondence analysis (AFC) was used to calculate a simple transfer function for the paleo-C org-flux, based on the data from twelve sites located at water depths greater than 200 m on the continental slope of the Sunda Shelf. The equations of Suess (1980) and Sarnthein *et al.* (1988) were used to calculate the organic carbon flux rates from the primary productivity data set of Platt (unpublished). Some geochemical (after Stattegger *et al.*, 1997), sedimentological (after Paulsen, 1998) data and calculated carbon flux values for the surface-sediment samples are given in Table 3.

3. RESULTS

3.1 FAUNAL ANALYSES

Stained surface samples from seventy-five sites along two main transects and additional sites in close vicinity across the Vietnam and Sunda Shelves were used for faunal analyses (see Fig. 1). The results are presented simultaneously for both study areas.

3.1.1 Standing stock

Vietnam transect: Of the 18 'living' assemblages studied, the majority are from shallow water (< 150 m), with the average standing stock value of 125 individuals per 10 cm^2 (Table 4a). The maximum standing stock of 330 indiv./10 cm^2 occurs at the water depth of 102 m. An extremely low value of only 2 indiv./10 cm^2 appears at site 18257, at water depth of 88 m. This may result from a local erosion caused by bottom-current or possibly by predating macrofauna. The two bathyal assemblages reveal standing stock values of 29 and 51 indiv./10 cm^2, at water depths of 1277 m and 1479 m respectively (Fig. 7 a).

The high values of standing stock, within the water depth range 40 m to 60 m, are related to the occurrence of large (> 1000 µm) foraminifera such as *Amphistegina radiata*, *Nummulites venosus* and *Operculina* ex gr. *ammonoides*. The presence of coarse sand and silt, at most of the shallow sites correlates well with low abundances of smaller, living foraminifera. The foraminifera smaller than 1000 µm contribute negligibly to the value of standing stock in these shallow water assemblages. Therefore, if a few species of larger foraminifera would be excluded from the calculation, a reverse trend could be observed, with increased values for the standing stock at greater depths (Fig. 8 a).

Sunda transect: In the Sunda area, of the 57 samples studied (Table 5), only 12 samples contain more than 100 indiv./10 cm^2. The 19 samples yield standing stocks of less than 50 indiv./10 cm^2. The neighbouring sites reveal a dispersed distribution pattern of standing stock values (Fig. 7 b). There is good correlation between high standing stock values and the presence of fine grained sediments. The average value in water depths shallower than 200 m is approximately 82 indiv./10 cm^2. The maximum value rises up to 256 indiv./10 cm^2 at the shallowest (60 m) sampled site. High values are found at locations shallower than 100 m, south-west of Natuna Island, where water saturated muddy sediment is present. The highest values of standing stock occur close to the shore of Natuna Island, where nutrients are contributed from land, the content of carbonate is generally high (≤ 66 %), and the sediment is well oxidised. Generally, low values are found north-east of Natuna Island at water depths between 100 m and 150 m. The amount of stained 'tubular forms' is also very low there. In contrast, the accumulation of empty foraminiferal tests is very high in this area. The standing stock in the bathyal zone averages between 36 to 113 indiv./10 cm^2. The minimum abundance of 36 indiv./10 cm^2 occurs at the deepest site, at a water depth of 1974 m. Also, the usual trend of decreasing standing stock values with increasing water depth is not well pronounced on the continental slope of the Sunda Shelf (Fig. 8 b).

Figure 7. Mapped distribution of benthic foraminiferal abundances on the Vietnam and Sunda Shelves – **(a & b)** Standing stock per unit area of 10 cm^2; **(c & d)** Absolute abundances of empty tests per volume of 100 cc.

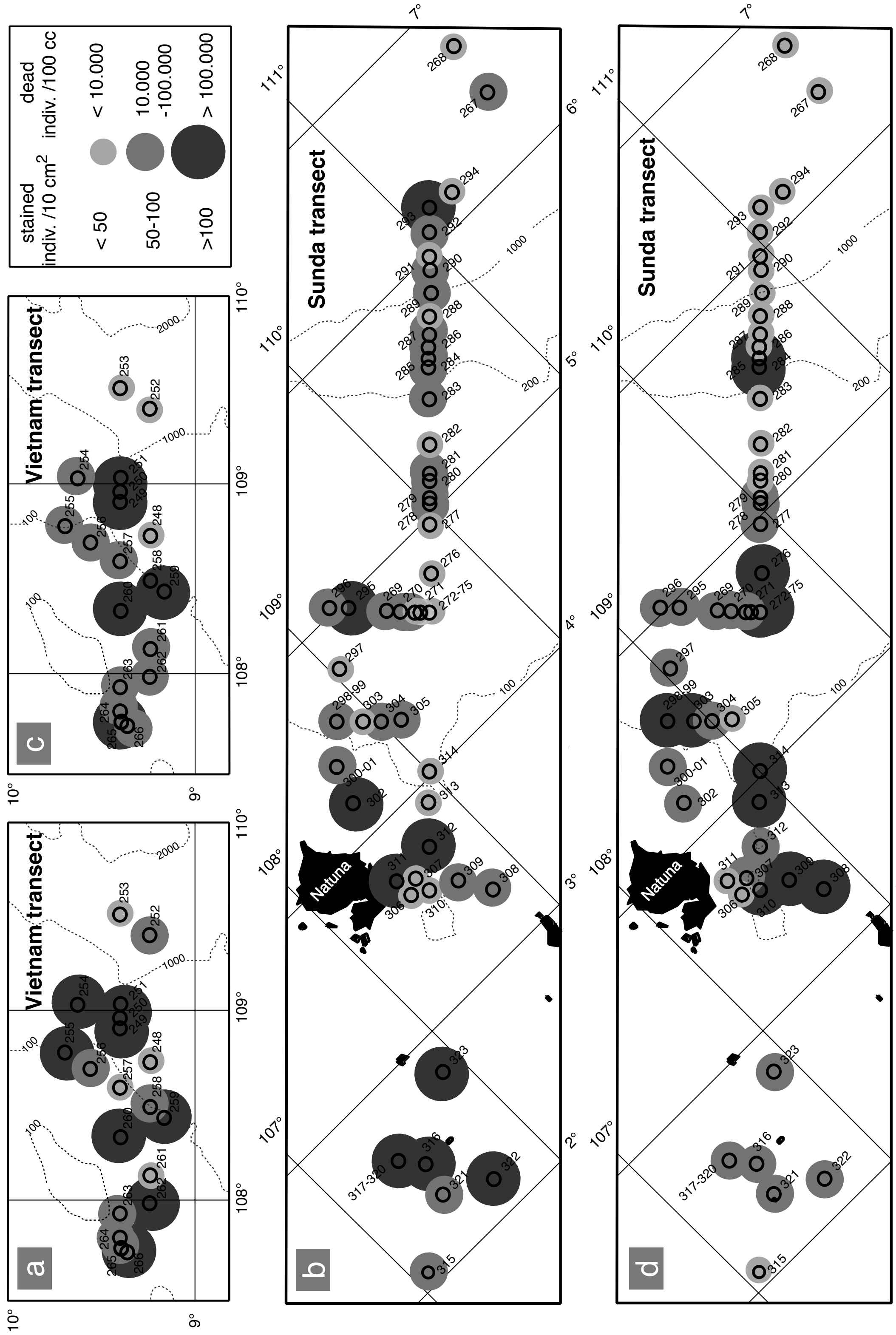


Table 4 a- c. Information of stained, dead and reworked benthic foraminiferal assemblages from the Vietnam Shelf with: station number, water depth (m), for stained standing stock (number of individuals per area of 10 cm^2 of the surface sediment), for dead and reworked counted individuals per sample, absolute abundances (number of individuals per volume of 100 cc of surface sediment), number of species (S), Fisher's Alpha Index, Shannon-Wiener Index H(S), Evenness (E), agglutinated to calcareous (A/C) ratio, percentage of the total number of agglutinated foraminifera (without 'tubular forms'), calcareous foraminifera and Miliolida. The data of sub-samples and fractions (>150 μm) are combined for analyses.

site	water depth	counte indiv.	standing stock	species	Fisher	Shannon -Wiener	Evenness	ratio	Agg.	Calc.	Miliolida
stained	**(m)**	**N**	**indiv./ 10 cm^2**	**S**	**Alpha**	**H(S)**	**E**	**A/C**	**%**	**%**	**%**
18-248	103	44	47.5	33	x	3.00	0.61	0.61	37.9	58.7	3.4
18-249	133	25	232.0	11	7.5	1.94	0.69	0.50	25.0	50.2	24.8
18-250	148	22	142.3	11	8.8	1.57	0.44	1.18	54.1	45.9	0.0
18-252	1277	252	51.1	83	43.2	3.35	0.38	2.96	74.7	24.8	0.4
18-253	1479	165	28.8	56	29.9	3.57	0.65	1.96	66.5	31.7	1.8
18-254	145	17	96.7	14	x	2.17	0.68	0.50	33.4	60.0	6.6
18-255	102	64	330.0	22	11.9	2.78	0.73	1.10	52.5	32.0	15.5
18-256	92	38	88.5	14	8.0	2.23	0.67	0.28	21.7	78.3	0.0
18-257	88	15	1.5	4	1.8	1.02	0.69				
18-258	88	49	54.4	25	20.4	2.97	0.78	0.42	29.4	58.8	11.8
18-259	88	42	169.8	12	5.6	2.08	0.67	0.08	7.7	84.8	7.5
18-260	74	42	220.5	18	11.9	2.48	0.66	0.69	40.7	36.1	23.2
18-261	68	24	27.9	6	2.6	0.40	0.25	11.68	92.1	7.9	0.0
18-262	56	43	131.0	12	5.5	2.32	0.85	0.11	9.8	80.5	9.8
18-263	51	28	79.6	7	3.0	1.65	0.74	0.19	16.1	51.8	32.2
18-264	48	12	51.6	3	1.3	1.10	1.00				
18-265	47	36	169.5	15	9.7	2.28	0.65	0.61	38.0	62.0	0.0
18-266	47	25	103.5	9	5.0	2.01	0.83				
dead			**indiv./ 100 cc**								
18-248	103	322	5760	105	54.2	4.06	0.55	0.14	12.2	63.2	24.6
18-249	133	1004	132839	138	43.3	4.19	0.48	0.17	14.7	71.3	13.9
18-250	148	1037	141973	161	53.4	4.44	0.52	0.20	16.6	65.9	17.6
18-252	1277	634	1336	115	41.1	4.05	0.53	1.06	51.1	46.3	2.7
18-253	1479	452	861	107	44.3	4.04	0.58	1.36	57.6	40.0	2.4
18-254	145	444	40221	139	69.5	4.46	0.62	0.18	14.2	67.5	18.3
18-255	102	719	91000	131	46.9	4.14	0.48	0.21	17.3	61.8	21.0
18-256	92	861	53406	124	39.7	4.25	0.56	0.32	22.1	61.2	16.7
18-257	88	296	37438	75	32.4	3.71	0.54	0.31	24.3	59.8	15.9
18-258	88	852	78188	135	45.2	4.03	0.42	0.17	14.3	71.8	13.9
18-259	88	984	150461	147	47.9	4.27	0.48	0.21	16.6	65.7	17.7
18-260	74	736	112030	132	46.9	4.11	0.46	0.10	9.1	71.9	19.0
18-261	68	455	65007	76	26.1	3.64	0.50	0.11	9.8	72.6	17.5
18-262	56	1226	80652	111	29.6	3.69	0.35	0.13	11.2	72.0	16.7
18-263	51	610	58867	69	20.0	3.27	0.38	0.12	10.5	72.9	16.6
18-264	48	606	53422	54	14.3	2.85	0.32	0.03	2.5	87.2	10.3
18-265	47	859	128255	86	23.8	3.00	0.24	0.07	6.7	82.0	11.3
18-266	47	667	77779	83	25.0	3.43	0.37	0.12	11.0	71.5	17.5
reworked											
18-248	103	73	1888	17		1.57	0.28		0.0	29.7	70.3
18-249	133	175	33070	48		3.16	0.48		2.4	42.6	55.0
18-250	148	105	18322	30		2.48	0.40		0.0	37.1	62.9
18-252	1277	0	0	0							
18-253	1479	0	0	0							
18-254	145	99	9412	30		2.83	0.56		0.0	50.4	49.6
18-255	102	181	27630	50		2.95	0.38		7.4	50.5	42.0
18-256	92	164	9549	38		3.18	0.63		5.4	55.7	39.0
18-257	88	103	21252	37		3.18	0.63		2.5	53.1	44.4
18-258	88	24	10785	10		2.02	0.75		0.0	90.5	9.5
18-259	88	116	17069	34		3.06	0.63		2.2	68.5	29.2
18-260	74	78	12569	28		2.92	0.66		17.3	60.3	22.4
18-261	68	114	8770	22		2.78	0.73		2.9	82.5	14.6
18-262	56	231	12786	28		2.01	0.27		0.0	46.4	53.6
18-263	51	403	10925	16		2.19	0.56		0.0	81.3	18.7
18-264	48	260	11233	20		2.20	0.45		6.5	73.2	20.3
18-265	47	248	17158	16		2.04	0.48		0.0	79.8	20.2
18-266	47	326	9284	13		1.94	0.53		0.0	76.6	23.4

Table 5. Information of 'stained' benthic foraminiferal assemblages from the Sunda Shelf with: station number, water depth (m), counted individuals per sample, standing stock (number of individuals per area of 10 cm^2 of the surface sediment), number of species (S), Fisher's Alpha Index, Shannon-Wiener Index H(S), Evenness (E), agglutinated to calcareous (A/C) ratio, percentage of the total number of agglutinated foraminifera (without 'tubular forms'), calcareous foraminifera and Miliolida. The data of sub-samples and fractions (>150 μm) are combined for analyses.

site number 18 /	water depth (m)	counted indiv. N	standing stock indiv./ 10 cm^2	species S	Fisher Alpha	Shannon -Wiener H(S)	Evenness E	ratio A/C	Agg. %	Calc. %	Miliolida %
18-267	1852	515	66.2	96	34.8	4.03	0.60	6.98	87.2	10.8	2.0
18-268	1974	279	36.0	95	50.8	3.89	0.54	6.06	85.9	13.3	0.8
18-269	114	283	40.5	88	43.8	3.83	0.54	0.36	24.0	66.8	9.2
18-270	106	423	83.6	102	42.7	3.91	0.51	0.34	24.9	67.8	7.2
18-271	116	433	60.4	105	44.1	3.96	0.51	0.46	29.8	64.3	5.9
18-272	121	260	32.4	63	26.4	3.51	0.57	0.59	35.0	61.8	3.2
18-273	127	491	108.2	115	47.3	4.13	0.56	0.69	41.1	49.4	9.5
18-274	117	137	41.6	43	21.5	3.26	0.62	0.39	27.4	71.6	1.0
18-275	109	184	69.1	53	24.9	3.42	0.58	0.33	21.9	71.4	6.7
18-276	120	142	49.1	50	27.5	3.32	0.54	0.28	20.1	74.4	5.5
18-277	134	165	39.6	56	29.9	3.69	0.77	0.87	45.2	50.0	4.8
18-278	137	249	72.9	67	30.1	3.23	0.39	0.43	28.7	44.7	26.6
18-279	139	289	87.5	78	35.1	3.77	0.57	0.73	42.5	55.3	2.2
18-280	144	135	39.5	62	44.4	3.69	0.66	0.73	41.7	52.2	6.1
18-281	145	363	84.3	94	41.1	3.91	0.54	0.95	48.1	47.6	4.3
18-282	152	160	45.8	60	34.9	3.75	0.71	1.34	56.6	37.6	5.8
18-283	166	176	55.8	57	29.3	3.50	0.58	1.27	52.3	41.1	6.6
18-284	226	262	37.0	46	16.2	2.91	0.44	3.94	79.8	19.1	1.1
18-285	291	325	50.9	90	41.2	3.90	0.57	1.36	57.1	40.1	2.8
18-286	404	378	57.0	99	43.7	4.24	0.72	1.46	58.3	40.7	1.0
18-287	595	430	60.6	118	53.7	4.25	0.62	1.81	63.0	35.0	1.9
18-288	790	295	41.6	79	35.3	3.52	0.45	0.89	47.1	51.2	1.7
18-289	978	469	72.5	106	42.7	4.06	0.57	1.79	64.0	33.3	2.7
18-290	1124	325	65.1	105	53.8	4.08	0.59	2.28	69.3	28.1	2.6
18-291	1208	266	37.5	84	42.3	3.87	0.59	1.58	61.1	34.7	4.2
18-292	1309	338	57.8	104	51.3	4.12	0.62	3.32	76.8	20.8	2.4
18-293	1404	316	113.0	78	33.1	3.74	0.60	14.41	93.5	5.8	0.8
18-294	842	327	36.8	86	38.0	3.75	0.49	0.74	42.0	57.1	0.9
18-295	117	391	103.9	94	39.3	3.79	0.50	0.79	41.5	50.6	8.0
18-296	118	233	64.4	66	30.7	3.68	0.61	1.11	49.3	45.7	5.0
18-297	112	178	49.8	64	35.8	3.67	0.62	0.44	30.2	62.6	7.3
18-298	103	162	62.1	74	52.7	4.00	0.76	0.51	33.1	51.9	15.0
18-299	102	100	63.4	48	36.3	3.39	0.65	0.67	39.7	52.7	7.6
18-300	94	316	86.5	100	50.4	4.16	0.65	1.57	60.6	28.6	10.8
18-301	92	317	92.0	102	52.1	4.16	0.64	0.68	38.6	46.4	15.0
18-302	83	380	105.1	94	40.0	4.00	0.57	0.55	34.2	51.4	14.4
18-303	107	44	21.9	26	x	2.97	0.78	0.72	42.0	56.2	1.8
18-304	104	228	68.4	80	43.8	3.92	0.63	0.74	42.3	47.1	10.6
18-305	109	393	77.7	99	42.6	4.13	0.64	0.91	47.9	43.7	8.3
18-306	88	299	43.2	91	44.5	3.99	0.61	1.40	57.7	29.1	13.1
18-307	100	302	46.9	90	43.4	3.84	0.52	0.72	41.4	44.2	14.4
18-308	80	305	59.7	89	42.3	4.05	0.64	0.55	33.9	51.1	15.0
18-309	84	186	74.7	55	26.4	3.70	0.73	0.47	31.3	57.5	11.2
18-310	101	172	35.2	56	28.9	3.63	0.70	0.87	46.5	48.0	5.5
18-311	60	480	256.1	89	32.2	3.78	0.50	0.59	35.3	45.5	19.2
18-312	101	385	103.7	95	40.3	3.99	0.58	0.87	46.1	42.3	11.7
18-313	99	156	45.6	64	40.5	3.66	0.63	0.58	36.4	50.5	13.1
18-314	100	122	41.6	55	38.6	3.55	0.68	0.39	27.9	59.6	12.5
18-315	69	343	68.1	85	36.2	3.93	0.60	0.61	37.0	45.3	17.7
18-316	71	389	216.9	93	38.7	4.01	0.59	0.93	48.0	35.2	16.7
18-317	96	445	132.9	97	38.2	4.10	0.62	0.59	36.3	49.8	13.9
18-318	86	220	226.5	67	32.8	3.81	0.68	0.72	41.5	47.1	11.4
18-319	81	257	141.4	69	30.9	3.73	0.61	0.64	36.9	49.6	13.5
18-320	76	295	86.2	83	38.4	3.99	0.65	0.74	42.2	40.2	17.6
18-321	109	286	74.5	82	38.4	3.71	0.52	0.68	40.1	44.1	15.8
18-322	70	575	128.5	97	33.4	3.89	0.50	0.60	37.2	41.3	21.5
18-323	92	392	140.5	91	37.2	3.91	0.55	0.67	40.1	51.1	8.8

Table 6. Information of 'dead' benthic foraminiferal assemblages from the Sunda Shelf with: station number, water depth (m), counted individuals per sample, absolute abundances (number of individuals per volume of 100 cc of surface sediment), number of species (S), Fisher's Alpha Index, Shannon-Wiener Index H(S), Evenness (E), agglutinated to calcareous (A/C) ratio, plankton to benthos (P/B) ratio, percentage of the total number of agglutinated foraminifera (without 'tubular forms'), calcareous foraminifera and Miliolida. The data of sub-samples and fractions (>150 μm) are combined for analyses.

site number	water depth (m)	counted indiv. N	no. of indiv. / 100cc	species S	Fisher Alpha	Shannon -Wiener H(S)	Evenness E	ratio A/C	P/B	Agg. %	Calc. %	Miliolida %
18-267	1852	665	818	117	41.2	4.02	0.50	3.78	25.19	78.5	17.9	3.5
18-268	1974	677	1020	131	48.4	4.12	0.52	2.29	13.44	69.5	27.9	2.6
18-269	114	832	26026	151	54.0	4.21	0.45	0.26	3.07	19.9	60.3	19.8
18-270	106	816	69416	150	53.9	4.29	0.49	0.22	1.75	18.3	62.9	18.8
18-271	116	1022	95411	167	56.7	4.40	0.49	0.23	2.01	18.4	62.1	19.6
18-272	121	1174	76463	151	46.1	4.05	0.38	0.32	2.18	20.9	60.0	19.2
18-273	127	1315	62119	164	49.4	4.00	0.34	0.17	2.35	13.5	70.3	16.3
18-274	117	1225	201710	155	47.0	4.21	0.43	0.29	2.06	21.1	59.0	20.0
18-275	109	925	92915	143	47.3	4.28	0.50	0.31	1.31	21.4	61.5	17.0
18-276	120	1214	182964	134	38.5	4.04	0.42	0.32	1.41	21.2	62.5	16.4
18-277	134	657	24936	125	45.8	4.24	0.55	0.23	2.66	18.0	69.0	13.0
18-278	137	916	67156	160	56.1	4.32	0.47	0.21	1.62	16.7	72.2	11.1
18-279	139	653	24656	139	54.1	4.32	0.54	0.20	2.90	16.7	66.6	16.6
18-280	144	643	5698	136	52.7	4.33	0.55	0.21	4.29	16.4	69.3	14.3
18-281	145	639	6440	143	57.2	4.40	0.56	0.14	4.04	11.9	70.0	18.2
18-282	152	581	20322	131	52.7	4.21	0.51	0.25	3.80	20.1	70.8	9.1
18-283	166	1577	6433	179	52.0	4.28	0.40	0.13	7.05	10.9	73.1	16.0
18-284	226	1373	35320	160	46.9	4.01	0.35	0.13	1.44	11.3	77.0	11.7
18-285	291	940	13390	190	71.8	4.33	0.41	0.25	3.07	19.9	73.2	6.8
18-286	404	862	2157	161	58.4	4.36	0.50	0.51	5.41	33.6	59.0	7.4
18-287	595	1007	1828	171	59.1	4.36	0.48	1.20	6.90	54.2	43.9	1.9
18-288	790	713	1514	142	53.3	4.10	0.45	1.67	9.79	62.3	35.3	2.4
18-289	978	888	3070	143	48.2	4.12	0.45	1.27	8.08	55.5	41.8	2.7
18-290	1124	556	920	120	47.0	4.22	0.60	1.15	14.48	53.2	41.1	5.7
18-291	1208	536	828	115	44.9	4.15	0.58	1.98	14.73	66.2	30.7	3.1
18-292	1309	949	1593	154	52.1	4.38	0.56	2.03	11.22	66.8	30.4	2.9
18-293	1404	747	1113	148	55.4	4.26	0.51	2.24	15.92	66.9	30.3	2.9
18-294	842	636	1783	145	58.7	4.24	0.51	0.83	34.69	44.1	53.8	2.1
18-295	117	746	11444	152	57.7	4.31	0.50	0.18	3.40	14.6	65.3	20.1
18-296	118	528	17986	140	62.2	4.29	0.52	0.16	3.27	13.5	71.2	15.2
18-297	112	715	42896	127	44.9	4.02	0.44	0.26	2.87	20.8	64.5	14.7
18-298	103	643	149428	131	49.7	4.01	0.42	0.26	1.69	16.1	64.5	19.4
18-299	102	999	197636	127	38.6	4.05	0.45	0.29	2.01	20.2	59.4	20.4
18-300	94	1147	56661	142	42.7	4.12	0.43	0.25	1.61	20.1	60.5	19.4
18-301	92	928	119146	130	41.2	3.98	0.41	0.36	1.13	21.6	61.8	16.7
18-302	83	996	86392	124	37.3	3.95	0.41	0.43	0.83	29.3	56.1	14.7
18-303	107	705	236072	120	41.5	3.95	0.43	0.29	1.28	19.1	58.8	22.1
18-304	104	822	33027	141	49.0	4.26	0.51	0.33	2.45	22.1	55.7	22.2
18-305	109	654	6783	135	51.6	4.12	0.45	0.23	2.10	18.4	58.4	23.2
18-306	88	667	4186	137	52.2	4.14	0.46	0.23	0.89	18.2	50.8	31.1
18-307	100	651	23520	132	50.0	4.01	0.42	0.14	0.91	11.7	62.3	26.0
18-308	80	994	233947	100	27.7	3.74	0.41	0.30	0.23	22.6	57.2	20.2
18-309	84	1167	127929	129	37.1	4.01	0.42	0.32	0.35	20.5	59.1	20.4
18-310	101	1078	187498	159	51.5	4.14	0.39	0.15	0.25	11.4	64.2	24.4
18-311	60	588	10685	123	47.4	4.00	0.44	0.16	0.49	12.7	62.4	24.9
18-312	101	659	26651	118	41.9	4.12	0.52	0.28	1.12	21.9	54.0	24.1
18-313	99	830	151880	114	35.8	3.89	0.42	0.39	1.13	25.8	53.4	20.9
18-314	100	1083	113817	119	34.1	4.00	0.45	0.39	1.32	26.2	50.9	22.8
18-315	69	499	9648	90	32.1	3.74	0.47	0.33	0.73	22.8	46.8	30.3
18-316	71	673	64965	112	38.4	3.93	0.46	0.32	0.42	20.5	52.5	27.0
18-317	96	511	22033	87	30.1	3.74	0.49	0.33	0.49	22.9	52.2	25.0
18-318	86	772	34655	97	29.3	3.75	0.43	0.34	0.30	21.4	58.1	20.5
18-319	81	626	27680	97	32.1	3.82	0.46	0.46	2.21	27.3	48.0	24.7
18-320	76	710	24174	105	34.0	3.77	0.41	0.30	0.38	20.9	48.5	30.6
18-321	109	717	27905	77	21.9	3.20	0.32	0.15	0.50	10.6	71.3	18.2
18-322	70	707	64586	105	34.1	3.83	0.43	0.35	0.25	24.6	47.9	27.5
18-323	92	1170	57471	91	23.1	3.53	0.37	0.32	0.52	20.7	56.4	23.0

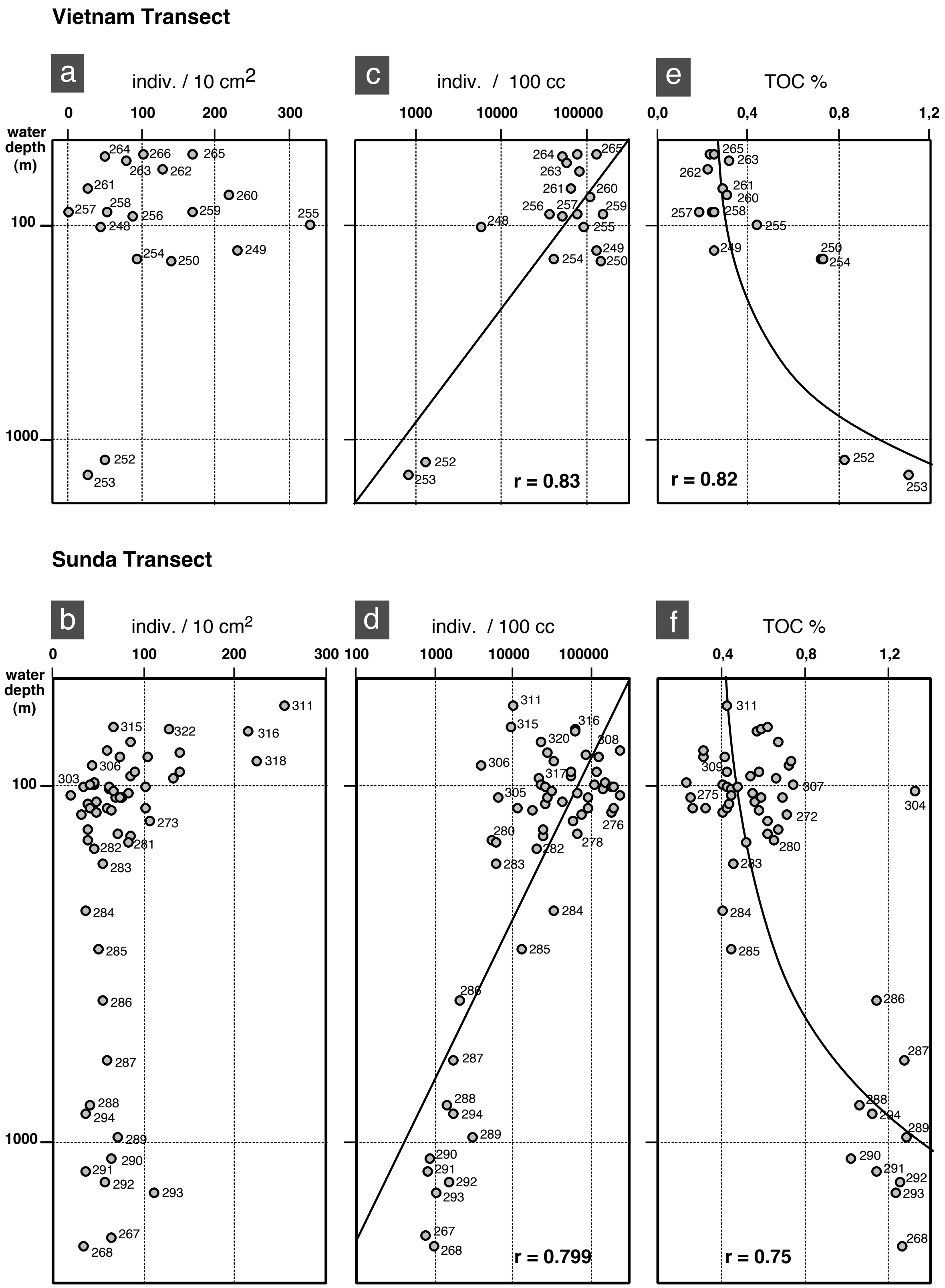


Figure 8. Information of benthic foraminiferal assemblages from the Vietnam and Sunda transects: (**a - b**) standing stock (no. of indiv. /10 cm2 of surface sediment); (**c - d**) absolute abundances (no of indiv. per volume of 100 cc of surface sediments); (**e - f**) percentages of total organic carbon (TOC). Water depth (axis y) and figs. c & d (axis x) are presented in the logarithmic scale.

3.1.2 Abundances of empty foraminiferal tests

Vietnam transect: The maximum abundance of 'dead' individuals on the shelf is 150461 indiv./100 cc at site 18259 (Table 4 b). Only four out of sixteen samples reveal abundances higher than 100000 indiv./100 cc (Fig. 7 c). These assemblages also have high standing stock values. Above the isobath of 150 m the average abundance reaches approximately 86000 indiv./100 cc. An exceptionally low value appears at site 18248, at 103 m water depth, where the total abundance of benthic foraminiferal tests is also very low. On the continental slope, the abundance of empty tests decreases to 1336 indiv./100 cc at a water depth of 1277 m, while it drops to 860 indiv./100 cc at 1479 m water depth (Fig. 8 c).

The sediment on the shelf contains a large amount of 'reworked' tests (Table 4 c). In most of the shelf assemblages, they constitute a quarter to one tenth of the total benthic foraminiferal abundances. The abundances of 'reworked' tests range between 1888 and 33070 indiv./100 cc, with an average value of approximately 13000 indiv./100 cc. Most of the 'reworked' individuals are represented by various Miliolids, predominantly *Quinqueloculina*, large foraminifera such as *Nummulites venosus*, *Operculina*, *Amphistegina* and some agglutinated species, mainly various *Textularia*. The maximum number of 'reworked' tests (33070 indiv./100 cc) occurs at site 18249. The 'reworked' tests are absent in the sites from the bathyal zone. Planktonic tests are very scarce over the entire shelf area.

Sunda transect: The absolute abundances of 'dead' foraminifera range from 818 to 236072 indiv./100 cc in the Sunda area (Table 6). The highest values (> 100000 indiv./100 cc) are obtained at the sites that trace the paleo-Molengraaff River valley, north-east of Natuna Island. The concentration of empty tests in this area coincides with the presence of coarser sediments, with generally more than 60 % of fine sand and lesser amounts of silt-clay sediments. All over the shelf area, above the 150 m isobath, abundance values are higher than 10000 indiv./100 cc, except for sites close to offshore Natuna Island, while they decrease towards the shelf edge (Fig. 7 d). The second peak of abundance, reaching 35000 indiv./100 cc, occurs at the shelf break. In the bathyal zone, the abundances gradually decrease, with some enhanced values at approximately 1000 m and 1400 m water depth. Regression plots show, that there is a clear trend in decreasing abundances of empty tests with increasing water depth (Fig. 8 d). Generally below 1000 m water depth, an average abundance value drops to approximately 1048 indiv./100 cc. In the assemblages from the continental slope, a decrease in abundances with water depth correlates with a decrease in the organic carbon flux (Fig. 9). Site 18294 is located on an under-water high, approximately 600 m above the surrounding sea-floor. The foraminiferal abundance and faunal composition are similar to those of corresponding water depths rather than to those from their vicinity. On the shelf, the proportion of planktonic foraminiferal tests is very high, reaching 30-45 % of the total microfaunal abundances. In the lower bathyal zone, it makes up more than 75 % of the total abundance.

3.1.3 Distribution of Astrorhizidae fragments ('tubular forms')

The relative abundances of the astrorhizida fragments so called 'tubular forms' (incl. *Hyperammina* spp., *Rhabdammina* spp., *Rhizammina* spp., *Saccorhiza ramosa*), show a clear distribution trend along the studied transects.

Figure 9. Foraminiferal abundances (indiv./100 cc) in relation to the calculated C org-flux (by equation of Suess, 1980): (**a**) the shelf area (< 200 m water depth), (**b**) the continental slope along the Sunda Transect.

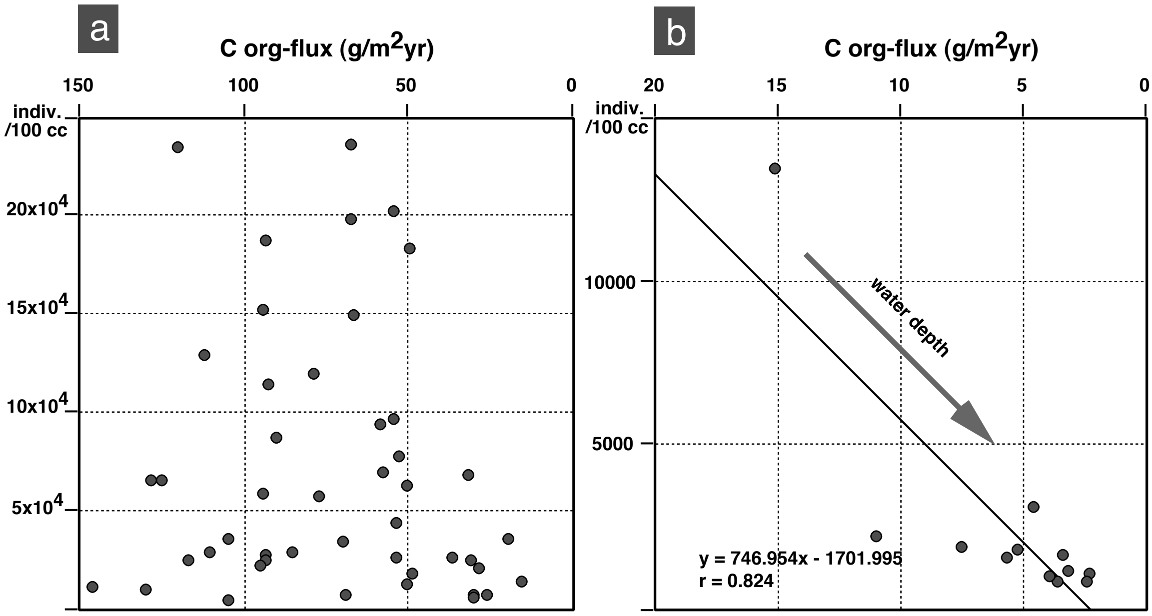
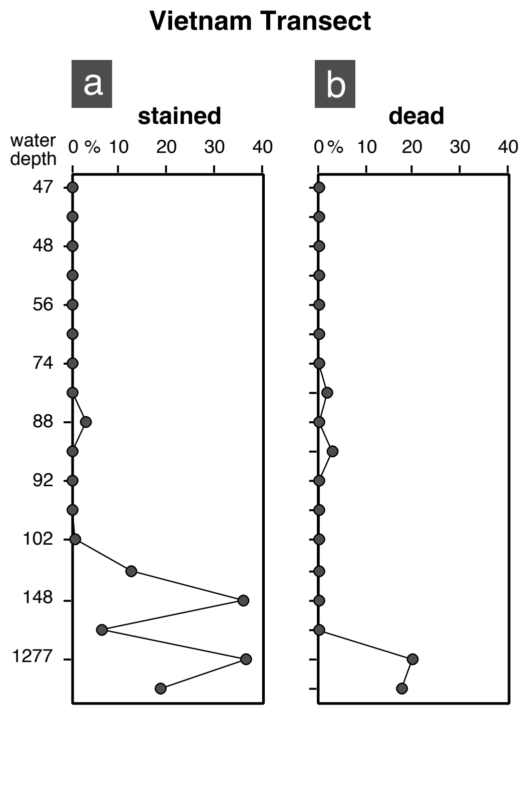
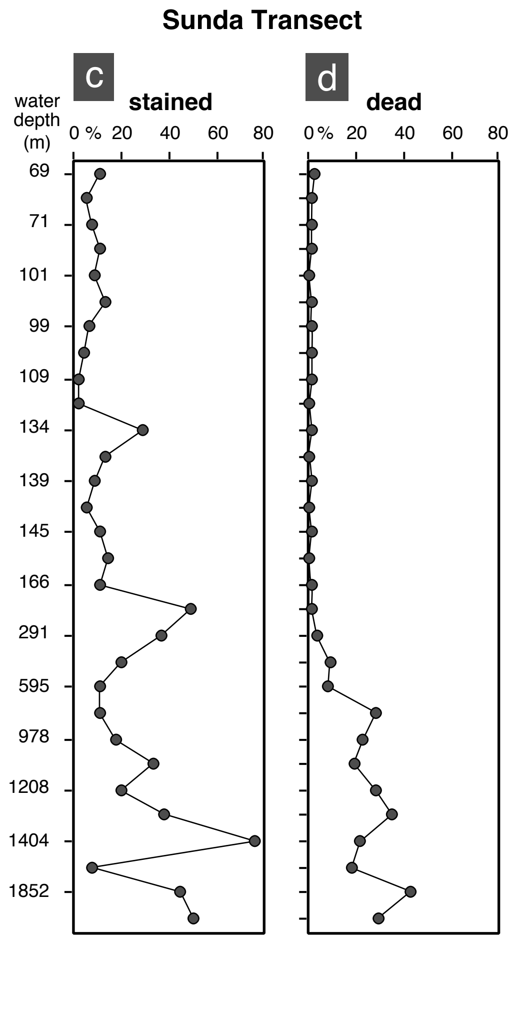


Figure 10. Percentage distribution of stained and dead Astrorhizidae fragments in relation to water depth along the Vietnam and Sunda transects.





S t a i n e d   a s t r o r h i z i d a   f r a g m e n t s : In the Vietnam assemblages, the astrorhizida fragments occur in considerable amounts only at water depths greater than 100 m. The maximum abundance of 'stained tubular forms' occurs at 148 m water depth, where it reaches approximately 40 % of the 'living' population (site 18250). The highest simple diversity in this area occurs at this location. On the continental slope, the proportions of tubular forms are between 30-40 % (Fig. 10 a).

Along the Sunda transect, the distribution pattern of astrorhizida fragments shows an irregular pattern, with no evident relationship to water depth. The proportions of tubular forms are low on the shelf, ranging between 2 % and 27 %, with an average value of 10 % of the 'living' population. The proportion increases to 50 % below the shelf edge and gradually decreases towards the deep basin. An extremely high abundance of astrorhizida fragments occurs at a water depth of 1404 m, reaching approximately 80 % of the total 'living' assemblage (Fig. 10 c).

D e a d   a s t r o r h i z i d a   f r a g m e n t s : The distribution of 'dead' astrorhizida fragments along the Sunda transect shows a clear correlation with water depth (Fig. 10 d). The proportions are very low on the shelf, ranging between 0,1 % and 1,7 % of the total 'dead' assemblage, with an average value of 0,7 %. Abundances of 'tubular forms' gradually increase towards the deep basin. The astrorhizida fragments on the uppermost continental slope constitute approximately 5,3 %, on the middle slope 28,8 %, and in the lower bathyal zone they make up 39 % of 'dead' assemblages. The highest percentage of 'tubular forms' (approximately 42,3 %) occurs at 1852 m water depth.

A similar pattern is observed along the Vietnam transect, but the proportion of 'dead' astrorhizids is generally lower (Fig. 10 b). The shelf assemblages have lower than 0,3 % proportion of astrorhizids. On the continental slope, they occur in proportions between 18 % and 24,4 %.

3.1.4 Distribution patterns of nine major orders

V i e t n a m   t r a n s e c t : On the shelf, the Rotaliida commonly dominate the assemblages reaching up to 70 % of the total fauna (Fig. 11 a). Whereas, representatives of the orders Miliolida, Textulariida and Lagenida show localized peaks in their percentages, however do not occur at other . On the outer shelf, the proportions of varying amounts of Astrorhizida, Lituolida and Buliminida increase at the expense of Rotaliida. The bathyal zone fauna is dominated by agglutinated foraminifera. Astrorhizida and Lituolida together make up 60 % of the 'living' fauna, although Rotaliida still occur in proportionally high percentages (20 %).

'Dead' assemblages show a relatively uniform distribution pattern over the shelf area (Fig. 11 b). The assemblages from water depths shallower than 50 m are composed of approximately 80 % Rotaliida and more than 10 % Miliolida. In water depths between 50 m and 150 m, an increase in percentage of Miliolida (≤ 25 %) and Buliminida (≤ 14 %) is observed. Lagenida are present in low percentages (≤ 6 %) and are absent at the most shallow sites. The agglutinated foraminifera, dominated by Textulariida and Lituolida, make up 13 % of the total assemblage. The distribution pattern of 'reworked' Rotaliida, Miliolida and Buliminida reflects the 'dead' assemblages (Fig. 11 c). The 'reworked' assemblages are mainly composed of calcareous foraminifera (≤ 90 %). In the bathyal zone, the distribution pattern of the 'dead' foraminifera, generally follows the trend of 'living' fauna. However, the calcareous foraminifera exhibit higher fossilisation potential than agglutinated.

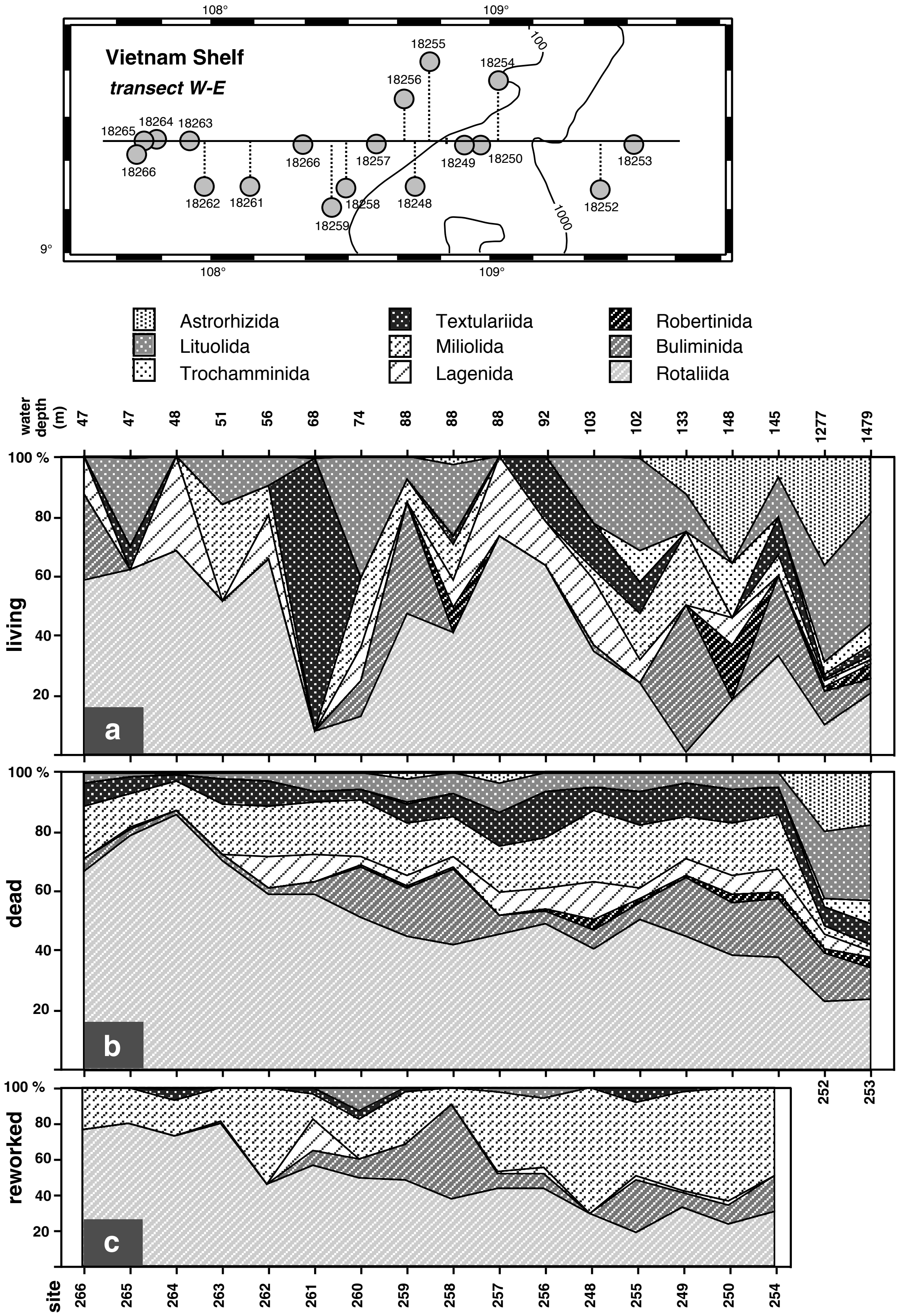


Figure 11. Proportions of the main orders in: (**a**) living (**b**) dead and (**c**) reworked benthic foraminiferal assemblages with location map of samples along the Vietnam transect.

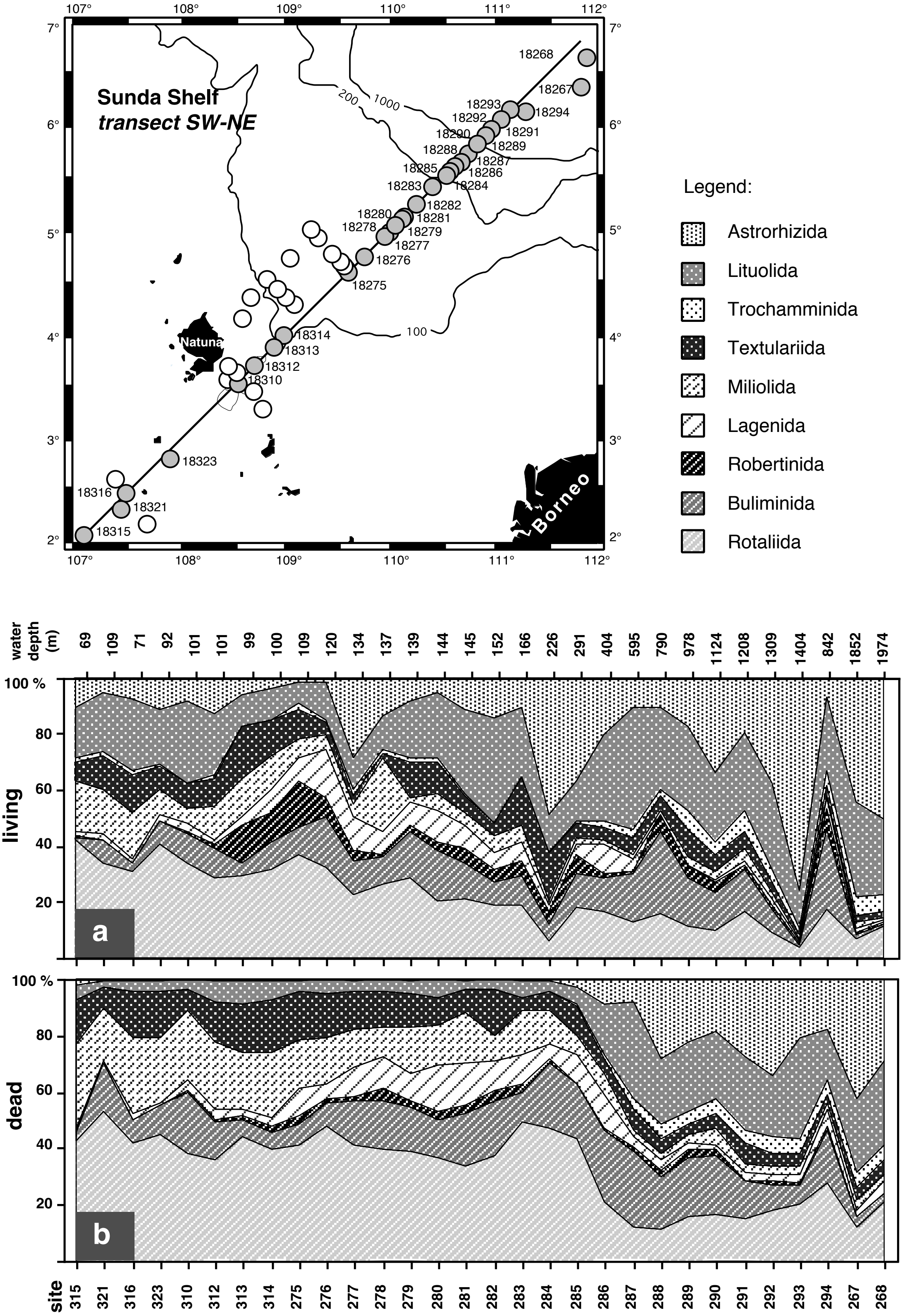


Figure 12. Proportions of the main orders in: (**a**) living and (**b**) dead benthic foraminiferal assemblages with location map of samples along the Sunda transect.

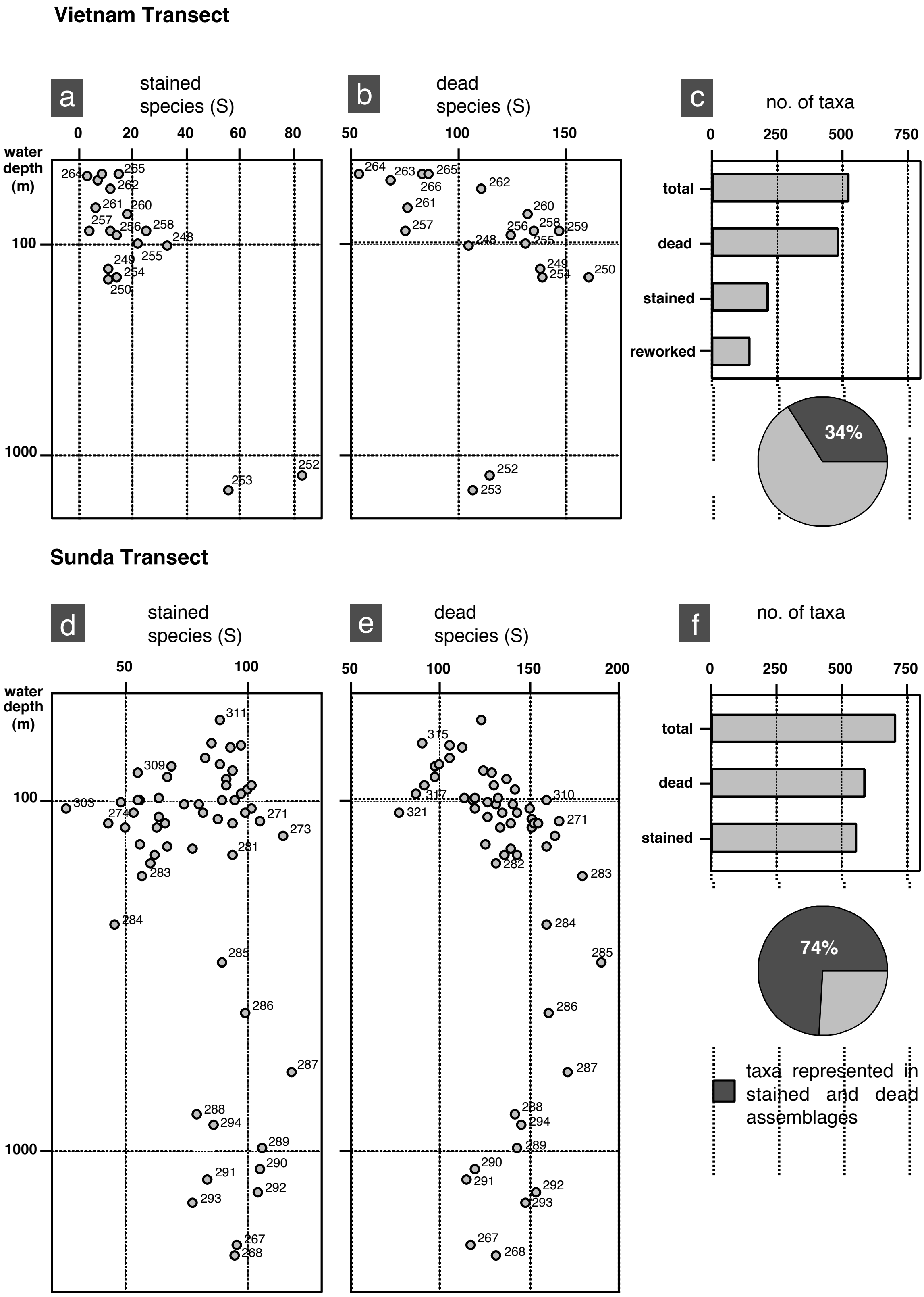


Figure 13. (**a-b** & **d-e**) Species richness (S) as a function of water depth. Depth (axis y) is presented in the logarithmic scale. (**c** & **f**) Cumulative histogram of recognised taxa and proportion of species occurring in both - stained and dead assemblages.

S u n d a   t r a n s e c t: Examination of the 'living' fauna shows strong dominance of Rotaliida on the shelf. They comprise the greatest proportions of 'living' individuals, ranging between 19 % and 42 %. The most shallow studied site is composed almost exclusively of Rotaliida (42 %), Miliolida (18 %) and Lituolida (18 %). The remaining orders contribute very little to the faunal composition (Fig. 12 a). This pattern prevails over the shelf area. Locally Astrorhizida occur in relatively low proportions. The shelf break zone is dominated by agglutinated foraminifera (80 %), with Astrorhizida making up almost 50 % of the total foraminiferal fauna. On the continental slope, there is an increase in percentages of Buliminida and Lituolida. Although not numerous (≤ 8 %), representatives of Trochamminida appear, while scarcely any are present in the shelf assemblages (0-1,5 %).

The 'dead' assemblages show a similar pattern to the 'living' ones, but are more uniformly distributed (Fig. 12 b). The proportions of various orders are balanced among the shelf assemblages. In the outer shelf zone, Miliolida make up to 24 %, then decrease towards the shelf edge to 14 %. The mean percentage of Rotaliida is 41 %. Only one third of the Lituolida (5,5 %) and scarcely any Astrorhizida (0,7 %) are preserved in the 'dead' assemblages. This can be attributed to the low fossilisation potential of certain arenaceous species with proteinaceous matrix. Textulariida which use calcite cement show, in contrast, a uniform distribution throughout the shelf (11-15 %). Below the shelf break, down to 800 m water depth, assemblages are dominated by Buliminida (≤ 23 %) and Lituolida (≤ 30 %). The proportion of Trochamminida gradually increases with water depth and reaches its maximum (5,7 %) in the lower bathyal zone. At greater depths assemblages consist of approximately 62-78 % of agglutinated foraminifera.

3.1.5 Species distribution patterns

V i e t n a m   t r a n s e c t: The final number of taxa occurring along the Vietnam transect totals 530 (Fig. 13 c). The relative abundances of individual species strongly vary along the transect. Approximately one third of the taxa is represented by 'living' and 'dead' individuals. Besides this, there are 'reworked' tests present in the residue. More than one quarter (139) of the species are also represented by 'reworked' individuals (Table 4 c) and six species are found to be 'reworked' only. More than 306 species have no 'living' representatives. That makes up to 58 % of all species in the Vietnam area. Thirty-seven species are represented exclusively by 'living' individuals (Table 7).

Table 7. Cummulative numbers of the benthic foraminiferal species in assemblages from the Vietnam and Sunda Shelves.

	Vietnam Shelf number of species			**Sunda Shelf** number of species		
	agglutinated	calcareous	total	agglutinated	calcareous	total
all species	178	352	530	270	479	749
dead	152	335	487	251	463	714
living	99	119	218	234	356	590
reworked	12	133	145			
represent by both:						
dead and living	73	108	181	215	340	555
occuring only at sites in this area						
	5	48	53	97	175	272

The mean number of taxa encountered per sample on the shelf is 120. The shelf assemblages are dominated by calcareous species and relict varieties of Miliolids and Rotaliids. The highest number of ‘reworked’ species occurs at site 18255. The ‘living’ species richness on the Vietnam Shelf is very low, with an average value between 3 and 33 species at one site (Table 4 a & Fig. 13 a). There is a well pronounced increase in ‘dead’ species richness from inner shelf waters to near the shelf edge (Table 4 b & Fig. 13 b). In the bathyal zone, the number of taxa varies from 86 taxa at 1277 m water depth to 56 taxa at 1479 m water depth. All common species in the bathyal zone are represented by ‘living’ and ‘dead’ individuals. The agglutinated species dominate the assemblages from the bathyal zone. The plot of the frequency of species occurrence along the Vietnam transect shows that 30 % of the species only occurs at one site, 43 % of species occurs at 5 or fewer sites and 27 % occurs at more than 5 localities (Fig. 14 a).

Sunda transect: Fifty-seven samples from the Sunda Shelf and its continental slope revealed 749 taxa (Fig. 13 f). Approximately three quarters of the taxa are represented by both ‘living’ and ‘dead’ individuals. Only 159 species (21 % of the total number of species) in the Sunda area have no ‘living’ representatives. Of the 590 ‘living’ species encountered, 35 species are represented exclusively by ‘living’ individuals (Table 7).

In the inner shelf waters (< 100 m), the mean number of taxa per sample is 147, while on the outer shelf (100-200 m) it is 169. An average number of taxa on the continental slope (200 m - 1000 m) is 186. The number of taxa decreases to approximately 150 at depths greater than 1800 m. The ‘living’ species richness is very low at the shelf edge and is highest in the upper bathyal zone (Table 5 & Fig. 13 d).

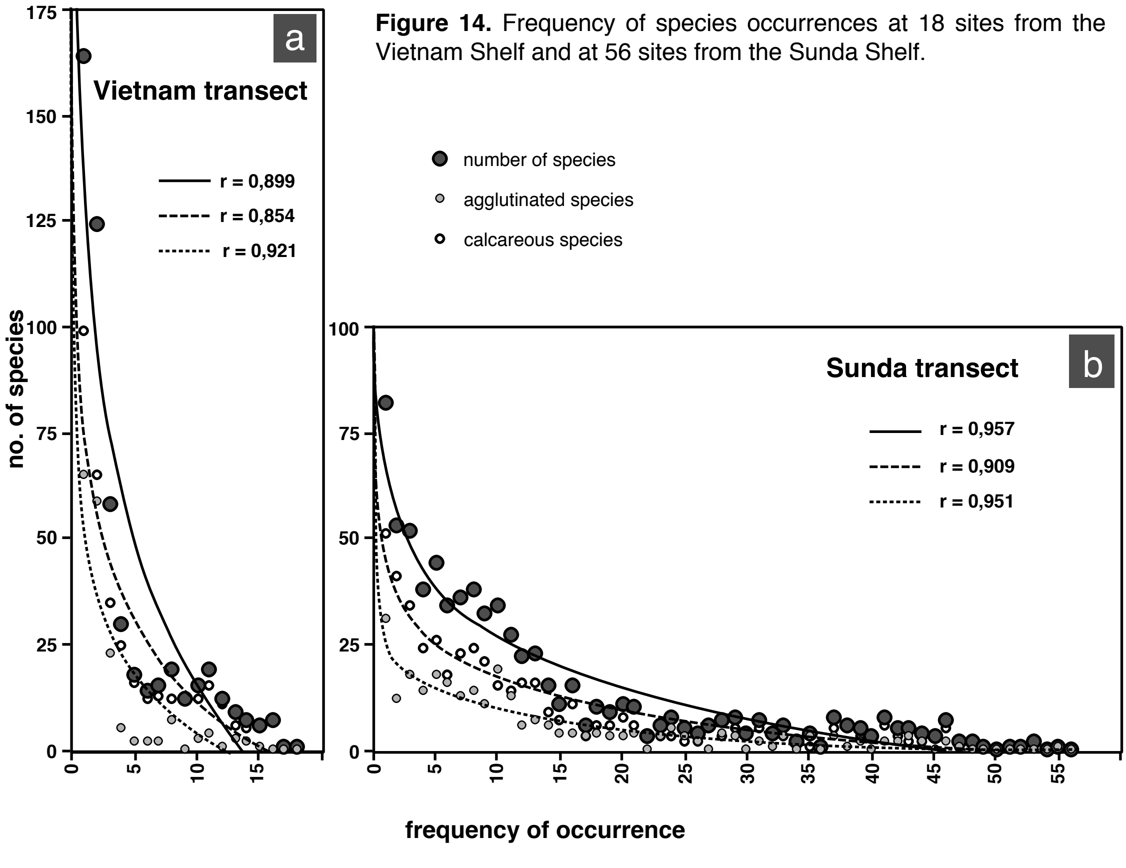


Figure 14. Frequency of species occurrences at 18 sites from the Vietnam Shelf and at 56 sites from the Sunda Shelf.

This contrasts with the occurrences of the 'dead' species. The increase in 'dead' species richness with increasing water depth is observed from the shelf towards the mid continental slope (Table 6 & Fig. 13 e). The highest number of 190 'dead' species occurs at a water depth of 291 m, while the highest number of 'living' species occurs at a water depth of 595 m. Along the Sunda transect the faunal composition is more uniform than along the Vietnam transect. The plot of the frequency of species occurrence shows that 11 % of the species occurs at only one site, 62 % of species occurs at 15 or fewer localities and 27 % occurs at more than 15 sites (Fig. 14 b).

The occurrence of 262 taxa is limited to the shelf environment, with 30 taxa only occurring at a water depth shallower than 100 m. The peak of species diversity occurs on the outer shelf and at the shelf break (Fig. 15). Approximately 600 taxa are found in the range between 100 and 226 m water depth. The occurrences of only 172 taxa are limited to the bathyal zone. Most of the species have a clearly defined upper boundary of occurrence and a diffused lower boundary. More than 90 species occur in total through the entire range of water depths from 50 m to 2000 m (*e.g.* *Anomalinoides globulosus*, *Cibicidoides* ex gr. *pachyderma*, *Neouvigerina ampullacea*). The abundances and observed depth ranges of the most common or bathymetrically diagnostic taxa are presented in the Appendices B.1 & B.2.

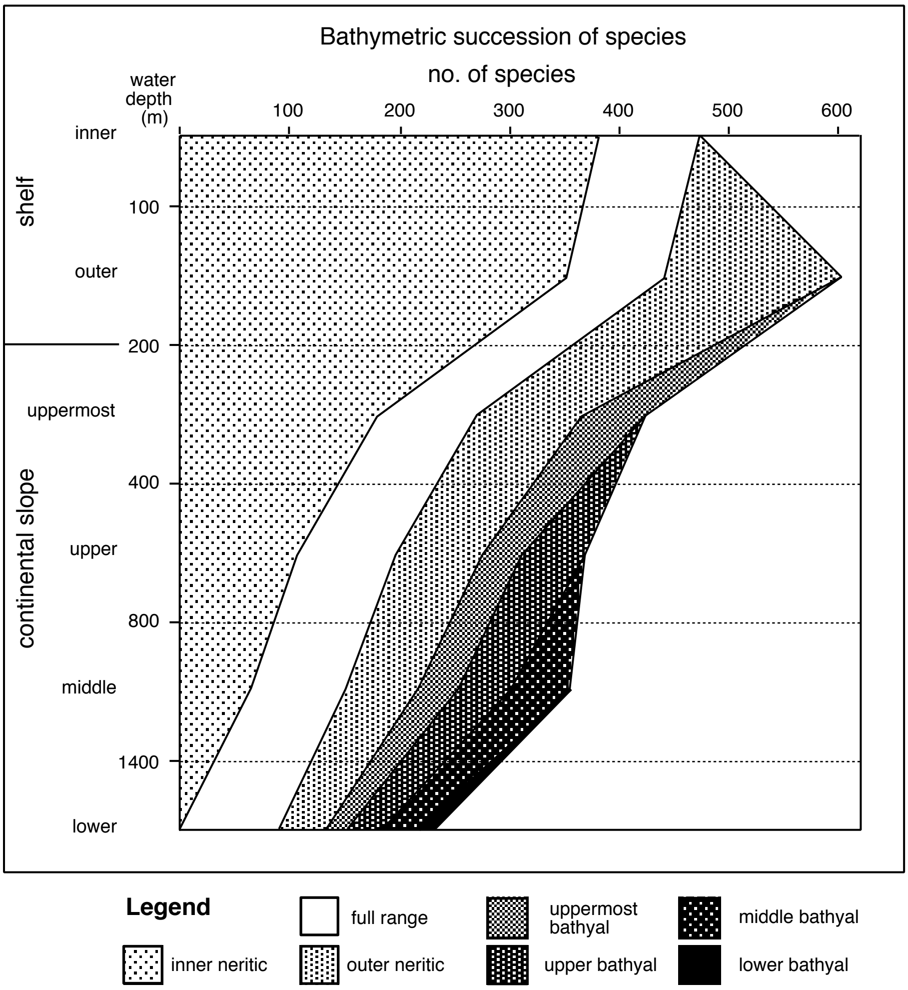


Figure 15. The bathymetric succession of benthic foraminiferal species (arranged in order of upper limit of the species occurrences).

3.1.6 Species diversity

Diversity values of Fisher's Alpha, Shannon-Wiener H(S) and Evenness E for each of the sites studied are plotted against water depth (Figs 16-17) and are listed in Tables 4-6.

V i e t n a m   t r a n s e c t : The Fisher's α and Shannon-Wiener H(S) diversity values in the 'living' and 'dead' assemblages show a progression from lower values in the inner shelf zone to higher values towards the shelf edge (Fig. 16 a-d). The mean diversity values of the 'living' fauna in the inner shelf zone (< 100 m) are extremely low (α=7, H(S)=1,9) in comparison to the 'dead' ones (α=32, H(S)=3,6). In the outer shelf zone (100-200 m) the mean values increase for the 'living' (α=10, H(S)=2,3) and 'dead' (α=53, H(S)=4,3). The two 'living' assemblages from the bathyal zone have the highest diversity values (α> 30, H(S) > 3,3), but diversity values for the 'dead' assemblages are lower than those registered on the outer shelf (α=43, H(S)=4,1).
The lowest value (E=0,25) appears at site 18261 and the maximum value (E=1) appears at site 18264. Evenness is generally lower for the 'dead' assemblages (Fig. 16 f). The lowest evenness values for the 'dead' assemblages (between 0,24 to 0,35), indicating the greatest dominance of one species, are recorded in waters shallower than 60 m.

S u n d a   t r a n s e c t : The diversity index values are highly variable on the shelf, but neighbouring samples reveal similar values. In the shelf area, the mean values of Fisher's α and Shannon-Wiener H(S) for the 'living' assemblages (α=35, H(S)=3,6) are lower than for the 'dead' (H(S)=4,1), (Fig. 17 a-d). The Fisher's α values for the 'dead' assemblages increase slightly from shallow (α=41) to deeper water (α=49). The 'dead' assemblages generally show stronger dominance (E=0,45) than the 'living' fauna (E=0,59), (Fig. 17 e-f). In the bathyal zone the values of α and H(S) increase in the 'living' (α=44, H(S)=3,96) and 'dead' (α=55, H(S)=4,25) assemblages. The maximum α=54 for the 'living' fauna occurs at 1124 m water depth, while for the 'dead' the maximum value (α=72) occurs at 291 m water depth. The H(S) peak for the 'living' fauna occurs between 400-600 m water depth, below this depth the values decrease slightly. The 'dead' assemblages show two zones of extremely high H(S) values. These are a local zone including few closely spaced samples on the shelf and a second zone at a water depth of 1309 m. In two lower bathyal assemblages the diversity indices slightly decrease. The dominance of species is more pronounced in the 'dead' assemblages. The highest value of E=0,41 appear at a water depth of 291 m; surprisingly an extremely high value of Fisher's α is observed at the same site. The indices for 'living' fauna from this site do not show any abnormally high values. This may indicate the down-slope transport of empty tests.

3.1.7 Proportion of living individuals and density of empty tests

On the Vietnam Shelf the ratio between 'living' and 'dead' (L/D) foraminifera shows an irregular pattern over the entire shelf area. On the shelf, the highest L/D ratio of 8,2 occurs at site 18248. The increase in the L/D ratio correlates well with increasing water depth (Fig. 18 a). In the bathyal zone the ratio ranges from 32 to 33. This is significantly lower than the ratio from similar water depths on the continental slope in the Sunda area. On the Sunda Shelf the L/D ratio is generally low, less than 25. On the continental slope down to a water depth of 1000 m, the L/D ratio ranges between 20 and 30.

Vietnam Transect

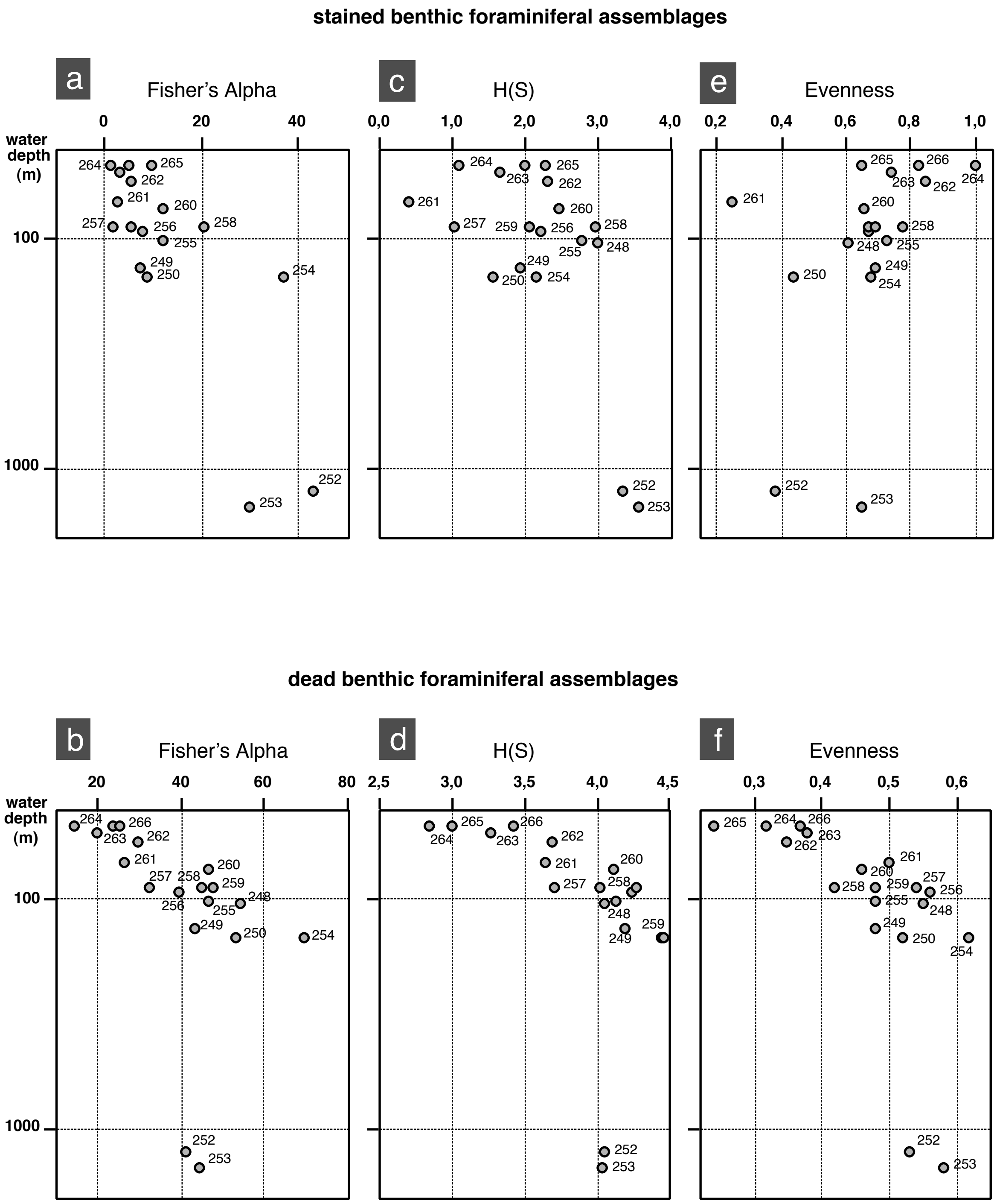


Figure 16. Diversity measures of benthic foraminiferal assemblages on the Vietnam Shelf: (**a** - **b**) Fisher's Alpha Index, (**c** - **d**) Shannon-Wiener Index H(S), (**e** - **f**) Evenness. Depth (axis y) is presented in the logarithmic scale.

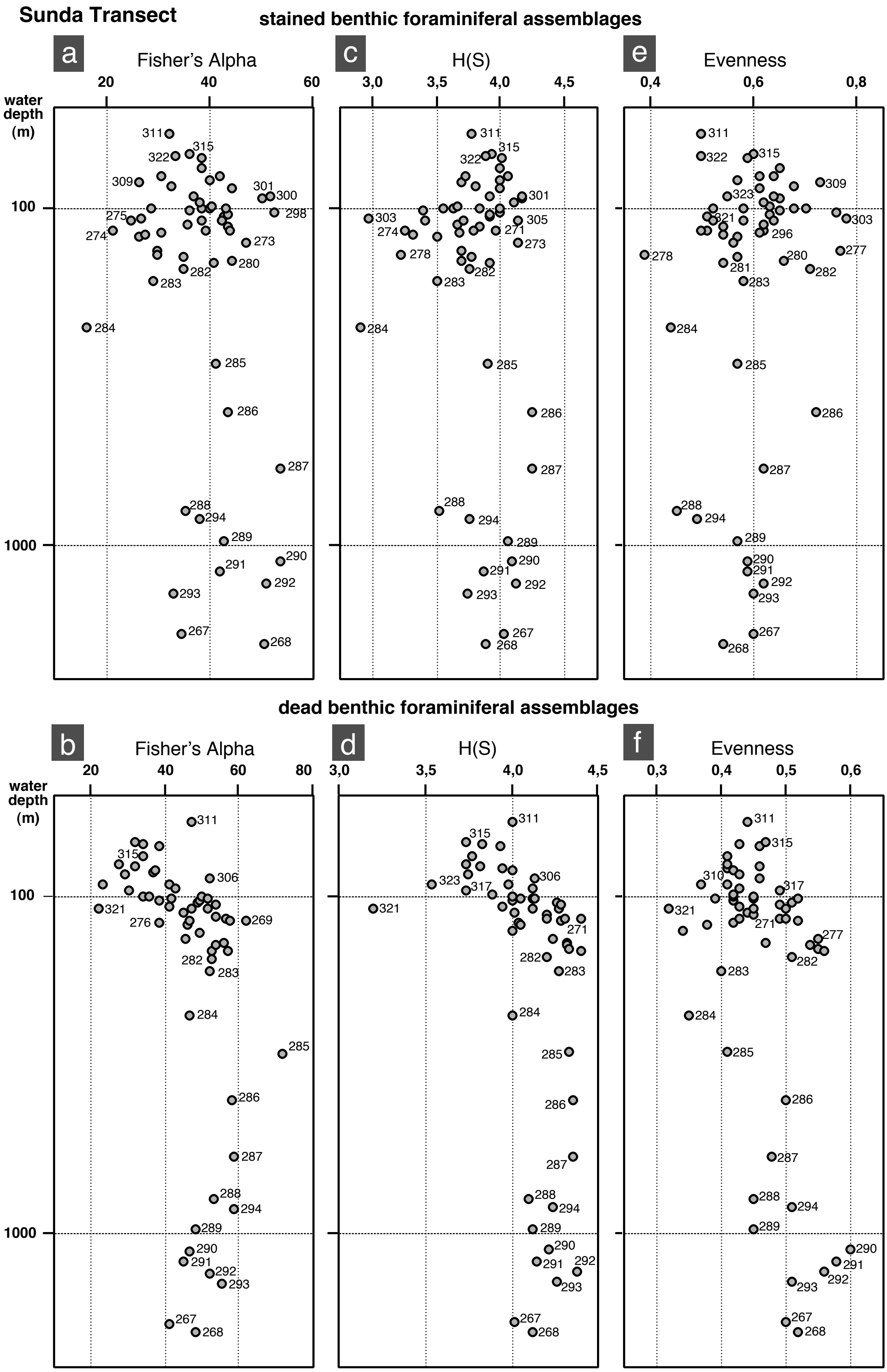


Figure 17. Diversity measures of benthic foraminiferal assemblages on the Sunda Shelf: (**a** - **b**) Fisher's Alpha Index, (**c** - **d**) Shannon-Wiener Index H(S), (**e** - **f**) Evenness. Depth (axis y) is presented in the logarithmic scale.

At greater depths, all values are above 25. Only at a water depth of 1404 m are the numbers of 'living' individuals equal to the numbers of 'dead' ones, although the diversity of 'living' fauna is much lower. The L/D ratio increases with increasing water depth along the continental slope (Fig. 18 b).

3.1.8 Agglutinated to calcareous benthic foraminifera ratio

The ratio between agglutinated and calcareous foraminiferal tests (A/C) in both study areas correlates well with increasing water depth (Fig. 18 c-d). The proportion of 'dead' agglutinated tests is very low on the shelf. It increases slightly in the bathyal zone, due to dissolution of calcareous tests. Generally the A/C ratio is much higher for the 'living' fauna, reflecting the lower fossilisation potential of the agglutinated tests in this higher energy, shelf environment.

3.1.9 Plankton to benthos ratio

The ratio between planktonic and benthic (P/B) foraminifera along the Sunda transect correlates well with water depth. It shows a general trend of increasing plankton proportions in the total faunal abundances with increasing water depth (Fig. 18 e-f). On the inner shelf, the percentages of planktonic tests are very high. They make up almost 50 % of the total foraminiferal abundance, except at the most proximal sites of the transect where they form between 30 % and 33 % (Fig. 19). On the outer shelf, the planktonic tests are more abundant than the benthic tests. The P/B ratio ranges between 2 and 7. At the shelf break the abundances of planktonic foraminifera are almost equal to those of benthic foraminifera. On the continental slope, the amount of plankton gradually increases to a ratio of 25,2 at 1852 m water depth. At the deepest sampled site (1974 m), the abundance of planktonic tests declines. The highest abundance of planktonic foraminifera and the highest P/B ratio of 34,7 occurs at site 18294, located at the under-water high.

3.1.10 Distribution of other meiofauna

Considerable agreement between distribution patterns of the foraminifera and the other meiofauna is observed along the Sunda Shelf transect (Fig. 19). The tests of small (< 2 cm) gastropods, bivalves, pteropods, ostracods and bryozoans contribute significantly to the total meiofaunal abundances (≤ 30 %) on the shelf. Furthermore, large amounts of gastropods, bivalves, and bryozoans shells occur on the uppermost part of the continental slope, probably due to down-slope transport. They disappear or their abundances decline at greater water depths, whereas the radiolarians show a gradual increase in abundance.

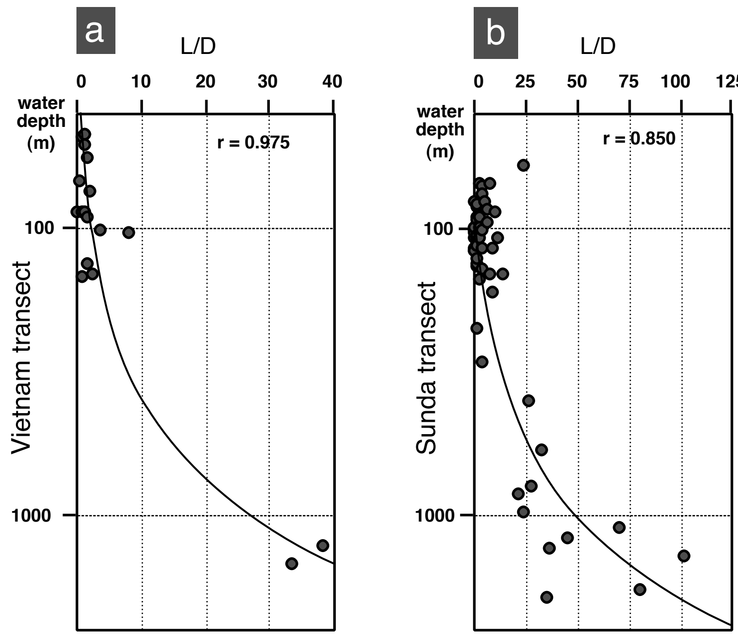
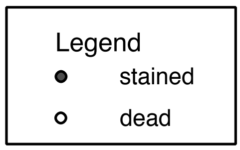
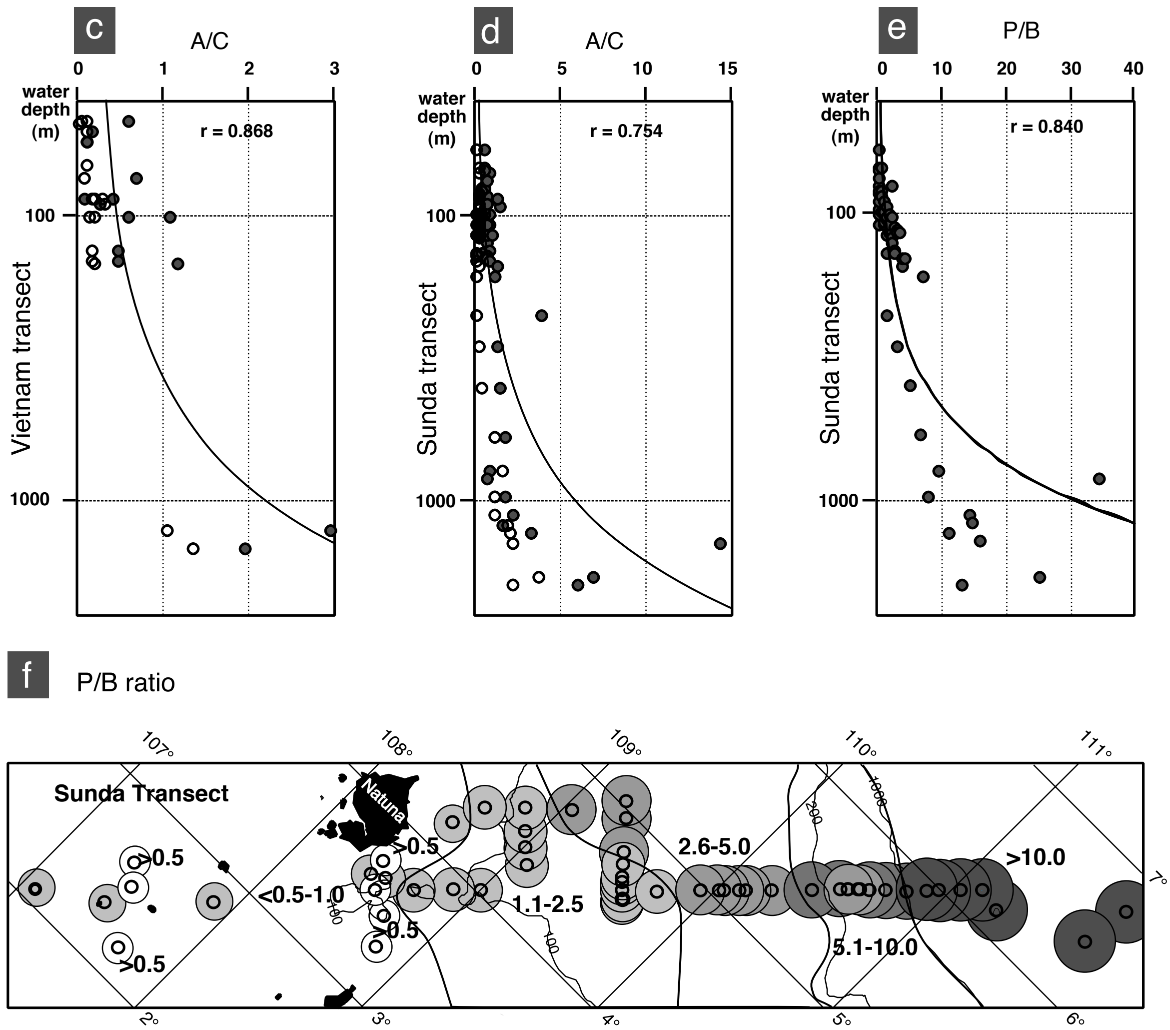


Figure 18. (**a** - **b**) The benthic foraminiferal living to dead (L/D) ratio, (**c** - **d**) the agglutinated to calcareous (A/C) ratio, (**e**) plankton to benthos (P/B) ratio. Water depth (axis y) is presented in the logarithmic scale. (**f**) Distribution map of P/B ratio along the Sunda Transect.





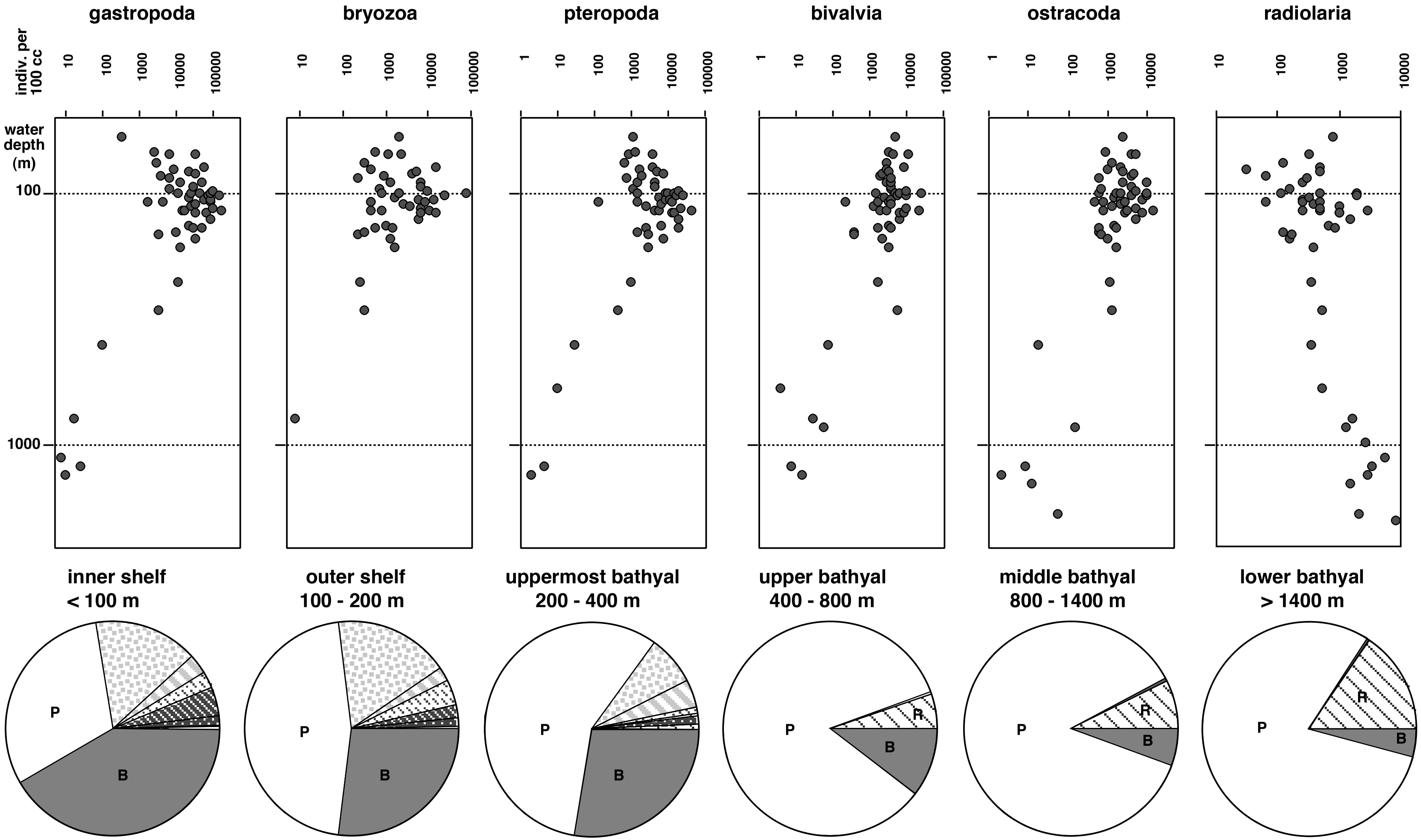


Figure 19. The bathymetric distribution and proportions of foraminifera and other meiofauna along Sunda Transect.

benthos (B) gastropoda pteropoda ostracoda
plankton (P) bivalvia bryozoa radiolaria (R)

3.2 ECOLOGICAL DISTRIBUTION PATTERNS

3.2.1 Results of Correspondence Factor Analysis

AFC 1: The first matrix used for the Correspondence Analysis (AFC 1) includes all sites from both study areas. Only the loadings of the variable elements for the first (F1) and second (F2) factors were significant. The first F1 axis has the largest eigenvalue λ_1 equal to 0.69 of the total dispersion of the species scores on the ordination axis and the F2 axis has the eigenvalue λ_2 equal to 0.28. These eigenvalues denote a good separation of the sites and species along the axes, therefore display a relevant information and could be used for an environmental interpretation. Other factors are influenced by loadings of rare species and result in diffused meaningless patterns on the plots which are not taken into consideration. The F1 axis represents the direction of greatest variation in species composition. The sites plotted against the axes of F1 and F2 result in the identification of the four major groups (Fig. 20 a). The F1 axis clearly reflects the bathymetry of the studied area. As shown in the regression plot of the F1 loadings against water depth, with an exponential correlation coefficient of r =0,962, a primary division occurs according to increasing water depth (Fig. 20 b), which can be associated to the organic carbon flux. All 60 sites from water depths shallower than 200 m are grouped on the negative side of the F1 axis, while 15 sites from the continental slope have positive F1 values. The F2 axis distinguishes the samples from the same geographic positions. It reflects dissimilarity in the faunal composition between two regions studied, particularly in the shelf area. All shallow sites of the Sunda transect are grouped on the negative side of the F2 axis, while the shallow sites of the Vietnam transect are scattered on the positive side of the axis. The sites from the uppermost (200-400 m) and upper (400-800 m) continental slope, except site 18284 characterised by mixed fauna, are placed on the negative side of the F2 axis. The deeper sites from the Sunda and Vietnam areas are grouped on the positive side of the F2 axis, however the Sunda sites cluster together closer to the origin of the axis.

AFC 2: A further analysis (AFC 2) was performed exclusively on the shallow sites located at water depths between 47 m and 226 m. Generally, loadings of the first three factors produce an interpretable pattern. The first F1 axis has the eigenvalue λ_1 equal to 0.29 of the total dispersion of the sites and species scores on the ordination axis, the F2 axis has the eigenvalue λ_2 equal to 0.23 and F3 axis has the eigenvalue λ_3 equal to 0.16.

Two main clusters of sites can be distinguished on the base of the F1 loadings (Fig. 21 a). The F1 axis apparently reflects dissimilarity in the environmental conditions of the two shelf areas. This factor, amongst others, could be related to the nutrient supply. Besides, the loadings of the F1 correlate roughly to increasing water depth (Fig. 21 b). All sites from the Sunda transect are placed on the negative side of the F1 axis, while the sites from the Vietnam transect are all on the positive side. The F2 loadings are influenced by similarity of the faunal composition and diversity of the assemblages. Positive values of F2 generally represent higher diversity. In the AFC 2 analysis the 18284 site, located below the shelf edge, at a water depth of 226 m, shows significant dissimilarity to the shelf assemblages. Loadings of the F3 values are influenced by an offshore-shelfward trend in the species composition (Fig. 21 c). It allows one to distinguish the assemblages on the shelf in both study areas. The negative loadings of F3 generally indicate the inner neritic environment and positive ones, the outer neritic environment.

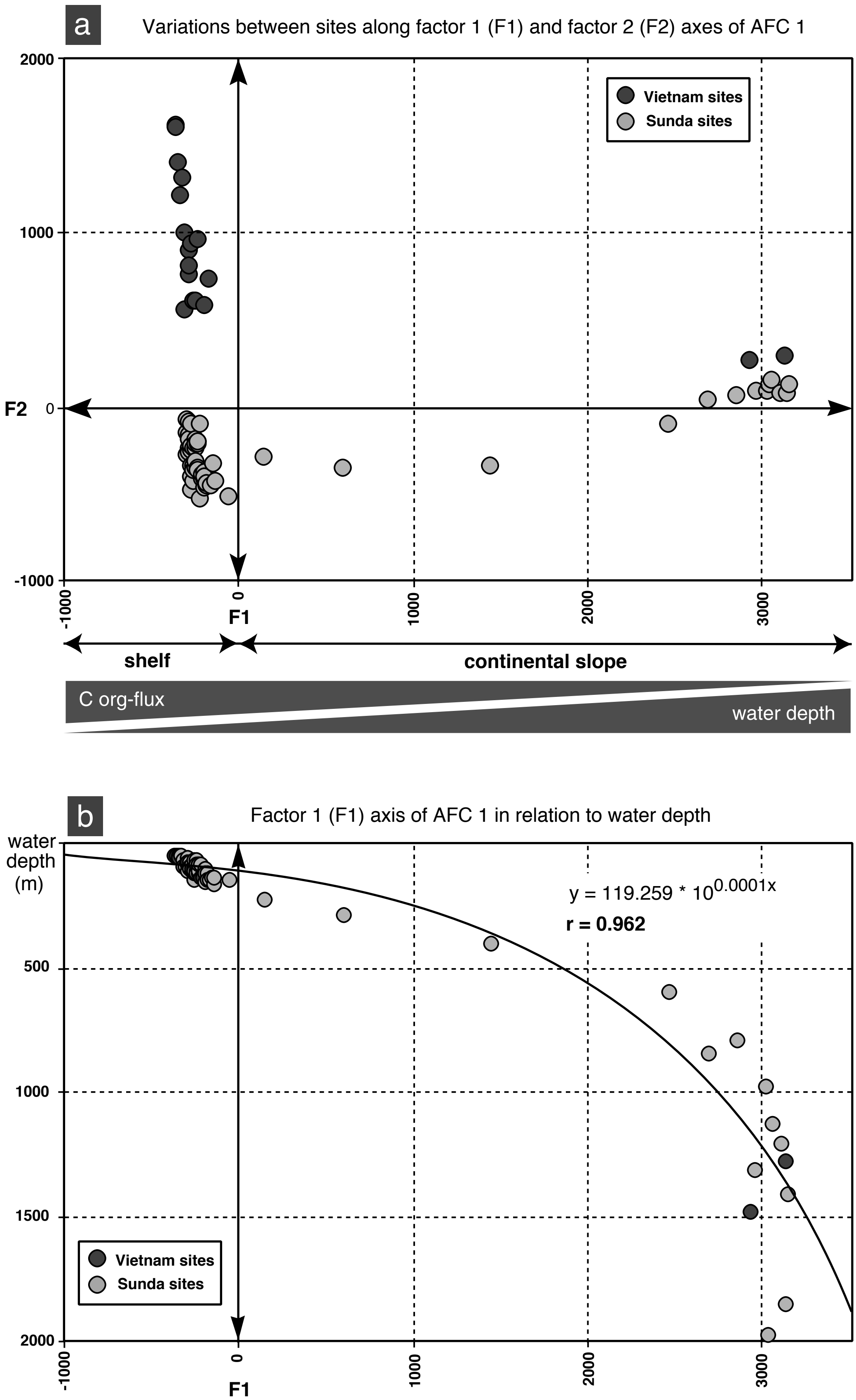


Figure 20. (a) Distribution of 75 sites along the factor 1 (F1) and factor 2 (F2) axes of Correspondence Analyses (AFC 1). **(b)** Sites loadings (F1) in relation to water depth.

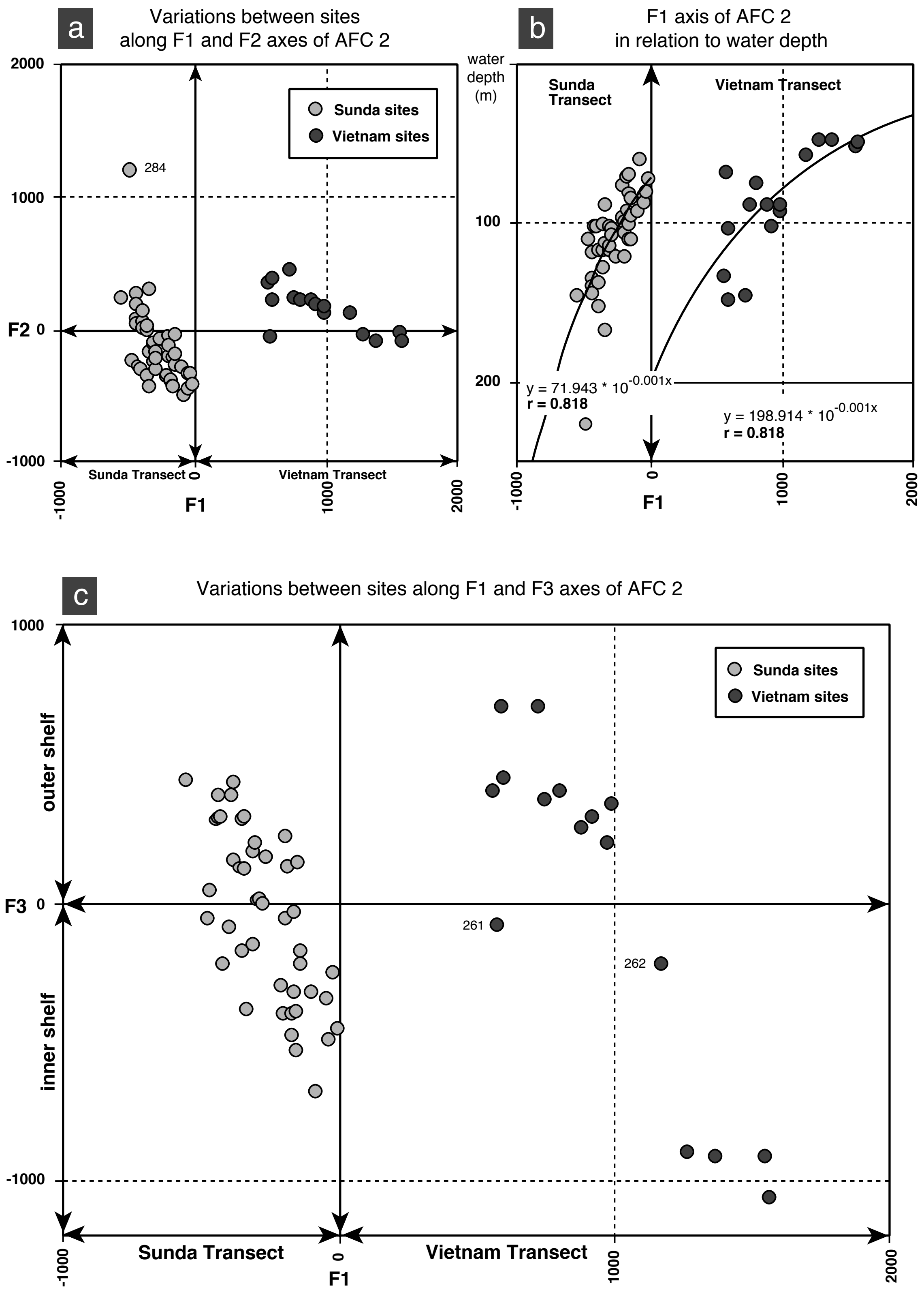


Figure 21. (a) Distribution of sites from the shelf areas along the factor 1 and factor 2 axes of Correspondence Analysis (AFC 2). **(b)** Factor 1 values in relation to water depth. **(c)** Factor axes 1 and 3 showing the biogeographic and depth related distribution pattern of benthic foraminiferal assemblages.

Two sites, 18261 and 18262, placed on the negative side of the F3 axis, show a closer relationship to the inner shelf assemblages, but their position along the F3 axis results from higher diversity values in those assemblages.

AFC 3: In the AFC 3 matrix the supplementary parameters of the sediment type are included (Fig. 22). The F1 axis has the eigenvalue λ_1 equal to 0.72 and it clearly reflects the relationship between the faunal composition and the sediment type of the habitat. The sites with the greatest proportion of fine grained sediments (mud and silt) are grouped on the negative side of the F1 axis, while the sites with a high proportion of coarse sediments are grouped on the positive side of the axis. The F2 ordination axis explains a smaller part of the total variation (λ_2=0.25) and roughly respond to the geographical distribution of the species. The relationship between the sediment type and benthic foraminiferal distribution patterns seems to play an important role especially on the Vietnam Shelf.

3.2.2 Benthic foraminiferal associations

The analyses performed on the 528 species, clearly show the similarities between taxa and allow us to recognise the major benthic foraminiferal associations. Species plotted close to each other show similar distribution patterns, and thus are related to the same environmental conditions. Six benthic foraminiferal associations are distinguished by the Correspondence Factor Analysis on the basis of the taxa contribution to the factor loadings in the Sunda area. Two associations are related to the neritic zone and four correspond with the environment of the bathyal zone. In the Vietnam area, two associations related to the neritic zone can be distinguished and one, not precisely defined, from the bathyal zone (Fig. 23). Each association consists of two or more samples, that are grouped together, because of the similarity in their fauna and particularly, their dominant taxa. Although, all species are considered in the interpretation, only the taxa that significantly contribute to the factor values are plotted. The distribution patterns of dominant species are presented in alphabetical order in Appendix B.3. The absolute and relative abundances in relation to water depth are plotted for each of the species for both areas studied.

Sunda Shelf foraminiferal associations

Heterolepa aff. *dutemplei* - *Asterorotalia gaimardii* association

Inner Neritic Zone (< 100 m)
Sites: 18298-18304, 18306-18323
Diversity of assemblages:
'living' – α = 26-52 (mean 39), H(S) = 2,97-4,16 (mean 3,84), E = 0,5-0,78 (mean 0,62)
'dead' – α = 22-52 (mean 38), H(S) = 3,20-4,26 (mean 3,91), E = 0,32-0,52 (mean 0,43)

This association is composed of twenty five sites and includes 314 species. Each site contains on an average, 116 species. The water depth ranges between 60-109 m. This association occupies the proximal area of the Sunda transect, generally above the 100 m isobath, however locally the depth reaches 109 m. Only 24 species display a frequency of more than 1 % of the total foraminiferal fauna. Most of the abundant species in this association belong to Rotaliida and Miliolida.

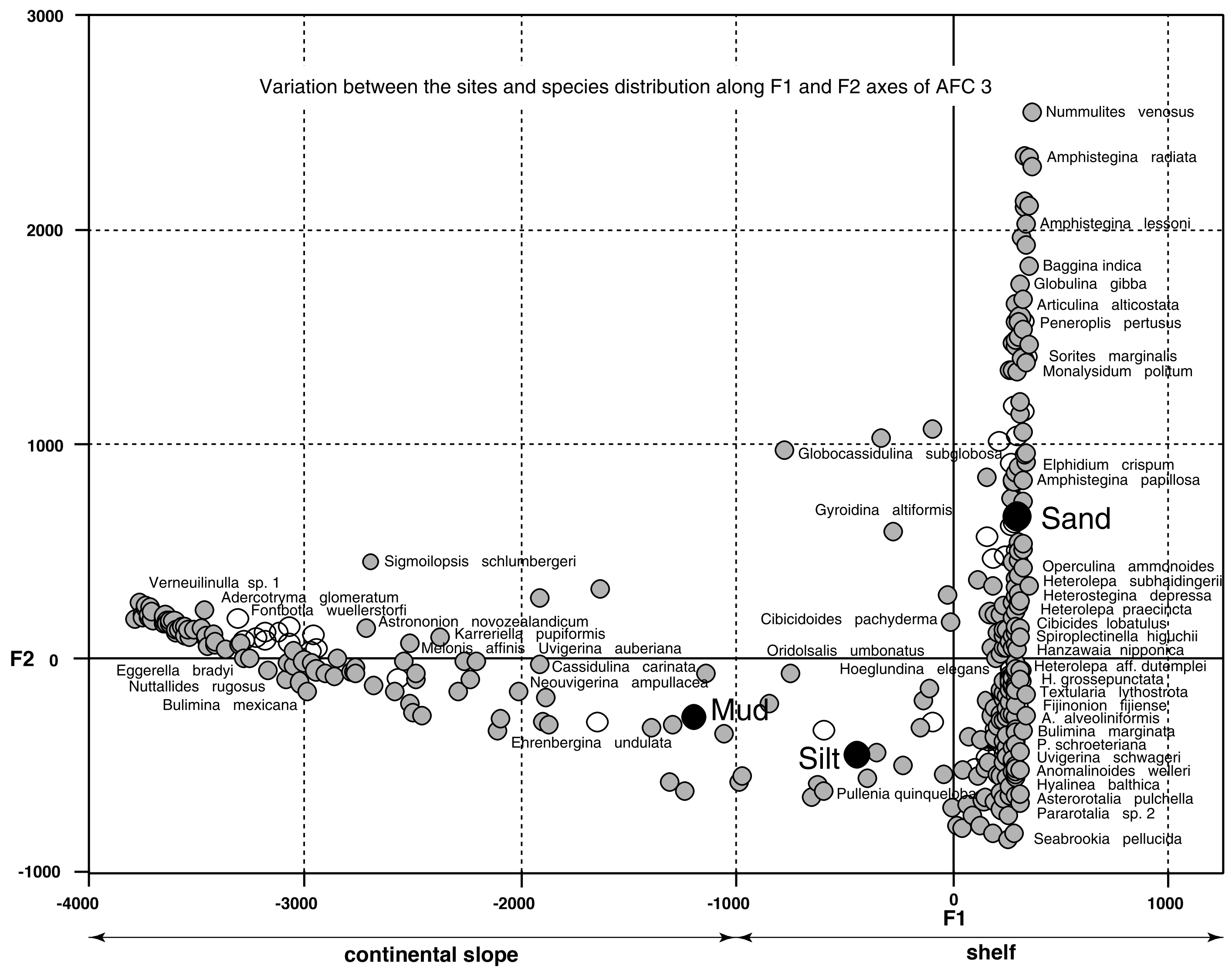


Figure 22. Correspondence Analysis (AFC 3) plot showing the variation between sites and species in relation to the sediment types introduced as passive parameters:

● Distribution of species along the factor 1 & factor 2 axes of AFC3

○ Distribution of 75 sites along the factor 1 & factor 2 axes of AFC3

Representatives of Textulariida species are also common, however individual species are only found in insignificant proportions. The 'dead' assemblages are dominated by *Heterolepa* aff. *dutemplei* (mean relative abundance 8,9 %). The sub-dominant taxa are: *Ammomassilina alveoliniformis* (5,2 %), *Textularia* cf. *lythostrota* (4,2 %), *Quinqueloculina seminulum* (4,2 %), *Asterorotalia gaimardii* (3,4 %), *Elphidium advenum* (2,9 %), *Islandiella japonica* (2,9 %), *Hanzawaia grossepunctata* (2,6 %), *Cibicidoides* ex gr. *pachyderma* (2,6 %) and *Ammonia beccarii* (2,5 %). The occurrence of some species is limited to the inner shelf environment, for example *Discorbinella* sp. 1, *Discorbia candeiana*, *Bigenerina* sp. 1. Other species although less significant, display peaks in their abundances at single locations, for example *Russella spinulosa*, *Cancris auriculus*, *Fijinonion fijiense*, *Helenina anderseni* and *Paracibicides endomica*.

***Bulimina marginata* - *Neouvigerina proboscidea* association**

Outer Neritic Zone (100-200 m)
Sites: 18269-18283, 18295-18297, 18305
Diversity of assemblages:
'living' – α = 21-47 (mean 35), H(S) = 3,23-4,13 (mean 3,69), E = 0,39-0,77 (mean 0,58)
'dead' – α = 38-62 (mean 51), H(S) = 4-4,4 (mean 4,23), E = 0,34-0,56 (mean 0,47)

This association is distributed on the outer shelf with water depths between 106 m and 166 m. It clusters samples from nineteen sites and includes approximately 421 species. The foraminiferal assemblages constituting this association display the highest diversity calculated in this study. The 23 species occur in the abundances higher than 1 % of the total foraminiferal fauna that belong to this association. The faunal composition is similar to that of the inner shelf area with a dominance of *Heterolepa* aff. *dutemplei*, *Ammomassilina alveoliniformis* and *Asterorotalia gaimardii* in proportions of 6 %, 4,5 % and 3,1 % respectively. An increase in the 'dead' assemblage abundance and standing stock is observed for particular species such as *Bulimina marginata* (3,5 %) and *Neouvigerina proboscidea* (3 %). Other significant species of this association are *Facetocochlea pulchra* (2,8 %) *Textularia bocki* (2,3 %), *Hanzawaia grossepunctata* (2,3 %), *Quinqueloculina seminulum* (2,3 %), *Ammonia beccarii* (2,1 %) and *Textularia* cf. *lythostrota* (2 %).
Some species of Buliminida occur in this association in their greatest abundances, *e.g. Bolivina glutinata*, *Bolivina spathulata*, *Uvigerina schwageri* and *Saidovina amygdalaeformis*. Rotaliida are represented by species such as *Poroepistominella decoratiformis*, *Discorbinella bertheloti* and *Hanzawaia nipponica*. *Hoeglundina elegans* is present in all distinguished associations, but reaches its peak of standing stock values in the outer neritic zone. The agglutinated foraminifera are represented in significant proportions by *Spirotextularia floridana*, *Spiroplectinella higuchii*, *Spiroplectinella pseudocarinata* and *Siphotextularia mestayerae*.

***Siphotextularia foliosa* - *Bulimina mexicana* association**

Uppermost Bathyal Zone (200-400 m)
Sites: 18284-18286
Diversity of assemblages:
'living' – α = 16-44 (mean 34), H(S) = 2,91-4,24 (mean 3,68), E = 0,44-0,72 (mean 0,57)
'dead' – α = 47-72 (mean 59), H(S) = 4,01-4,36 (mean 4,24), E = 0,35-0,5 (mean 0,42)

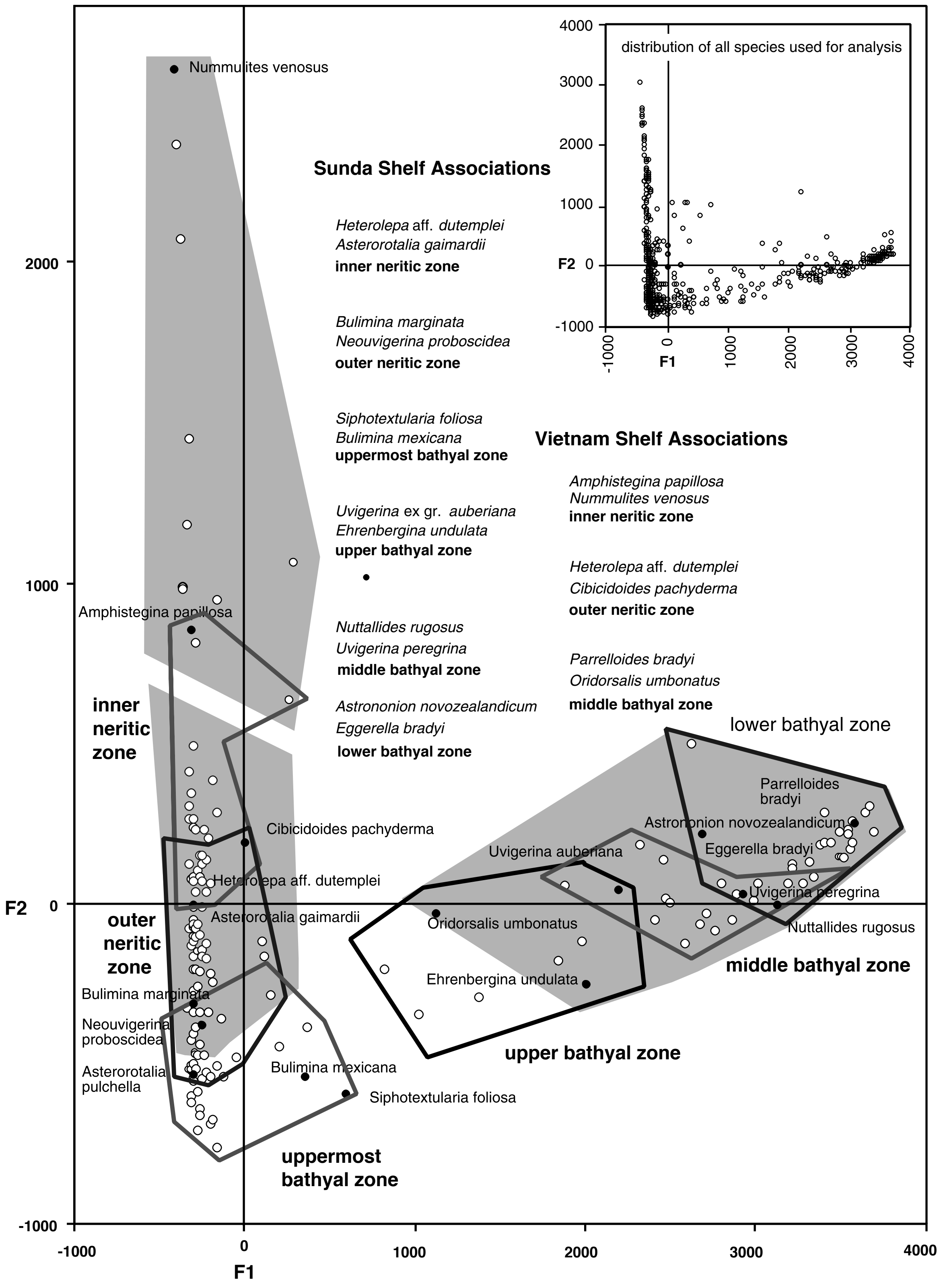


Figure 23. Correspondence Analysis (AFC 1) plot showing the variation within the species distribution. The bathymetrical succession of the benthic foraminiferal associations recognised on the basis of F1 and F2 loadings.

This association occurs on the uppermost continental slope at depths ranging from 226 to 404 m. Only three sites comprising 263 species belong to this association. Its upper boundary is based on the appearance of deep-water species such as *Hyalinea balthica*, *Pullenia bulloides* and *Melonis affinis*. However, the faunas from shallow and deeper waters are mixed within this zone. The assemblages are generally dominated by Buliminida, Lagenida and Rotaliida. Twenty three species occur in relative abundances higher than 1 %. *Asterorotalia pulchella* with a mean relative abundance of empty tests of 4,2 % dominates the assemblages, however, the low standing stock values suggest transportation from shallower waters. The sub-dominant species are *Pararotalia* sp. 1 (3,8 %), *Bulimina marginata* (2,8 %) and *Uvigerina* ex gr. *auberiana* (2,7 %). The other four significant species such as *Siphotextularia foliosa* (2,4 %), *Bulimina mexicana* (2,1 %), *Siphogenerina striatula* (2 %) and *Bolivina subaenariensis* var. *mexicana* (1,5 %) occur almost exclusively or display their greatest abundances in the uppermost bathyal zone.

***Uvigerina* ex gr. *auberiana* - *Ehrenbergina undulata* association**

Upper Bathyal Zone (400-800 m)
Sites: 18287, 18288, 18294
Diversity of assemblages:
'living' – α = 35-54 (mean 42), H(S) = 3,52-4,25 (mean 3,84), E = 0,45-0,62 (mean 0,52)
'dead' – α = 53-59 (mean 57), H(S) = 4,1-4,36 (mean 4,23), E = 0,45-0,51 (mean 0,48)

The three sites located on the upper continental slope, from depths between 482 m and 790 m, contain 206 species. This association is characterised by high proportions of Buliminida, Lituolida and Trochamminida. Many shelf species have their lower limit of occurrence within this zone. This association is strongly dominated by *Uvigerina* ex gr. *auberiana* (mean relative abundance 12,4 %). Sub-dominant species are *Bolivina robusta* (4,8 %), *Lagenammina difflugiformis* (4 %), *Ehrenbergina undulata* (3,9 %), *Eggerella bradyi* (3,3 %) and *Paratrochammina challengeri* (2,5 %). The representatives of *Reophax* occur in significant abundances in this association such as, *Reophax dentaliniformis* and *Reophax bilocularis*. The deep water agglutinated genera first seen in this association are *Hormosina*, *Hormosinella*, *Ammobaculites*, *Reophanus* and *Recurvoides*. The first occurrences of some important calcareous species are also observed, *e.g. Bulimina aculeata*, *Bulimina affinis*, *Fontbotia wuellerstorfi* and *Parrelloides bradyi*.

***Nuttallides rugosus* - *Uvigerina peregrina* association**

Middle Bathyal Zone (800-1400 m)
Sites: 18289-18293
Diversity of assemblages:
'living' – α = 33-54 (mean 45), H(S) = 3,74-4,12 (mean 3,97), E = 0,57-0,62 (mean 0,59)
'dead' – α = 45-55 (mean 50), H(S) = 4,12-4,38 (mean 4,23), E = 0,45-0,6 (mean 0,54)

This association comprises of five sites distributed on the middle continental slope at water depths ranging from 978 m to 1404 m. A total of 243 species are encountered, with dominance by agglutinated foraminifera. The representative species *Nuttallides rugosus* and *Uvigerina peregrina* have their greatest relative abundances in this zone. The mean values are 2,4 % and 1,9 % respectively. The co-dominant species are *Lagenammina difflugiformis* (6,3 %) and *Uvigerina* ex gr. *auberiana* (5 %). The other sub-dominant species are *Paratrochammina challengeri* (3,3 %),

Saccammina sphaerica (3,1 %), *Parrelloides bradyi* (2,2 %), *Eggerella bradyi* (2,2 %) and *Cassidulina carinata* (2,1 %).
The first occurrences of some significant agglutinated species such as *Nodosinum gaussicum*, *Trochammina nana* and *Adercotryma glomeratum* are recorded in this zone. Some calcareous species such as *Coronatoplanulina okinawaensis*, *Laticarinina pauperata* and various representatives of family Ellipsolagenidae also have their upper limit of occurrence in this zone. The lower boundary of this association is marked by the disappearance of tens of species.

***Astrononion novozealandicum* - *Eggerella bradyi* association**

Lower Bathyal Zone (> 1400 m)
Sites: 18267, 18268
Diversity of assemblages:
'living' – α = 35-51 (mean 43), H(S) = 3,89-4,03 (mean 3,96), E = 0,54-0,6 (mean 0,57)
'dead' – α = 41-48 (mean 45), H(S) = 4,02-4,12 (mean 4,07), E = 0,5-0,52 (mean 0,51)

Only two samples positioned in the most distal part of the Sunda transect represent the lower continental slope association, with water depths of 1852-1974 m. The benthic faunal composition is similar to that of the preceding zone, however, the diversity decreases. A total of 152 species is found to occur. Samples are strongly dominated by *Saccammina sphaerica* with the average relative abundance of 10,5 %. Following sub-dominant species characteristic of lower bathyal assemblages are *Astrononion novozealandicum* (5,5 %), *Eggerella bradyi* (4,4 %), *Cibicidoides pachyderma* (3,9 %), *Hormosinella guttifera* (3,2 %), *Glomospira gordialis* (3,2 %) and *Usbekistania charoides* (2,6 %). Other distinctively deep-water forms that occur in this association include *Oridorsalis umbonatus*, *Melonis affinis* and *Eratidus recurvus*. The assemblages appear to be entirely autochthonous, with no typical shallow-water forms present in the residue.

Vietnam Shelf foraminiferal associations

***Amphistegina papillosa* - *Nummulites venosus* association**

Inner Neritic Zone (< 60 m)
Sites: 18262-18266
Diversity of assemblages:
'living' – α = 2-10 (mean 5), H(S) = 1,1-2,32 (mean 1,87), E = 0,65-1 (mean 0,81)
'dead' – α = 14-30 (mean 23), H(S) = 2,85-3,69 (mean 3,25), E = 0,24-0,38 (mean 0,33)

The faunal composition of this association is mainly controlled by the depth of light penetration. This association is composed of five sites with water depths between 47 m and 56 m. The total number of encountered species is 162. The diversity is the lowest observed in this study. Most of the abundant species in this association belong to Rotaliida, Miliolida and Textulariida. Co-dominant are *Amphistegina papillosa*, *Operculina ammonoides* and *Amphistegina lessoni* with relatively high mean values of relative abundances: 10,9 %, 9,9 % and 9,5 % respectively. The sub-dominant species are *Amphistegina radiata* (6,7 %), *Amphicoryna papillosa* (2,3 %), *Heterolepa* aff. *dutemplei* (2,1 %) and *Quinqueloculina seminulum* (2 %). This association is characterised by the high abundances of symbiont-bearing benthic foraminifera such as *Nummulites*, *Operculina*, *Heterostegina*, *Peneroplis*, *Borelis*, *Dendritina* and *Sorites*.

***Heterolepa* aff. *dutemplei* - *Cibicidoides pachyderma* association**

Outer Neritic Zone (> 60 m)
Sites: 18248-18250, 18254-18261
Diversity of assemblages:
'living' – α = 2-20 (mean 9), H(S) = 0,4-3 (mean 2,06), E = 0,25-0,78 (mean 0,62)
'dead' – α = 26-70 (mean 46), H(S) = 3,64-4,46 (mean 4,12), E = 0,42-0,62 (mean 0,51)

This association is related to the outer shelf environment with water depths between 68 m and 148 m. It clusters samples of eleven sites and includes approximately 264 species. Only 14 species occur in abundances higher than 1 % of the total foraminiferal fauna in this association. The co-dominant species are *Heterolepa* aff. *dutemplei* (4,9 %) and *Cibicidoides pachyderma* (4,4 %). Other significant species are *Quinqueloculina seminulum* (2,9 %), *Bolivina glutinata* (2,3 %), *Ammonia beccarii* (2,1 %) and *Asterorotalia gaimardii* (2 %). Some species of *Heterolepa* and *Elphidium* occur in their highest abundances, *e.g.* *Heterolepa praecincta*, *Heterolepa subhaidingerii*, *Elphidium advenum*, *Elphidium crispum* and *Elphidium singaporense*. The representatives of Buliminida also appear in significant proportions, *e.g.* *Bolivina spathulata* and *B. subreticulata*, *Uvigerina schwageri* and *Saidovina amygdalaeformis*. The agglutinated foraminifera are represented by *Spiroplectinella higuchii*, *Spiroplectinella pseudocarinata*, *Gaudryina robusta* and *Bigenerina nodosaria*.

***Parrelloides bradyi* - *Oridorsalis umbonatus* association**

Middle / Lower Bathyal Zone (> 1200 m)
Sites: 18252-18253
Diversity of assemblages:
'living' – α = 30-43 (mean 36), H(S) = 3,35-3,57 (mean 3,46), E = 0,38-0,65 (mean 0,51)
'dead' – α = 41-44 (mean 43), H(S) = 4,04-4,05 (mean 4,04), E = 0,53-0,58 (mean 0,56)

This association comprise of only two sites located on the continental slope at depths of 1277 m and 1479 m. The total number of species is 162. The co-dominant species are *Lagenammina difflugiformis* (4,7 %) and *Parrelloides bradyi* (4,6 %). The other significant taxa are *Uvigerina* ex gr. *auberiana* (3,9 %), *Usbekistania charoides* (3,6 %), *Oridorsalis umbonatus* (3,5 %), *Melonis affinis* (3,2 %), *Saccammina sphaerica* (3 %), *Eggerella bradyi* (2,8 %), *Astrononion novozealandicum* (2,8 %), *Cassidulina carinata* (2,8 %) and *Paratrochammina challengeri* (2,8 %). The faunal composition of this association is similar to the one observed on the middle continental slope along the Sunda transect, but with generally higher proportions of distinctively deep-water forms.

4. DISCUSSION

The biogeographic distribution patterns of the benthic foraminiferal assemblages observed on the Vietnam and Sunda Shelves reflect the faunal response to different environmental conditions. A variety of environmental and sedimentological parameters, which may control foraminiferal distribution (*e.g.* light penetration, food supply, salinity, temperature, dissolved oxygen, relative solubility of carbonates, currents or substrate) are proposed to explain the distribution patterns of shallow-water benthic foraminifera (Murray, 1973, 1991; Loubere & Fariduddin, 1999). All these parameters are potentially limiting factors for benthic foraminifera, however, only few reach a critical limit for an individual species (Loubere & Fariduddin, 1999). The importance of individual limiting factors also varies with water depth. While light penetration (limiting autotrophic symbionts), wave and current activity and resulting substrate properties are main factors controlling benthic foraminifera distribution on the shelf. The benthic foraminiferal assemblages from the bathyal zone are mainly controlled by C org-flux and oxygen content (Coulbourn & Lutze, 1988; Corliss & Emerson, 1990; Loubere *et al.*, 1993; Jorissen *et al.*, 1994; Van der Zwaan *et al.*, 1999). The importance of these factors on the benthic foraminiferal fauna of the south-western SCS is discussed in detail.

4.1 Factors controlling benthic foraminiferal assemblages on the shelf

Temperature and salinity are fairly uniform on both the Sunda and Vietnam Shelves (see Fig. 6), and are not considered as main factors controlling the distribution patterns and faunal composition there. The multivariate statistical analyses of the benthic foraminiferal fauna clearly discriminate the assemblages from the Vietnam and Sunda Shelves. The differences in the faunal composition, density and diversity may depend on several parameters, of which food supply, light penetration, substrate and currents will be discussed. The main food source for the benthic foraminiferal fauna is the downward flux of organic matter reaching the sea-floor (Gooday, 1993). The food supply is generally related to sea-surface productivity (Gooday, 1994; Kuhnt *et al.*, 1999; Rijk *et al.*, 2000). In the shallow waters, the effects of oxygen deficiency and C org-flux on the foraminiferal population is difficult to separate. The diversity and equitability measures, however, can help to distinguish between eutrophic and oligotrophic conditions (Van der Zwaan *et al.*, 1999). The correlation between the C org-flux and foraminiferal populations in the shallow-water environment (< 200 m) is difficult to evaluate (see Fig. 9), since other factors may obscure that correlation.

The sea-surface productivity in the entire SCS is generally low, except in coastal areas along the continental margin off China and Vietnam and in the coastal area off Borneo, where it may reach values of > 400 g C $m^{-2}yr^{-1}$ (Platt *et al.*, 1995). The majority of the shelf assemblages from both areas studied exhibit a standing stock between 20-330 indiv./10 cm^2. As reported by Murray (1973) such values are typical for marginal marine environments. On the open shelf, the primary production values are fairly uniform, ranging from 121 g C $m^{-2}yr^{-1}$ to 254 g C $m^{-2}yr^{-1}$ in the areas studied (see Table 3). On the Vietnam Shelf, however, the lower diversity and low standing stock, particularly of smaller sized foraminifera (< 1000 µm), reflect the higher energy environment and generally lower levels of the organic matter reaching the sea-floor. The enhanced values of standing stock for the shallow water assemblages are associated exclusively to the occurrences of large Rotaliida (> 1000 µm). It is known from some regions of the world's oceans, that the sea-surface productivity is seasonal and the C org-flux reaches the sea-floor in pulses (Smith *et al.*, 1996). The benthic foraminiferal population on the Vietnam Shelf may also depend on seasonal pulses rich in organic matter. For instance, a phytoplankton bloom occurs in this area in spring (Guo, 1994) and monsoonal upwelling along the northern part offshore Vietnam occurs in summer (Huang *et al.*, 1994; Chao *et al.*, 1996). Thus, a substantial portion of the nourishment may reach the benthos in this area.

In contrast, the foraminiferal assemblages on the Sunda Shelf exhibit a more uniform distribution pattern and extremely high diversity. The high standing stock shows that food supply is not a major limiting parameter for benthic foraminifera in this area. The very high standing stock and abundances of empty tests offshore Natuna Island correlate well with an increased flux in organic matter, that may be derived from coastal waters. This has also been reported from many nearshore locations (*e.g.* Altenbach & Sarnthein, 1989; Altenbach, 1992; Blake & Hilbig, 1994). On the Sunda Shelf, the supply of organic carbon may be related to characteristics in the water circulation patterns. The vectors of winds, the water drift in the surface layer (at the 2,5 m water column depth) and the bottom-currents during the winter monsoonal regime show the south-westward flow offshore Borneo (Shaw & Chao, 1994; Huang *et al.*, 1994). This flow may transport the organic matter from Borneo to the study area.

The results obtained from correspondence analysis shows, that assemblages on the Vietnam Shelf strongly depend on the sediment type for their habitat. There is a clear correlation between the composition of benthic foraminiferal fauna and the presence of sandy substrate (*e.g. Baggina indica*, *Peneroplis pertusus*, *Articulina alticostata*, *Sorites marginalis*, *Amphistegina* spp.). The large, symbiont-bearing species associated with the presence of coarse sediments (Hohenegger, 1994) are the most abundant foraminifera in the Vietnam Shelf assemblages (*e.g. Amphistegina lessonii*, *Heterostegina depressa*, *Operculina ammonoides* and *Nummulites venosus*). Symbiosis allows these foraminifera to profit from both, solar energy (photosynthesis) and organic matter (Hallock, 1999). The high abundances of symbiont-bearing foraminifera in the photic zone (< 60 m) indicate a clear, nutrient-deficient and high energy environment (Hallock, 1999) on the Vietnam Shelf. In addition, the foraminiferal tests are generally highly-abraded and well sorted. Moreover, the 'reworked' and 'dead' individuals of Miliolids and some Rotaliids are found to be more thick-walled and robust than their representatives from the Sunda assemblages. These may indicate the high energy environment in this area during Winter, when strong south-eastward bottom-currents flow over the Vietnam Shelf (Huang *et al.*, 1994). These currents may be responsible for the winnowing of fine sediments and smaller foraminiferal tests. They may also prevent the organic matter from settling on the sea-floor, thus in consequence reduce the size of standing stock.

The substrate seems to be a less important parameter controlling the faunal distribution patterns on the Sunda Shelf. Locally, the occurrences of certain species (*e.g. Cassidulina carinata*; *Neouvigerina ampullacea*; *Bolivina robusta*) correlate with the high content of clay in the sediments. Only north-east of Natuna Island, the enhanced accumulation of empty foraminiferal tests and the decline of standing stock coincide with the presence of coarse sediments. The sea-floor in this area shows a high degree of roughness, which suggests erosive activity of the bottom currents (Stattegger *et al.*, 1997). The cold eddy, which seasonally appears between Natuna Island and the Wan'an Bank (Huang *et al.*, 1994), can have some influence on the environmental conditions in this area. Currents may be partly responsible for the transport and sorting of empty tests, as well as the distribution and deposition of fresh organic matter on the sea-floor. The common occurrence of suspension-feeding foraminifera (Stigter *et al.*, 1998), so called 'tubular forms' (*e.g. Rhizammina indivisa*, *Saccorhiza ramosa*), indicate the presence of lateral transport carrying organic matter in suspension (Jones & Charnock, 1985). The species with a clinging mode of life, indicative of a high energy environment (Kitazato, 1994), also commonly occur in these assemblages (*e.g. Hanzawaia nipponica*, *Planulina arimiensis* or *Rosalina* spp.).

4. 2 Factors controlling benthic foraminiferal assemblages in the bathyal zone

There is a generally accepted assumption that the carbon flux is inversely correlated to water depth (Müller & Suess, 1979; Suess, 1980; Coulbourn & Lutze, 1988; Sjoerdsma & Van der Zwaan, 1992; Van der Zwaan *et al.*, 1999). This trend is usually reflected by a decreasing standing stock with increasing water depth (Rathburn & Corliss, 1994; Stigter *et al.*, 1998; Loubere & Fariduddin, 1999), but is vaguely reflected in the values obtained from the Sunda continental slope. The standing stock, although decreasing with greater water depth is not much lower on the slope than on the shelf. This may result from shallow upwelling, which according to Chao *et al.*, (1996) occurs on the edge of the Sunda Shelf in Winter. It may also result from using different coring techniques, such as a multi-corer on the slope and box-corer on the shelf. The standing stock values are comparable to the values obtained by Heß (1998) in the vicinity of the present study area.

The signal of C org-flux to the sea-floor, that is preserved in the 'dead' assemblages, is usually enhanced (Loubere & Fariduddin, 1999). The total foraminiferal abundances in both areas studied decrease with increasing water depth. This is a general trend also observed by Altenbach & Sarnthein (1989), Loubere (1991), Gooday *et al.* (1992), Loubere & Fariduddin (1999), as well as by Heß (1998) and Kuhnt *et al.* (1999) in both central and northern parts of the SCS, and by Rathburn & Corliss (1994) in the Sulu Sea.

The bathyal assemblages from the Vietnam and Sunda continental slopes are strongly influenced by decreasing rates of organic flux in the deeper ocean, resulting in a well pronounced bathymetrical succession of foraminiferal associations (Carney, 1989; Loubere & Fariduddin, 1999; Kuhnt *et al.*, 1999). However, the faunal composition of the assemblages from the Vietnam continental slope differs significantly from those of corresponding water depths on the Sunda continental slope. Assemblages on the Vietnam continental slope, are dominated by *Parrelloides bradyi* and *Oridorsalis umbonatus*, usually associated with high oxygen content and low C org-flux (Miao & Thunell, 1993). These species show the peak in their abundances in the shallower waters on the Sunda Shelf. However, the assemblages on the Sunda continental slope are dominated by *Nuttallides rugosus*, *Uvigerina peregrina* and *U. auberiana*, usually associated with low-oxygen and a high C org-flux (Kuhnt *et al.*, 1999; Holbourn *et al.*, 2001). These species are present in the Vietnam assemblages, however, only in low percentages. Dissimilarity in the distribution patterns between the Vietnam and Sunda assemblages strongly suggest that depth-related successions of foraminiferal associations recognised in one area are only applicable to that area. Some of the detritus-feeding species commonly occurring on the Sunda and Vietnam continental slopes (*e.g. Bulimina aculeata*, *Uvigerina peregrina* and *Uvigerina auberiana*) depend on a high supply of fresh organic matter, with a high nutritious value that follows phytoplankton blooms (Rijk, 2000). Therefore, the abundances of dominant species on the Vietnam and Sunda continental slopes, may reflect changes in surface primary productivity controlled by seasonally reversing monsoonal regime.

The benthic foraminiferal assemblages from the central and northern parts of the SCS were used by Kuhnt *et al.* (1999) to estimate the C org-flux rates from downcore samples. They obtained correlation with an exponential coefficient r^2 =0,949 and r^2 =0,918. In this study, the data sets from twelve sites, evenly distributed along the Sunda continental slope, are used to examine the relationship of 'dead' benthic foraminiferal assemblages to the C org-flux. Correlation between the assemblage composition (factor 1 of AFC 1) and C org-flux is very good (Fig. 24 a-b). The linear correlation coefficients are r^2 =0,962 and r^2 =0,92 according to the equation of Suess (1980) and Sarnthein *et al.* (1988) respectively.

The differences between the regression plots of Kuhnt *et al.* (1999) and those from this study, may result from applying two different coring techniques: the multi-corer and box-corer devices. Surface samples obtained from the multi-corer and box-corer show distinctly different densities of foraminiferal tests. The epifaunal species abundances are underestimated in the box-corer samples due to a loss of the fluffy surface sediment. This causes the differences in the values of factor loadings and obscures the correlation between the assemblage composition and C org-flux. As a result, it is impossible to combine the data sets obtained with these two coring techniques. However, correlation coefficients are very good for both, indicating that each method used individually, has potential to estimate carbon flux from benthic foraminiferal data.

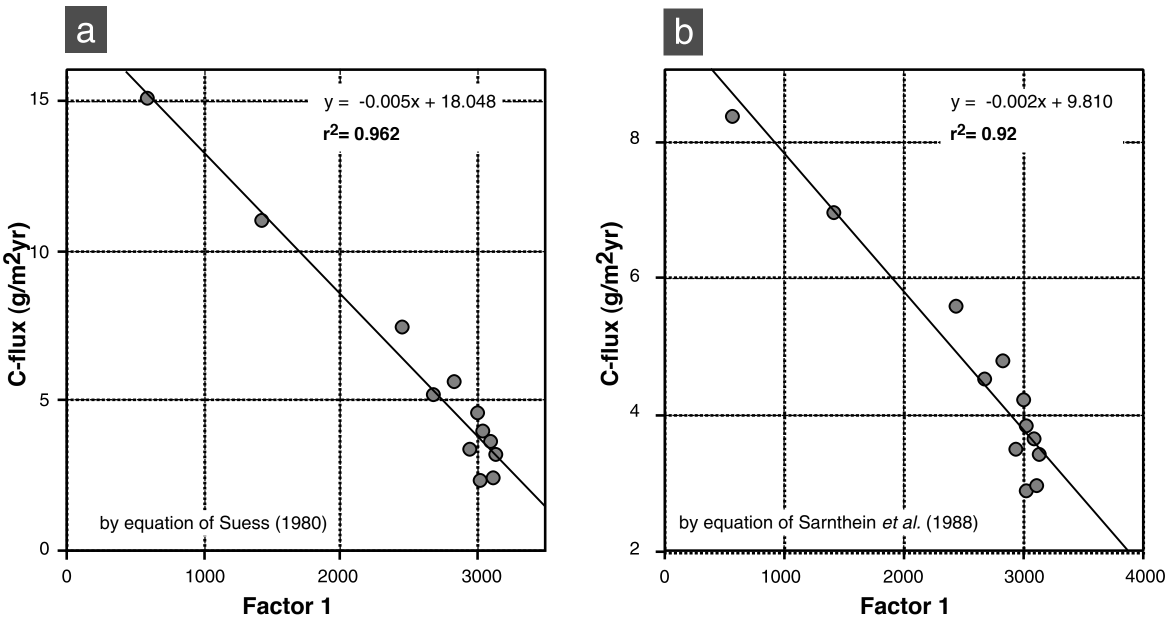


Figure 24. Regression of Factor 1 of the correspondence analyses against C org-flux rates calculated **(a)** after Suess (1980) and **(b)** Sarnthein *et al.* (1988), using the average primary production data set of Platt (unpublished). The best fit obtained is linear and shows a correlation coefficient equal to r^2= 0.962 and r^2= 0.92 respectively.

4.3 Diversity trends

A worldwide observed trend of increasing diversity from the shore-line to the edge of the continental shelf is well pronounced in the assemblages from the studied shelves. It is also reported from other parts of the SCS and adjacent seas (Miao & Thunell, 1993; Zheng & Fu, 1994). The diversity measures (H(S) & Evenness) from this study are comparable to the measures from other locations in the South China Sea and East China Sea (Table 8). According to Boltovskoy & Wright (1976) the diversity increases with water depth in the bathyal zone. As noticed by Lutze & Coulbourn (1984) and Murray (1991) and recognised also on the Vietnam continental slope, this trend is stronger in the 'living' population. However, the diversity of the 'dead' fauna declines with increasing water depth in both study areas. A similar trend is reported from the Pacific (Saidova, 1971) and the Gulf of Mexico (Buzas & Gibson, 1969).

Offshore Natuna Island, a decrease in the diversity indices (H(S) and Fisher's α), together with an increase in the foraminiferal abundances is observed. As reported by Loubere & Fariduddin (1999) this trend appears in many nearshore areas in response to the supply of organic matter delivered from land. The maximum diversity value (Fisher's α=71), occurs at a deeper water depth (291 m) than the suspected faunal break. The correspondence analyses revealed a dissimilarity in the faunal composition at a water depth shallower than 226 m. Thus, the extremely high diversity on the upper part of the continental slope may be an effect of down-slope transport of the empty tests, since most of the species are present only in the 'dead' assemblage.

Table 8. Comparison of the diversity indices from different locations in the South China Sea and East China Sea.

	Vietnam Shelf	Sunda Shelf	southern SCS	northern SCS	ECS
	present study	present study	Heß, 1997	Zheng & Fu, 1994	Zheng & Fu, 1994
depth range	47-1479 m	60-1974 m	889-1556 m	7-1010 m	41-2050 m
average H(S)	3,87	4,08	4,20	2,87	2,62
max. H(S)	4,46	4,40	4,33	4,49	4,11
average E	0,46	0,46	0,57	0,40	0,40
max. E	0,62	0,60	0,59	0,63	1,00

4.4 Regional biogeography

There is a very obvious dissimilarity in the faunal composition of the Vietnam and Sunda Shelves. Only 478 taxa, of the total 802 taxa recognised occur in both study areas. The benthic foraminiferal assemblages on the Sunda Shelf contain 272 taxa more than the Vietnam assemblages. Whereas only 53 shallow-water taxa from the Vietnam Shelf assemblages do not occur in the Sunda area. These are mainly Rotaliids and Miliolids which are usually associated with sandy substrate. Ninety taxa occur through the entire studied water depth range (50-2000 m). The remaining species exhibit a depth related distribution (see Appendix B.2). Deep-water species are almost the same in both areas, due to similar and stable hydrographic conditions prevailing at greater water depths.

Approximately 400 taxa have depth limited ranges in the ‘living’ assemblages. Commonly, the occurrences of ‘living’ individuals are closer to the upper limit of the species depth range (Resig, 1958).

The proportion of taxa represented in both ‘living’ and ‘dead’ assemblages are strikingly different in the two areas studied. In the Vietnam area only 34 % of taxa have their representatives in both assemblages. The ratio between ‘living’ and ‘dead’ (L/D ratio) for large foraminifera is high (*e.g. Quinqueloculina* spp., *Operculina ammonoides*, *Nummulites venosus*, *Amphistegina radiata* or *A. lessoni*). The smaller species are mainly represented by ‘dead’ individuals (*e.g. Ammonia beccarii*, *Amphistegina papillosa* or *Cibicidoides pachyderma*). The tests of species using organic cement disintegrate after the death of the foraminifera, thus several mainly arenaceous species occur exclusively in the ‘living’ assemblages (*e.g. Crithionina pisum*, *Astrorhiza arenaria*).

In the Sunda area approximately 74 % of all species are represented by both ‘living’ and ‘dead’ individuals. The L/D ratio is high in the assemblages on the Sunda Shelf. All common species are represented by ‘living’ individuals. Some species develop a local peak of abundance, but occur only at single locations (*e.g. Uvigerina bassensis* and *Bolivina subaenariensis* var. *mexicana*). The species represented exclusively by ‘living’ individuals include mainly specimens with fragile, agglutinated walls (*e.g. Ammobaculites filiformis*), and monolamellar calcite (*e.g. Lagena* spp., *Dentalina* spp.).

The benthic foraminiferal abundances expressed in proportions of the main orders reveal more general distribution patterns in the faunal composition. The shelf assemblages from both areas studied are dominated by Miliolida and Rotaliida. This is a typical composition in normal marine shelf and continental slope environments (Murray, 1991). Comparable faunal compositions are reported from other seas, for example from the Arabian Gulf (Cherif *et al.*, 1997), the central west coast of India (Nigam & Khare, 1999) and from the northern shelf of the South China Sea (Wang *et al.*, 1985). Hayward *et al.* (1999) reported, that high (> 20 %) proportions of Miliolida are typical for normal marine, inner shelf environments, while the high proportions of Lagenida usually indicate an outer shelf or upper bathyal environment. This corresponds perfectly to the proportions of Lagenida (~9-10 %) observed on the Sunda Shelf (Fig. 25). Also, the proportions of Miliolida decrease from 25 % in the inner shelf to 15 % in the outer shelf assemblages. The same pattern was observed in the northern part of the Vietnam Shelf by Wang *et al.* (1985). The proportions of main orders, grouped with respect to recognised water depth zones for recent foraminiferal fauna, provide an applicable indication of water depth, and thus allow one to distinguish the shelf fauna from the bathyal fauna in down-core samples. The benthic foraminiferal associations and distribution plots of the dominant taxa (Appendix B.3) may support the more precise paleo-depth estimate in the bathyal zone.

4.5 Taphonomic processes

The presence of ‘reworked’ foraminifera from the early Holocene transgression in the assemblages indicates intense mixing of Holocene sediments on the Vietnam Shelf. The mixing of older material with recent sediments is often observed in carbonate-rich environments, because high carbonate contents buffer dissolution and help to preserve tests (Martin, 1999).

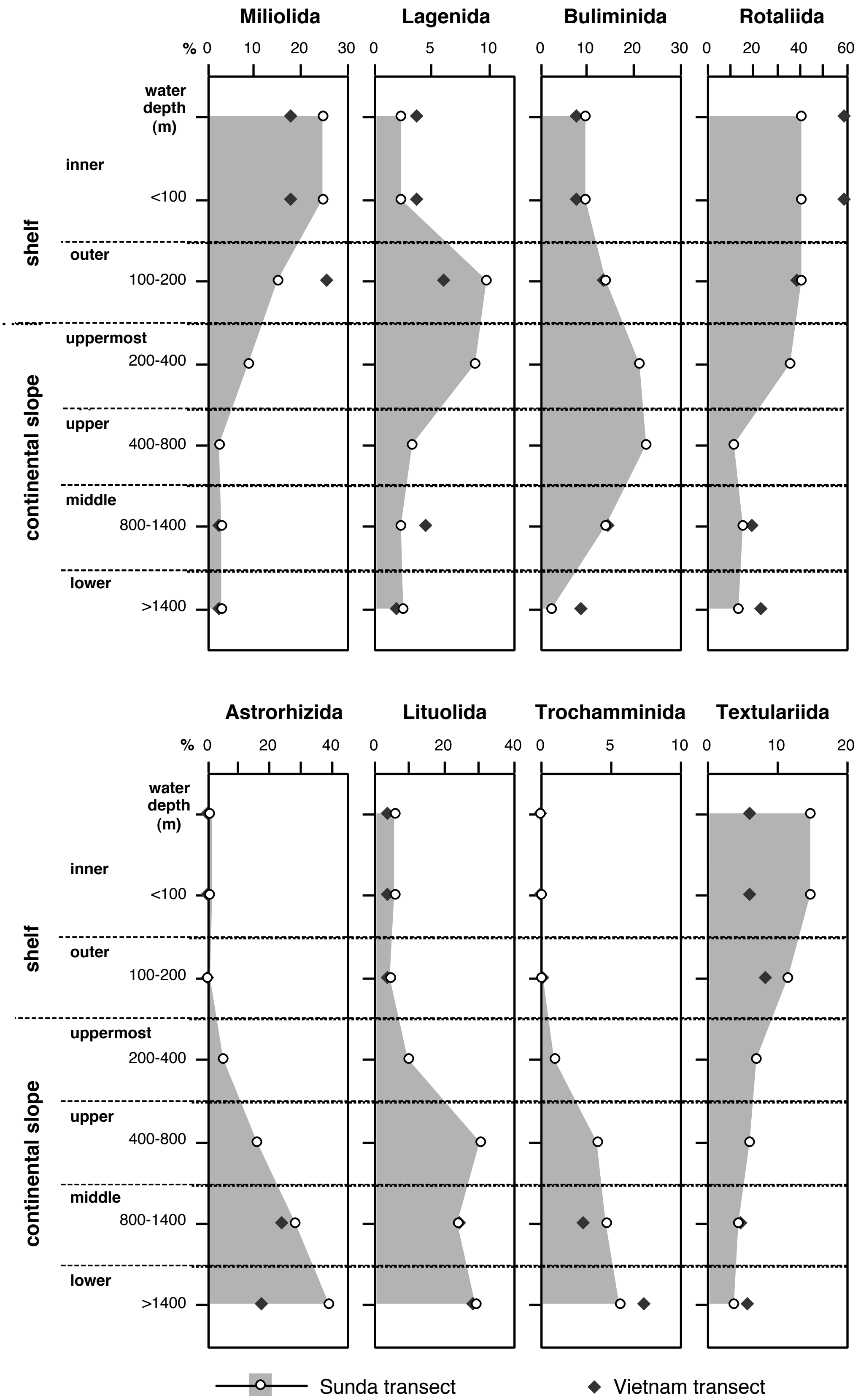


Figure 25. Generalised proportions of major orders in total benthic foraminiferal faunas and their correlation with bathymetry.

The most abundant tests of the large foraminifera such as *Amphistegina* and *Nummulites* are very resistant to abrasion and dissolution (Martin, 1999), thus can persist in the sediment for a long time and be mixed with recent faunas. The faunal composition of the reworked assemblage indicates a sea-level rise of approximately 20-30 m from the time of deposition, since the highly abraded individuals of symbiont-bearing Miliolids (*e.g. Peneroplis*, *Dendritina* or *Monalysidum*) are present in the assemblages in waters deeper than 60 m. As reported by Hallock (1999) symbiont-bearing Miliolids occupy shallower habitats (< 40 m) and have a more restricted depth range than the large Rotaliids. The co-existence of 'shallow-euphotic' Miliolids and stained 'deep-euphotic' Rotaliids in the same assemblages may indicate that the community shifts in response to a sea-level rise. A large part of the shelf was exposed during the Last Glacial Maximum, including an area that reaches 120 m below present day sea-level (Wong *et al.*, 1999; Hanebuth & Stattegger, 2000). Based on the sea-level curve of Hanebuth (2000), the potential duration of the 'reworked' tests in surface sediments may be up to 11 kyr.

In contrast, the foraminiferal assemblages from the Sunda Shelf are considered to be more reliable paleoenvironmental indicators. They can be considered as modern and autochthonous, since the 'reworked' individuals are very scarce in the surface sediments and also a high proportion of individuals with fragile tests indicates *in situ* fossilisation.

4.6 Plankton to benthos ratio

The P/B ratio has been traditionally used to estimate water depth on continental margins (Parker, 1954). The sensitivity of this method is relatively low. Van der Zwaan *et al.* (1990) proposed to use the P/B ratio as quantitative markers of water depth. The flux dependency can be eliminated using the P/B ratio, since both planktonic and benthic foraminifera depend on the flux of organic carbon. Therefore, the P/B ratio is only depth-dependent (Van der Zwaan *et al.*, 1999) and may be used as an indicator of depositional depth in fossil records (Gibson, 1989). The P/B ratio can be altered in areas of upwelling (Boltovskoy & Wright, 1976) and in regions influenced by major current systems or boundary currents (Arnold & Parker, 1999), where the planktonic foraminifera may reach abnormally high abundances.

The abundance of planktonic foraminifera on the inner and outer shelf in the Sunda area are very high, but the general trend of increasing plankton proportions in relation to benthos with increasing water depth is well pronounced. Correlation of the P/B ratio with water depth exhibits the linear correlation coefficient of r=0,84. The strong southward current occurring in the Sunda Shelf area in Winter (Shaw & Chao, 1994; Chao *et al.*, 1996), may be responsible for the distribution of planktonic tests on the inner shelf. In this case the high P/B ratio is altered by water circulation (Bock, 1982), thus the P/B ratio does not necessarily indicates water depth. However, it may be used as an indicator of the water circulation patterns.

5. CONCLUSIONS

- The surface sediments of the south-western part of the South China Sea (Sunda Shelf) revealed more than 800 taxa of benthic foraminifera. Ninety taxa occur through the entire studied water depth range (50-2000 m). The remaining species exhibit a depth related distribution. Four hundred taxa of 'living' species, however have a limited water depth range. The benthic foraminiferal assemblages on the Sunda Shelf and its continental slope contain 749 taxa (including 590 stained) whereas the assemblages from Vietnam Shelf comprise of only 530 taxa (incl. 218 stained). Diversity indices (H(S) and Fisher's α) are high in both areas studied, while the species dominance is low. The standing stock values are typical for marginal marine environments (20-330 indiv./10 cm^2).

- There is a strong relationship between biodiversity, species composition and habitat area. Shallow-water (< 200 m) foraminiferal assemblages exhibit significantly distinct distribution patterns that can be correlated to current activity, substrate properties and the levels of organic matter reaching the benthos. These are the main factors causing the differences in faunal composition between the Vietnam and Sunda areas. On the Vietnam Shelf, winnowing processes are prevalent, and there may be reduced deposition of organic matter to the sea-floor due to stronger bottom currents. The dominance of the large symbiont-bearing Rotaliida, associated with clear waters (deep light penetration) and sandy substrates, reflects the high energy and nutrient-deficient environment. The presence of relict assemblages on the sediment surface indicate intense mixing of Holocene sediments on the Vietnam Shelf. The faunal composition of the relict assemblage denotes a sea-level rise of approximately 20-30 m from the time of deposition. The shelf foraminiferal assemblages form four statistically independent associations discriminated on the basis of the correspondence analysis (*Heterolepa* aff. *dutemplei* - *Asterorotalia gaimardii*; *Bulimina marginata* - *Neouvigerina proboscidea*; *Amphistegina papillosa* - *Nummulites venosus*; *Heterolepa* aff. *dutemplei* - *Cibicidoides pachyderma*).

- The bathyal assemblages are strongly influenced by the decreasing rates of C org-flux with increasing water depth, resulting in a depth-related succession of assemblages. The correspondence analysis delineated four benthic foraminiferal associations between 200 m and 2000 m water depth on the Sunda continental slope (*Siphotextularia foliosa* - *Bulimina mexicana*; *Uvigerina* ex gr. *auberiana* - *Ehrenbergina undulata*; *Nuttallides rugosus* - *Uvigerina peregrina*; *Astrononion novozealandicum* - *Eggerella bradyi*) and one on the Vietnam slope (*Parrelloides bradyi* - *Oridorsalis umbonatus*). The distribution patterns of the major species of benthic foraminifera generally follow the same trends in both study areas. The species, depending on high C org-flux, are found in the shallower waters and are succeeded by a more 'oligotrophic' species at greater depths. However, the dissimilarity in the distribution patterns between study areas, suggests that bathymetrical successions of foraminiferal assemblages recognised in one area are only applicable to that area.

• Correlation between the total foraminiferal assemblages from the Sunda continental slope and C org-flux (r^2=0,962) may be used to estimate C org-flux rates from the down-core fossil record. Factor values of assemblages obtained by multi-core and box-core sampling have differing regression lines against carbon flux values. This result shows, that it is impossible to combine the data sets obtained with these two coring techniques to improve the transfer function of Kuhnt *et al.* (1999). However, the regression lines against carbon flux are parallel for multi-corer and box-corer surface assemblages, indicating that each internally consistent data set, has the potential to estimate carbon flux from benthic foraminiferal data.

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TAXONOMY

APPENDIX A

TAXONOMY

Benthic foraminifera constitute the most diverse group of shelled meiofauna in modern oceans (Sen Gupta, 1999). According to Zheng & Fu (1994) approximately sixteen hundred species occur in the assemblages of the South China Sea (SCS). The number of benthic taxa occurring in all the China seas is estimated at approximately two thousand. The Vietnam and Sunda Shelves foraminiferal assemblages reveal more than 800 taxa belonging to 12 orders. In this appendix 745 identified taxa are shortly described or referred. Taxa are arranged in taxonomical order and include 257 agglutinated and 488 calcareous species.

The suprageneric classification adapted in this chapter follows Loeblich & Tappan (1992), except where more recent classifications could be applied. These included a modified version of Loeblich & Tappan (1994) and recently proposed changes by Sen Gupta (1999). For suprageneric references see Loeblich & Tappan (1987; 1994). For the generic assignments mostly the concepts of Loeblich & Tappan (1987) are used. For some genera of the family Lagenidae the definitions of Jones (1984) and Patterson & Richardson (1987) are used. For genera of the family Trochamminidae terminology of Brönnimann & Whittaker (1988) is followed, except for the genus *Carterina* Brady. According to Loeblich & Tappan (1992) and Sen Gupta (1999) it should be placed exclusively in a separate order. In case of some confusion at the generic or specific level (e.g. *Fontbotia* Gonzales-Donoso & Linares, 1970, *Assilina* d'Orbigny, 1839, *Heterolepa* Franzenau, 1884) the suspected synonyms are given in references and are shortly discussed.

The 68 taxa not determined on a specific level are left in open nomenclature (e.g. *Hormosina* sp. 1). Suspected 'ecophenotypes' of several species are counted apart and the differences are shortly outlined. This includes forms that reveal clear morphologic alterations (e.g. *Hormosinella guttifera, Hoeglundina elegans, Heterolepa margaritifera*). The abbreviation 'spp.' is used for badly preserved or incomplete specimens of particular genera grouped together. Results of the first part of this study rely on applied taxonomic nomenclature, therefore the main objective of the taxonomic study was directed towards accurate and consistent identification of the taxa.

Class Foraminiferea J.J. Lee, 1990

Order **ALLOGROMIIDA** Fursenko, 1958
Family Allogromiidae Rhumbler, 1904
Subfamily ARGILLOTUBINAE Avnimelech, 1952
Genus **NODELLUM** Rhumbler, 1913

Nodellum membranaceum (Brady, 1879)

Reophax membranacea BRADY, 1879a, p. 53, pl. 4, fig. 9. –BRADY, 1884, p. 297, pl. 32, figs 1-4 (ZF 2277).
Nodellum membranaceum (Brady). –EARLAND, 1934, p. 84, pl. 2, fig. 41. –SCHRÖDER, 1986, p. 28, pl. 1, fig. 3. –JONES, 1994, p. 38, pl. 32, figs 1-4.

Order **ASTRORHIZIDA** Lankester, 1885
Superfamily ASTRORHIZACEA Brady, 1881
Family ASTRORHIZIDAE Brady, 1881
Subfamily ASTRORHIZINAE Brady, 1881
Genus **ASTRORHIZA** Sandahl, 1858

Astrorhiza arenaria Norman, 1876

Astrorhiza arenaria NORMAN, 1876, p. 213. –BRADY, 1884, p. 232, pl. 19, figs 5-10. –JONES, 1994, p. 31, pl. 19, figs 5, ?6, 7-10.

Astrorhiza crassatina Brady, 1881

Astrorhiza crassatina BRADY, 1881, p. 47. –BRADY, 1884, p. 233, pl. 20, figs 1-9. –SCHRÖDER, 1986, p. 30, pl. 1, fig. 4. –JONES, 1994, p. 32, pl. 20, figs 1-9.
Psammosiphonella crassatina (Brady). –BARKER, 1960, p. 40, pl. 20, figs 1-9.

***Astrorhiza* sp. 1**

Key features: Test lenticular with short, flattened stolons; wall finely agglutinated, loosely cemented; in broken tests pseudochitinous inner coating can be visible; colour gray.

Genus **PELOSINA** Brady, 1879

Pelosina cylindrica Brady, 1884

Pelosina cylindrica BRADY, 1884, p. 236, pl. 26, figs 1-6. –SCHRÖDER, 1986, p. 37, pl. 10, fig. 6. –JONES, 1994, p. 34, pl. 26, figs 1-6.

Pelosina variabilis Brady, 1879

Pelosina variabilis BRADY, 1879a, p. 30, pl. 3, figs 1-3. –SCHRÖDER, 1986, p. 37, pl. 10, fig. 7. –JONES, 1994, p. 35, pl. 26, figs 7-9.

Subfamily VANHOEFFENELLINAE Saidova, 1981
Genus **VANHOEFFENELLA** Rhumbler, 1905

***Vanhoeffenella* sp.**

Key features: Test small, elongated and fusiform; wall of single layer of siliceous coarse grains; aperture at the tubular neck on both ends of the test.

Remarks: In the Sunda Shelf material mainly stained specimens have been found with clearly visible big protoplasm body filling the test. The protoplasm string protruding from both ends of the test.

Family BATHYSIPHONIDAE Avnimelech, 1952
Genus **BATHYSIPHON** M. Sars, 1872

Bathysiphon filiformis M. Sars, 1872

Bathysiphon filiformis SARS, M., 1872, p. 251. –BRADY, 1884, p. 248, pl. 26, figs 15-20 (not fig. 16). –CUSHMAN, 1921, p. 41, pl. 2, fig. 1. –JONES, 1994, p. 34, pl. 26, figs 15, 17-20.

Key features: Test large, tubular and straight; wall composed of very fine sand and sponge spicules, loosely cemented; often coated with black particles; colour white-light gray.

Family RHABDAMMINIDAE Brady, 1884
Subfamily RHABDAMMININAE Brady, 1884
Genus **MARSIPELLA** Norman, 1878

Marsipella cylindrica Brady, 1882

pl. 1, fig. 1

Marsipella cylindrica BRADY, 1882, p. 714. –BRADY, 1884, p. 265, pl. 24, figs 20-22 (ZF 1811-12). –HOFKER, 1972, p. 81, pl. 25, figs 2-8. –ZHENG, 1988, p. 26, pl. 1, fig. 10. –JONES, 1994, p. 34, pl. 24, figs 20-22.

Key features: Test tubular, elongated; wall comprised of longitudinally arranged sponge spicules.

Marsipella elongata Norman, 1878

pl. 1, fig. 2

Marsipella elongata NORMAN, 1878, p. 281, pl. 16, fig. 7. –BRADY, 1884, p. 264, pl. 24, figs 10-19. –HOFKER, 1972, p. 80, pl. 24, figs 13-21; pl. 25, fig. 1. –JONES, 1994, p. 34, pl. 24, figs 10-19.

Remarks: Differs from *Marsipella cylindrica* Brady in elongated, fusiform shape of the test, thickest in the middle. Some specimens comprised of two fusiform sequences joined together have been observed.

Genus **RHABDAMMINA** M. Sars, 1869

Remarks: The specimens of this genera usually are broken to the countless pieces in the preparation process of the samples, therefore only specimens bigger than 250 μm are used for analyses.

Rhabdammina abyssorum M. Sars, 1869

Rhabdammina abyssorum SARS, M. in Carpenter, 1869, p. 60. –BRADY, 1884, p. 266, pl. 21, figs 1-8, 10-13 (ZF 2294). –HÖGLUND, 1947, p. 25, pl. 1, fig. 2. –JONES, 1994, p. 32, pl. 21, figs 1-8, 10-13. –HEß, 1998, p. 69, pl. 1, figs 1-2.

Key features: Large, free test; usually with central subglobular chamber from where branching off three tubular arms with no divisions; wall of firmly cemented fine sand grains; colour pale brown.

Rhabdammina discreta Brady, 1881

pl. 1, fig. 3

Rhabdammina discreta BRADY, 1881, p. 48. –BRADY, 1884, p. 268, pl. 22, figs 7-10 (ZF 2299). –HÖGLUND, 1947, p. 26, pl. 1, figs 6-7; text-fig. 16. –HOFKER, 1972, p. 30, pl. 6, figs 15-18. –JONES, 1994, p. 32, pl. 22, figs 7-10.

Key features: Straight, tubular test with swellings at irregular divisions along the test; wall of fine sand grains firmly cemented; colour pale brown.

Rhabdammina linearis Brady, 1879

Rhabdammina linearis BRADY, 1879a, p. 37, pl. 3, fig. 10. –BRADY, 1884, p. 269, pl. 22, figs 1-6 (ZF 2304; ZF 2307). –CUSHMAN, 1910b, p. 28, fig. 14. –HÖGLUND, 1947, p. 27, pl. 1, figs 1, 5. –HOFKER, 1972, p. 29, pl. 6, figs 2-5. –JONES, 1994, p. 32, pl. 22, figs 1-6.

Key features: Straight, tubular test with two divisions branching off and slightly swollen central part; wall of fine sand grains, firmly cemented.

Rhabdammina pacifica Shchedrina, 1952

pl. 1, fig. 4

Rhabdammina abyssorum Carpenter var. *pacifica* Shchedrina. –SAIDOVA, 1961, p. 11, pl. 1, fig. 1. –ZHENG, 1988, p. 21, pl. 2, figs 2-3.

Genus **RHIZAMMINA** Brady, 1879

Rhizammina algaeformis Brady, 1879

Rhizammina algaeformis BRADY, 1879a, p. 39, pl. 4, figs 16-17. –BRADY, 1884, p. 274, pl. 28, figs 1-11. –SCHRÖDER, 1986, p. 32, pl. 4, fig. 1. –ZHENG, 1988, p. 23, pl. 2, fig. 6. –JONES, 1994, p. 36, pl. 28, figs 1-11. –HEß, 1998, p. 69, pl. 1, fig. 6.

Rhizammina indivisa Brady, 1884

Rhizammina indivisa BRADY, 1884, p. 277, pl. 29, figs 5-7. –SCHRÖDER, 1986, p. 32, pl. 5, fig. 1. –ZHENG, 1988, p. 24, pl. 1, fig. 4.
Testulosiphon indivisus (Brady). –JONES, 1994, p. 36, pl. 29, figs 5-7.

Subfamily DENDROPHRYINAE Haeckel, 1894
Genus **DENDROPHRYA** Wright, 1861

***Dendrophrya* sp.**

Key features: Test large, dendritic, irregularly branching tube; coarsely agglutinated; branchlets decreasing in diameter; apertures at the open ends of the branches.

Family HIPPOCREPINELLIDAE Loeblich & Tappan, 1984
Genus **HIPPOCREPINELLA** Heron-Allen & Earland, 1932

Hippocrepinella alba Heron-Allen & Earland, 1932

Hippocrepinella alba HERON-ALLEN & EARLAND, 1932a, p. 259, pl. 1, figs 16-18. –HÖGLUND, 1947, p. 45, pl. 1, figs 11-13; text-fig. 17. –HOFKER, 1972, p. 73, pl. 22, figs 9-13.

Key features: Test fusiform or cylindrical; aperture terminal on the neck; very thin, smooth wall of white, dusty particles.

Hippocrepinella crassa Heron-Allen & Earland, 1932

Hippocrepinella hirudinea Heron-Allen & Earland var. *crassa* HERON-ALLEN & EARLAND, 1932a, p. 259, pl. 2, figs 1-3. –HÖGLUND, 1947, p. 44, pl. 1, figs 14-16.

Key features: Test oviform; aperture terminal; smoothly finished wall of very fine particles with fine latitudinal wrinkles.

Family PSAMMOSPHAERIDAE Haeckel, 1894
Subfamily PSAMMOSPHAERINAE Haeckel, 1894
Genus **PSAMMOSPHAERA** Schulze, 1875

Psammosphaera fusca Schulze, 1875

Psammosphaera fusca SCHULZE, 1875, p. 113, pl. 2, fig. 8. –BRADY, 1884, p. 249, pl. 18, figs 1-8 (ZF 2191). –CUSHMAN, 1910b, p. 36, text-figs 25-28. –HÖGLUND, 1947, p. 46, pl. 4, figs 9-14. –HOFKER, 1972, p. 32, pl. 7, figs 1-3. –SCHRÖDER, 1986, p. 36, pl. 10, fig. 1. –ZHENG, 1988, p. 32, pl. 7, figs 3-4. –JONES, 1994, p. 31, pl. 18, figs 1-8.

Remarks: There seems to be a great confusion over the identity of this species and *Saccammina sphaerica* G.O. Sars.

Specimens with roughly finished and less firmly cemented wall of bigger grains have been referred herein to *Psammosphaera fusca* Schulze.

Genus **SOROSPHAERA** Brady, 1879

Sorosphaera consociata (Rhumbler, 1931)

? Saccammina consociata FLINT, 1899, p. 269, pl. 9, fig. 3.
Psammophax consociata RHUMBLER in Wiesner, 1931, p. 81, pl. 4, figs 38-40, pl. 5, figs 41-44. –PARR, 1950, p. 257, pl. 3, figs 11-14.
Sorosphaera consociata (Rhumbler). –HEß, 1998, p. 71, pl. 2, fig. 2.

Key features: Small, arenaceous test, comprised of two to three small, spherical chambers with no visible aperture; rough wall of fine grains, firmly cemented; colour dark brown.

Family SACCAMMINIDAE Brady, 1884
Subfamily SACCAMMININAE Brady, 1884
Genus **LAGENAMMINA** Rhumbler, 1911

Lagenammina arenulata (Skinner, 1961)

pl. 1, figs 7-8

Reophax difflugiformis Brady. –BRADY, 1884 (not Brady, 1879a), p. 289, pl. 30, fig. 5.
Reophax atlantica (Cushman). –BARKER, 1960, p. 62, pl. 30, fig. 5.
Reophax difflugiformis Brady var. *arenulata* SKINNER, 1961, p. 1239.
Lagenammina arenulata (Skinner). –JONES, 1994, p. 37, pl. 30, fig. 5.

Key features: Test pyriform, comprised of one chamber; wall roughly agglutinated with grains of varying sizes, including quartz grains, sponge spicules or tests of planktic foraminifera; firmly cemented; aperture round, open, resembles that of *Reophax dentaliniformis* Brady.

Lagenammina difflugiformis (Brady, 1879)

pl. 1, figs 9-10

Reophax difflugiformis BRADY, 1879a, p. 51, pl. 4, fig. 3. –BRADY, 1884, p. 289, pl. 30, figs 1-3. –SCHRÖDER, 1986, p. 43, pl. 14, figs 6-7. –HEß, 1998, p. 67, pl. 2, figs 7-9.
Lagenammina difflugiformis (Brady). –LOEBLICH & TAPPAN, 1987, p. 31, pl. 21, figs 7-8. –JONES, 1994, p. 36, pl. 30, figs 1-3. –YASSINI & JONES, 1995, p. 64, fig. 23.

Key features: Test pyriform, comprised of one chamber with short cylindrical neck; wall agglutinated with fine to coarse quartz grains, firmly cemented and smoothly finished; colour light brown.

Lagenammina tubulata (Rhumbler, 1931)

pl. 1, fig. 11

Saccammina tubulata RHUMBLER in Wiesner, 1931, p. 82, pl. 23, fig. 1.
Lagenammina tubulata (Rhumbler). –SCHRÖDER, 1986, p. 37, pl. 10, fig. 2.

Key features: Test spherical with very thin and long apertural neck; wall thin, firmly cemented with medium to coarse sand grains; colour brown.

Genus **SACCAMMINA** Carpenter, 1869

Saccammina edita (Saidova, 1975)

Thurammina edita SAIDOVA, 1975, p. 48, pl. 9, fig. 8.
Saccammina edita (Saidova). –LOEBLICH & TAPPAN, 1994, p. 13, pl. 3, figs 3-4.

Saccammina sphaerica G.O. Sars, 1872

Saccammina sphaerica SARS, G.O., 1872, p. 250. –BRADY, 1884, p. 253, pl. 18, figs 11-15, 17. –CUSHMAN, 1918a, p. 44, pl. 16, figs 4-5. –HÖGLUND, 1947, p. 50, pl. 4, figs 15-17. –LOEBLICH & TAPPAN, 1964, p. C196, fig. 112.1. –HOFKER, 1972, p. 44, pl. 12, figs 1-3. –ZHENG, 1988, p. 33, pl. 4, fig. 12. –JONES, 1994, p. 31, pl. 18, figs 11-15, ? 17. –YASSINI & JONES, 1995, p. 64, figs 8-9. –HEß, 1998, p. 70, pl. 2, figs 5-6.

Key features: Test free, comprised of single globular chamber; wall thin, smooth, firmly cemented of fine grains; with or without visible simple aperture; colour variable, usually orange-brown.

Genus **TECHNITELLA** Norman, 1878

Technitella legumen Norman, 1878

pl. 1, figs 12-13

Technitella legumen NORMAN, 1878, p. 269, pl. 16, figs 3-4. –BRADY, 1884, p. 246, pl. 25, figs 8-12. –HERON-ALLEN & EARLAND, 1912, p. 382, pl. 5, figs 1-2. –SCHRÖDER, 1986, p. 38, pl. 10, fig. 5. –JONES, 1994, p. 34, pl. 25, figs 8-12.

Technitella melo Norman, 1878

pl. 1, fig. 14

Technitella melo NORMAN, 1878, p. 280, pl. 16, figs 5-6. –BRADY, 1884, p. 246, pl. 25, fig. 7. –HOFKER, 1972, p. 78, pl. 23, figs 19-22. –JONES, 1994, p. 34, pl. 25, fig. 7.

Subfamily THURAMMININAE Miklukho-Maklay, 1963

Genus **ASTRAMMINA** Rhumbler, 1931

Astrammina rara Rhumbler, 1931

Astrammina rara RHUMBLER in Wiesner, 1931, p. 77. –LOEBLICH & TAPPAN, 1987, p. 33, pl. 22, figs 1-2; pl. 23, figs 10-14.

Key features: Test spherical, with several apertural necks irregularly spaced all over the test; wall agglutinated with fine grains, firmly cemented and smoothly finished, with some bigger grains scattered in fine material; colour gray.

Astrammina sphaerica (Heron-Allen & Earland, 1932)

Armorella sphaerica HERON-ALLEN & EARLAND, 1932a, p. 256, pl. 2, figs 4-11. –EARLAND, 1934, p. 69, pl. 2, figs 12-14. –HÖGLUND, 1947, p. 55, pl. 5, figs 1-9.
Astrammina sphaerica (Heron-Allen & Earland). –SCHRÖDER, 1986, p. 30, pl. 1, fig. 6.

Remarks: Specimens referred herein to *A. sphaerica* (Heron-Allen & Earland) differ from *A. rara* Rhumbler in single layered structure of the wall, agglutinated with medium sand grains and being orange-brown.

Genus **THURAMMINA** Brady, 1879

Thurammina compressa Brady, 1879

Thurammina compressa BRADY, 1879a, p. 46, pl. 5, fig. 9. –BRADY, 1884, p. 324, pl. 37, fig. 1. –JONES, 1994, p. 42, pl. 37, fig. 1.

Thurammina papillata Brady, 1879

Thurammina papillata BRADY, 1879a, p. 45, pl. 5, figs 4-8. –BRADY, 1884, p. 321, pl. 36, figs 7-18 (ZF 2483). –CUSHMAN, 1918a, p. 70, pl. 28, figs 10-11. –PARR, 1950, p. 259, pl. 3, fig. 25. –JONES, 1994, p. 42, pl. 36, figs 7-18.
Psammosphaera (Thurammina) papillata Brady. –HOFKER, 1972, p. 34, pl. 7, figs 10-15.

Key features: Test globular or slightly compressed and irregular; wall smooth, very thin, papillate, agglutinated with fine grains, firmly cemented; colour reddish-brown or orange-brown.

Thurammina papyracea Cushman, 1913

Thurammina papyracea CUSHMAN, 1913b, p. 637, pl. 79, fig. 4. –CUSHMAN, 1921, p. 52, pl. 3, fig. 3. –ZHENG, 1988, p. 35, pl. 7, fig. 10.

Family HEMISPHAERAMMINIDAE Loeblich & Tappan, 1961
Subfamily CRITHIONININAE Hofker, 1972
Genus **CRITHIONINA** Goës, 1894

Crithionina hispida Flint, 1899

Crithionina pisum Goës var. *hispida* FLINT, 1899, p. 267, pl. 6, fig. 2. –HÖGLUND, 1947, p. 36, pl. 2, fig. 3, pl. 25, figs 24-29.
Crithionina hispida Flint. –HOFKER, 1972, p. 68, pl. 20, figs 7-10.

Remarks: Differs from *C. pisum* Goës in having sponge spicules perpendicularly incorporated in wall of the test.

Crithionina mamilla Goës, 1894

Crithionina mamilla GOËS, 1894, p. 15, pl. 3, figs 34-36. –HOFKER, 1972, p. 67, pl. 20, figs 1-3.

Crithionina pisum Goës, 1896

pl. 1, fig. 15

Crithionina pisum GOËS, 1896, p. 24, pl. 2, figs 1-2. –HÖGLUND, 1947, p. 35, pl. 2, figs 1-2; pl. 25, figs 8-14, 31; text-fig. 7. –HOFKER, 1972, p. 67, pl. 20, figs 4-6. –LOEBLICH & TAPPAN, 1994, p. 13, pl. 3, fig. 7.

Key features: Test small; single globular chamber with no visible aperture; thick wall of very fine, white, dusty particles, loosely cemented but smoothly finished.

Superfamily KOMOKIACEA Tendal & Hessler, 1977
Family KOMOKIIDAE Tendal & Hessler, 1977
Genus **LANA** Tendal & Hessler, 1977

Lana neglecta Tendal & Hessler, 1977

Lana neglecta TENDAL & HESSLER, 1977, p. 186, text-fig. 8; pl. 13A-B, 14D, 26B. –LOEBLICH & TAPPAN, 1987, p. 41, pl. 30, fig. 6.

Genus **SEPTUMA** Tendal & Hessler, 1977

Septuma ocotillo Tendal & Hessler, 1977

Septuma ocotillo TENDAL & HESSLER, 1977, p. 180, text-fig. 4; pl. 9C, 10A-B, 12A-B, 19A, 20A-F, 21A-D. –LOEBLICH & TAPPAN, 1987, p. 41, pl. 30, figs 1-2.

Superfamily HIPPOCREPINACEA Rhumbler, 1895
Family HIPPOCREPINIDAE Rhumbler, 1895
Subfamily HYPERAMMININAE Eimer & Fickert, 1899
Genus **HYPERAMMINA** Brady, 1878

Hyperammina distorta Cushman, 1918

pl. 1, fig. 5

Hyperammina distorta CUSHMAN, 1918a, p. 78. –HOFKER, 1972, p. 50, pl. 14, figs 9-14.

Key features: Test elongate, tubular; wall very thin, composed of very fine sponge spicules and grains, with irregularly incorporated bigger grains or foraminifera tests; colour gray or yellowish-brown.

Remarks: Closely resembles *Hyperammina malovensis* Heron-Allen & Earland.

Hyperammina elongata Brady, 1878

Hyperammina elongata BRADY, 1878, p. 433, pl. 20, fig. 2. –BRADY, 1884, p. 257, pl. 23, fig. 8 (ZF 1591-92). –HOFKER, 1972, p. 45, pl. 12, figs 4-7. –SCHRÖDER, 1986, p. 34, pl. 6, fig. 2. –ZHENG, 1988, p. 28, pl. 4, figs 4-5. –JONES, 1994, p. 33, pl. 23, fig. 8. –HEß, 1998, p. 63, pl. 1, figs 8-9.

Key features: Test elongate, tubular with subglobular proloculus; rough wall of fine grains, firmly cemented; colour orange-brown.

Hyperammina laevigata Wright, 1891

Hyperammina elongata BRADY, 1884, p. 257, pl. 23, figs 9-10.
Hyperammina elongata Brady var. *laevigata* WRIGHT, 1891, p. 466, pl. 20, fig. 1.
Hyperammina laevigata Wright. –HOFKER, 1972, p. 46, pl. 11, figs 10-14. –ZHENG, 1988, p. 29, pl. 4, fig. 6. –SCHRÖDER, 1986, p. 34, pl. 6, fig. 3. –JONES, 1994, p. 33, pl. 23, figs 9-10.

Remarks: Differs from *H. elongata* Brady in having more finely grained, smoothly finished, shiny wall.

Hyperammina spiculifera Lacroix, 1928

Hyperammina spiculifera LACROIX, 1928, p. 527, pl. 14, fig. 13. –HOFKER, 1972, p. 50, pl. 14, figs 1-4.

Key features: Test elongate, tubular with subglobular proloculus; wall comprised of longitudinally arranged sponge spicules.

***Hyperammina* sp. 1**

Key features: Test elongate, tubular, slightly widening towards end; large, globular proloculus; thick, rough wall comprised of fine to medium grains, firmly cemented; colour grayish-white; aperture an open end of tube.

***Hyperammina* sp. 2**

Key features: Test elongate, tubular; small, subglobular proloculus; wall agglutinated with fine grains, firmly cemented, smoothly finished with sponge spicules irregularly incorporated; colour light brown to cream-brown; aperture an open end of tube.

Genus **SACCORHIZA** Eimer & Fickert, 1899

Saccorhiza ramosa (Brady, 1879)

pl. 1, fig. 6

Hyperammina ramosa BRADY, 1879a, p. 33, pl. 3, figs 14-15. –BRADY, 1884, p. 261, pl. 23, figs 15-19 (ZF 1596).
Saccorhiza ramosa (Brady). –CUSHMAN, 1910b, p. 65, pl. 30, figs 3-4; text-fig. 81. –SCHRÖDER, 1986, p. 35, pl. 7, fig. 1. –ZHENG, 1988, p. 31, pl. 3, figs 6-9; pl. 7, figs 1-2. –INOUE, 1989, pl. 18, fig. 1. –JONES, 1994, p. 33, pl. 23, figs 15-19. –LOEBLICH & TAPPAN, 1994, p. 14, pl. 1, figs 4-5. –HEß, 1998, p. 70, pl. 1, figs 3-5.
Hyperammina (Saccorhiza) ramosa Brady. –HOFKER, 1972, p. 53, pl. 15, figs 5-8.

Subfamily HIPPOCREPININAE Rhumbler, 1895
Genus **JACULELLA** Brady, 1879

Jaculella* cf. *acuta Brady, 1879

Jaculella acuta BRADY, 1879a, p. 35, pl. 3, figs 12-13. –BRADY, 1884, p. 255, pl. 22, figs 14-18. –SCHRÖDER, 1986, p. 35, pl. 8, fig. 7. –JONES, 1994, p. 33, pl. 22, figs 14-18.

Key features: Tubular, conical and elongated test; wall coarsely agglutinated, firmly cemented with very roughly finished interior surface; specimens vary a lot in width of the test.

Order **LITUOLIDA** Lankester, 1885
Superfamily AMMODISCACEA Reuss, 1862
Family AMMODISCIDAE Reuss, 1862
Subfamily AMMODISCINAE Reuss, 1862
Genus **AMMODISCOIDES** Cushman, 1909

***Ammodiscoides* sp.**

pl. 2, figs 4-5

Key features: Test small, conical, similar in plan to *Ammodiscus* Reuss, but with regular trochospiral coil, evolute and not closely coiled; aperture at the open end of tube; wall firmly cemented of fine sand grains; orange-brown colour.

Genus **AMMODISCUS** Reuss, 1862

Ammodiscus anguillae Höglund, 1947

pl. 1, fig. 16

Ammodiscus incertus (d'Orbigny). –BRADY, 1884 (non *Operculina incerta* d'Orbigny, 1839), p. 330, pl. 38, figs 1-3.
Ammodiscus anguillae HÖGLUND, 1947, p. 128, pl. 28, fig. 8; pl. 29, fig. 4; text-figs 101, 105, 109. –TAPPAN & LOEBLICH, 1982, pl. 47, fig. 6. –JONES, 1994, p. 43, pl. 38, figs 1, 2?, 3. –LOEBLICH & TAPPAN, 1994, p. 14, pl. 4, figs 13-14.

Ammodiscus catinus Höglund, 1947

pl. 1, figs 17-18

Ammodiscus catinus HÖGLUND, 1947, p. 122, pl. 8, figs 1, 7; pl. 28, figs 19-23; text-figs 82-84, 105-107, 109. –HEß, 1998, p. 56, pl. 6, figs 2-4.
Ammodiscus evolutus ZHENG, 1988, p. 308, pl. 5, figs 4-5.

Key features: Small, thin, planispiral test with numerous whorls of narrow, tubular chamber; sutures between whorls distinct; proloculus globular; rough wall of fine grains; colour orange-brown; last whorls usually irregularly arranged.

Ammodiscus cretaceus (Reuss, 1845)

Operculina cretacea REUSS, 1845, p. 35, pl. 13, figs 64-65.
Ammodiscus cretaceus (Reuss). –HEß, 1998, p. 56.

Ammodiscus planorbis Höglund, 1947

pl. 2, figs 1-2

Ammodiscus planorbis HÖGLUND, 1947, p. 125, pl. 8, figs 4, 9; pl. 28, figs 13-16; text-figs 91, 105, 109.
Involutina hoeglundi UCHIO, 1960, p. 51, pl. 1, fig. 12.
Ammodiscus hoeglundi (Uchio). –ZHENG, 1988, p. 36, pl. 5, fig. 2; pl. 51, fig. 3; text-fig. 3.

Key features: Test planispiral to biconcave, very regularly coiled with numerous slightly overlapping whorls; sutures between whorls distinct; proloculus globular and small; smooth, shiny wall of very fine grains; colour orange-brown.

Remarks: Uchio (1960) found it necessary to restrict *A. planorbis* Höglund and *A. hoeglundi* (Uchio). Differentiation between them is problematic, since several variations, from flat to strongly biconcave, with the varying size of the proloculus are found in the Sunda material. Herein specimens of these two species are grouped together.

Ammodiscus tenuis Brady, 1881

pl. 2, fig. 3

Ammodiscus tenuis BRADY, 1881, p. 51. –BRADY, 1884, p. 332, pl. 38, figs 4-6. –JONES, 1994, p. 43, pl. 38, figs 4-6.
Ammodiscus cf. *tenuis* Brady. –HÖGLUND, 1947, p. 127, pl. 8, fig. 6; pl. 28, figs 5-7; pl. 29, figs 1-2; text-figs 95-98, 105, 106, 109.

Ammodiscus **sp. 1**

Key features: Small, planispiral test with numerous whorls; sutures between whorls distinct; proloculus globular; very smooth, shiny wall of very fine grains; colour pale gray; last whorls usually irregularly arranged.

Subfamily TOLYPAMMININAE Cushman, 1928
Genus **AMMOLAGENA** Eimer & Fickert, 1899

Ammolagena clavata (Jones & Parker, 1860)

pl. 2, fig. 9

Trochammina irregularis (d'Orbigny) var. *clavata* JONES & PARKER, 1860, p. 304.
Webbina clavata (Jones & Parker). –BRADY, 1884, p. 349, pl. 41, figs, 12-16 (ZF 2623-24).
Ammolagena clavata (Jones & Parker). –CUSHMAN, 1921, p. 61, pl. 6, figs 1-4; pl. 10, figs 3-4. –SAIDOVA, 1961, p. 24, pl. 7, fig. 32. –SCHRÖDER, 1986, p. 40, pl. 11, figs 5-6. –LOEBLICH & TAPPAN, 1987, p. 49, pl. 36, fig. 16. –ZHENG, 1988, p. 39, pl. 6, fig. 6. –JONES, 1994, p. 46, p. 41, figs 12-16. –LOEBLICH & TAPPAN, 1994, p. 14, pl. 4, figs 1-4.

Genus **TOLYPAMMINA** Rhumbler, 1895

Tolypammina vagans (Brady, 1879)

Hyperammina vagans BRADY, 1879a, p. 33, pl. 5, fig. 3. –BRADY, 1884, p. 260, pl. 24, figs 1-9 (ZF 1599).
Tolypammina vagans (Brady). –CUSHMAN, 1921, p. 55, pl. 4, figs 2-3; pl. 7, figs 1-2. –SCHRÖDER, 1986, p. 39, pl. 11, figs 7-9. –ZHENG, 1988, p. 38, pl. 7, fig. 8. –JONES, 1994, p. 33, pl. 24, figs 1-5. –LOEBLICH & TAPPAN, 1994, p. 15, pl. 1, figs 7-8.
Hyperammina (Tolypammina) vagans (Brady). –HOFKER, 1972, p. 55, pl. 16, figs 8-10.

Subfamily AMMOVERTELLININAE Saidova, 1981
Genus **GLOMOSPIRA** Rzehak, 1885

Glomospira glomerata Höglund, 1947

pl. 2, fig. 6

Glomospira glomerata HÖGLUND, 1947, p. 130, pl. 3, figs 8-10; text-fig. 104. –ZHENG, 1988, p. 37, pl. 6, fig. 5.

Glomospira gordialis (Jones & Parker, 1860)

pl. 2, fig. 8

Trochammina squamata Jones & Parker var. *gordialis* JONES & PARKER, 1860, p. 304.
Ammodiscus gordialis (Jones & Parker). –BRADY, 1884, p. 333, pl. 38, figs 7-9 (ZF 1058).
Glomospira gordialis (Jones & Parker). –CUSHMAN, 1918a, p. 99, pl. 36, figs 7-9. –LOEBLICH & TAPPAN, 1964, p. C212, fig. 122.6. –SCHRÖDER, 1986, p. 39, pl. 11, figs 1-2. –ZHENG, 1988, p. 38, pl. 6, fig. 4. –JONES, 1994, p. 43, pl. 38, figs 7-9. –HEß, 1998, p. 61, pl. 6, fig. 1.

Subfamily USBEKISTANIINAE Vyalov, 1968

Genus **USBEKISTANIA** Suleymanov, 1960

Usbekistania charoides (Jones & Parker, 1860)

pl. 2, fig. 7

Trochammina squamata Jones & Parker var. *charoides* JONES & PARKER, 1860, p. 304.
Ammodiscus charoides (Jones & Parker). –BRADY, 1884, p. 334, pl. 38, figs 10-16 (ZF 1052).
Glomospira charoides (Jones & Parker). –CUSHMAN, 1918a, p. 100, pl. 36, figs 10-15. –HÖGLUND, 1947, p. 129, pl. 3, fig. 11; text-fig. 103. –RESIG, 1981, pl. 9, fig. 8. –ZHENG, 1988, p. 37, pl. 6. figs 1-3.
Repmanina charoides (Jones & Parker). –LOEBLICH & TAPPAN, 1987, p. 52, pl. 39, figs 24-26. –LOEBLICH & TAPPAN, 1994, p. 15, pl. 4, figs 5-12.
Usbekistania charoides (Jones & Parker). –JONES, 1994, p. 43, pl. 38, figs 10-16.

Remarks: Jones (1994) regarded *Repmanina* Suleymanov (in Arapova & Suleymanov, 1966) as a junior synonym of *Usbekistania* Suleymanov (1960).

Superfamily HORMOSINACEA Haeckel, 1894
Family REOPHACIDAE Cushman, 1910
Genus **REOPHAX** de Montfort, 1808

Reophax bilocularis Flint, 1899

Reophax bilocularis FLINT, 1899, p. 273, pl. 17, fig. 3. –CUSHMAN, 1920, p. 10, pl. 3, figs 3-4. –CUSHMAN, 1921, p. 74, pl. 12, fig. 7. –HOFKER, 1972, p. 38, pl. 9, figs 3-4. –SCHRÖDER, 1986, p. 42, pl. 14, figs 8-13. –ZHENG, 1988, p. 42, pl. 9, figs 7-8. –HEß, 1998, p. 67, pl. 2, figs 11-14.

Reophax bradyi Brönnimann & Whittaker, 1980

pl. 2, fig. 17

Reophax scorpiurus de Montfort. –BRADY, 1884 (not de Montfort, 1808), p. 291, pl. 30, fig. 12.
Saccammina sphaerica Sars, G.O. –BRADY, 1884 (not Sars, G.O., 1872), p. 253, pl. 18, fig. 16.
Reophax bradyi BRÖNNIMANN & WHITTAKER, 1980b, p. 264, figs 13-16. –JONES, 1994, p. 31, pl. 18, fig. 16; p. 37, pl. 30, fig. 12.

Reophax curtus Cushman, 1920

Reophax curtus CUSHMAN, 1920, p. 8, pl. 2, figs 2-3. –HADA, 1931, p. 57, text-fig. 8. –SAIDOVA, 1961, p. 16, pl. 4, fig. 17. –SEN GUPTA, 1971, p. 84, pl. 1, figs 2-4. –ZHENG, 1988, p. 43, pl. 12, fig. 2. –WANG *et al.*, 1988, p. 117, pl. 10, figs 4, 16.

Reophax dentaliniformis Brady, 1881

pl. 2, figs 14-15

Reophax dentaliniformis BRADY, 1881, p. 49. –BRADY, 1884, p. 293, pl. 30, figs 21-22. –EARLAND, 1934, p. 81, pl. 2, figs 32-35. –HÖGLUND, 1947, p. 88, pl. 9, fig. 13; text-fig. 54. –ZHENG, 1988, p. 43, pl. 10, figs 2-3. –JONES, 1994, p. 37, pl. 30, figs 21-22. –HEß, 1998, p. 67, pl. 3, figs 1-2.
Hormosina dentaliniformis (Brady). –BRÖNNIMANN & WHITTAKER, 1980b, p. 265, figs 8-11.

Key features: Slender, elongated, almost straight test; 5-7 elongated chambers slowly increasing in size; round aperture protruded on the short, tubular neck; thin wall of sand grains varying in size, smoothly finished.

Reophax fusiformis (Williamson, 1858)

Proteonina fusiformis WILLIAMSON, 1858, p. 1, pl. 1, fig. 1.
Reophax fusiformis (Williamson). –BRADY, 1884, p. 290, pl. 30, figs 7-10, ?11. –SCHRÖDER, 1986, p. 44, pl. 15, fig. 9. –JONES, 1994, p. 37, pl. 30, figs 7-10, ?11. –YASSINI & JONES, 1995, p. 67, fig. 17.

Reophax helenae (Rhumbler, 1911)

Proteonina helenae RHUMBLER, 1911, p. 380.
Reophax helenae (Rhumbler). –SCHRÖDER, 1986, p. 44, pl. 15, fig. 8. –HEß, 1998, p. 67, pl. 3, figs 8-9.

Reophax hispidulus Cushman, 1920

Reophax hispidulus CUSHMAN, 1920, p. 24, pl. 5, fig. 7. –ZHENG, 1988, p. 46, pl. 10, figs 10-11; pl. 12, fig. 9.

Reophax longicollaris Zheng, 1988

pl. 2, fig. 10

Reophax longicollaris ZHENG, 1988, p. 47, pl. 8, figs 11-12.

Reophax micaceus Earland, 1934

pl. 2, fig. 11

Reophax micaceus EARLAND, 1934, p. 82, pl. 2, figs 37-40.
Reophax micaceus Earland. –UCHIO, 1960, p. 50, pl. 1, fig. 2.

Reophax pesciculus Saidova, 1975

Reophax pesciculus SAIDOVA, 1975, p. 95, pl. 95, fig. 8.

Reophax regularis Höglund, 1947

Reophax regularis HÖGLUND, 1947, p. 86, pl. 9, figs 11-12; pl. 26, figs 37-43; pl. 27, figs 24-27; text-fig. 53. –ZHENG, 1988, p. 51, pl. 13, fig. 1.

Key features: Tapering, almost straight test, composed of 4-6 chambers; terminal aperture on the short neck; rough wall of large sand grains.

Reophax scorpiurus de Montfort, 1808

pl. 3, figs 1-5

Reophax scorpiurus DE MONTFORT, 1808, p. 330, text-fig. 130. –BRADY, 1884, p. 291, pl. 30, figs 15-17 (not figs 12-14). –CUSHMAN, 1921, p. 65, pl. 6, fig. 6. –HOFKER, 1972, p. 38, pl. 8, figs 17-18. –BRÖNNIMANN & WHITTAKER, 1980b, p. 261, figs 1-7, 12, 17. –ZHENG, 1988, p. 51, pl. 13, fig. 6. –HATTA & UJIIÉ, 1992a, p. 55, pl. 1, figs 2-3; pl. 19, fig. 1. –YASSINI & JONES, 1995, p. 68, figs 18-19. –HEß, 1998, p. 68, pl. 3, figs 6, 10.

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

Reophax spiculifer Brady, 1879

pl. 2, fig. 13

Reophax spiculifera BRADY, 1879a, p. 54, pl. 4, figs 10-11. –BRADY, 1884, p. 295, pl. 31, figs 16-17 (ZF 2290-91).

Reophax spiculifer Brady. –HOFKER, 1972, p. 39, pl. 9, figs 9-13. –ZHENG, 1988, p. 52, pl. 13, fig. 4. –JONES, 1994, p. 38, pl. 31, figs 16-17. –YASSINI & JONES, 1995, p. 68, fig. 13. –HEß, 1998, p. 68, pl. 3, fig. 3.

Reophax subdentaliniformis Parr, 1950

pl. 2, fig. 16

Reophax subdentaliniformis PARR, 1950, p. 269, pl. 4, fig. 20. –SAIDOVA, 1975, p. 58, pl. 12, fig. 4. –ZHENG, 1988, p. 52, pl. 14, fig. 13.

Reophax subfusiformis Earland, 1933

pl. 2, fig. 12

Reophax subfusiformis EARLAND, 1933, p. 74, pl. 2, figs 16-19. –HÖGLUND, 1947, p. 82, pl. 9, figs 1-4; pl. 26, figs 1-36; pl. 27, figs 1-19; text-figs 43-50. –HOFKER, 1972, p. 38, pl. 9, figs 1-2. –ZHENG, 1988, p. 52, pl. 13, fig. 7. –HEß, 1998, p. 69, pl. 3, fig. 5. –HAYWARD *et al.*, 1999, p. 82, pl. 1, figs 15-16.

Key features: Test strongly curved, composed of 4-6 chambers rapidly increasing in size; round aperture on the neck placed near outer edge of the curve; thin wall of sand grains varying in size.

Reophax tubulus Zheng, 1988

Reophax tubulus ZHENG, 1988, p. 53, pl. 10, figs 7-8.

Key features: Test large, straight, uniserial; wall agglutinated with coarse grains and big particles of planktonic and benthic foraminiferal tests; 5-7 chambers, slightly increasing in size as added; aperture terminal, round on the end of tapering neck.

***Reophax* sp. 1**

Reophax scorpiurus de Montfort. –BRADY, 1884 (not de Montfort, 1808), p. 291, pl. 30, fig. 14 (not figs 12-13, 15-17).

Reophax sp. nov. (1). –JONES, 1994, p. 37, pl. 30, fig. 14.

Key features: Test small, uniserial; wall agglutinated with medium coarse quartz grains; 4-6 pyriform chambers; slightly increasing in size as added; the base of chambers equipped with long spines; aperture terminal, round on the end of long tapering neck.

***Reophax* sp. 2**

Key features: Large, uniserial test; wall agglutinated with very coarse grains, with great amount of cement; chambers elongated, slightly increasing in size as added; aperture terminal, round.

***Reophax* sp. 3**

Key features: Test small, slender, uniserial; wall agglutinated with fine quartz grains; 4-5 pyriform, elongated chambers, slightly increasing in size as added; characteristic perpendicular change in growth direction after first two chambers; aperture terminal, round on the end of tapering neck.

Genus **SCHEROCHORELLA** Loeblich & Tappan, 1984

Scherochorella moniliforme (Siddall, 1886)

Reophax moniliforme SIDDALL, 1886, p. 54, pl. 1, fig. 2. –ZHENG, 1988, p. 48, pl. 10, fig. 9; pl. 11, fig. 5.

Reophax moniliformis Siddall. –MURRAY, 1971, p. 19, pl. 2, fig. 1.

Scherochorella moniliforme (Siddall). –HAYWARD *et al.*, 1999, p. 83, pl. 1, figs 13-14.

Genus **SUBREOPHAX** Saidova, 1975

Subreophax aduncus (Brady, 1882)

pl. 3, fig. 10

Reophax adunca BRADY, 1882, p. 715. –BRADY, 1884, p. 296, pl. 31, figs 23-26 (ZF 2256-59).

Subreophax aduncus (Brady). –SAIDOVA, 1975, p. 57, pl. 11, fig. 6. –LOEBLICH & TAPPAN, 1987, p. 59, pl. 44, figs 17-20. –JONES, 1994, p. 38, pl. 31, figs 23-26. –LOEBLICH & TAPPAN, 1994, p. 15, pl. 5, figs 11-12.

Reophax aduncus (Brady). –ZHENG, 1988, p. 40, pl. 8, fig. 7.

Subreophax monile (Brady, 1881)

Trochammina (Hormosina) monile BRADY, 1881, p. 52.
Hormosina monile Brady. –BRADY, 1884, p. 328, pl. 39, figs 10-13 (ZF 1585). –CUSHMAN, 1912, p. 229, pl. 28, figs 9-10. –ZHENG, 1988, p. 54, pl. 12, fig. 8.
Subreophax monile (Brady). –JONES, 1994, p. 44, pl. 39, figs 10-13.

***Subreophax* sp. 1**

Key features: Test straight, uniserial; wall thin, agglutinated with fine to medium coarse grains; 4-6 round chambers, embracing slightly the previous ones and moderately increasing in size as added; aperture terminal, round, no neck; colour light brown.

Family TELAMMINIDAE Loeblich & Tappan, 1985
Genus **AGGEROSTRAMEN** Loeblich & Tappan, 1985

Aggerostramen rustica (Heron-Allen & Earland, 1912)

Psammosphaera rustica HERON-ALLEN & EARLAND, 1912, p. 383, pl. 5, figs 3-4; pl. 6, figs 2-4. –ZHENG, 1988, p. 32, pl. 7, fig. 5. –HEß, 1998, p. 65, pl. 2, fig. 1.
Marsipella rustica (Heron-Allen & Earland). –HOFKER, 1972, p. 82, pl. 26, figs 5-7; pl. 27, figs 1-5.
Aggerostramen rustica (Heron-Allen & Earland). –LOEBLICH & TAPPAN, 1987, p. 56, pl. 43, figs 1-7.

Family HORMOSINIDAE Haeckel, 1894
Subfamily HORMOSININAE Haeckel, 1894
Genus **HORMOSINA** Brady, 1879

Hormosina globulifera Brady, 1879

Hormosina globulifera BRADY, 1879a, p. 60, pl. 4, figs 4-5. –BRADY, 1884, p. 326, pl. 39, figs 1-6 (ZF 1581). –HOFKER, 1972, p. 60, pl. 17, figs 13-16. –SCHRÖDER, 1986, p. 41, pl. 13, figs 1-3. –VAN MARLE, 1991, p. 236. –JONES, 1994, p. 44, pl. 39, figs 1-4, 6.

Key features: Test composed of 1-5 spherical chambers; increasing in size, without definite growth axis; last chamber slightly embracing the previous one; aperture at the short narrow, tubular neck; smooth wall of very fine firmly cemented grains; colour orange-brown.

Hormosina normanii Brady, 1881

Hormosina normanii BRADY, 1881, p. 52. –BRADY, 1884, p. 329, pl. 39, figs 19-23 (ZF 1586). –CUSHMAN, 1920, p. 32, pl. 7, fig. 1. –HOFKER, 1972, p. 61, pl. 18, figs 1-3. –JONES, 1994, p. 44, pl. 39, figs 19-23.

Hormosina pilulifera (Brady, 1884)

Reophax pilulifera BRADY, 1884, p. 292, pl. 30, figs 18-20. –YASSINI & JONES, 1995, p. 68, fig. 20.
Reophax pilulifer Brady. –ZHENG, 1988, p. 49, pl. 14, fig. 1.
Hormosina pilulifera (Brady). –JONES, 1994, p. 37, pl. 30, figs 18-20.

Hormosina spiculifera Hofker, 1972

Hormosina spiculifera HOFKER, 1972, p. 63, pl. 19, figs 1-4. –HOFKER, 1976, p. 48, fig. 25. –ZHENG, 1988, p. 54, pl. 8, figs 1-4.

***Hormosina* sp. 1**

Key features: Test small, uniserial; wall agglutinated with medium to coarse quartz grains; 3-5 globular, chambers, all the same size; each chamber attached near the base of the short neck of the previous chamber; aperture terminal, round on a short neck.

***Hormosina* sp. 2**

pl. 3, fig. 6

Key features: Test small, uniserial; wall agglutinated with fine grains and great amount of small foraminiferal tests; usually more than 5 pyriform chambers, slightly increasing in size; each chamber attached near the base of the short neck of the previous chamber; aperture terminal, round on a short neck.

Remarks: *Hormosina* sp. 2 resembles closely *Hormosina* sp. 1, but differs in having rather pyriform than globular and usually more than five chambers.

Genus **LOEBLICHOPSIS** Hofker, 1969

Loeblichopsis cylindrica Brady, 1884

Reophax cylindrica BRADY, 1884, p. 299, pl. 32, figs 7-9 (ZF 2264).
Loeblichopsis cylindrica (Brady). –JONES, 1994, p. 38, pl. 32, figs 7-9.

Genus **PSEUDONODOSINELLA** Saidova, 1970

Pseudonodosinella bacillaris (Brady, 1881)

Reophax bacillaris BRADY, 1881, p. 49. –BRADY, 1884, p. 293, pl. 30, figs 23-24 (ZF 2261-2262). –SCHRÖDER, 1986, p. 42, pl. 16, figs 1-2.
Hormosina bacillaris (Brady). –JONES, 1994, p. 37, pl. 30, figs 23-24.
Pseudonodosinella bacillaris (Brady). –HEß, 1998, p. 66.

Pseudonodosinella sp. 1

pl. 3, fig. 7

Pseudonodosinella sp. 1. –HEß, 1998, p. 66, pl. 4, figs 1-3.

Key features: Test elongated, uniserial; wall finely agglutinated, firmly cemented; chambers round with slightly depressed sutures; the initial part of the test always anchored in empty test of planktonic foraminifera; colour dark brow; aperture terminal, round.

Pseudonodosinella sp. 2

Nodosinum gaussicum (Rhumbler). –LOEBLICH & TAPPAN, 1994 (non *Nodosinella gaussica* Rhumbler, 1913), p. 16, pl. 5, figs 18-19.

Key features: Test long, slender; tapering, usually straight but can be arcuate; wall coarsely agglutinated, rough; pyriform chambers slightly embracing the pervious ones; increasing in size as added; aperture round, terminal; colour grayish white.

Genus **REOPHANUS** Saidova, 1970

Reophanus oviculus (Brady, 1879)

pl. 3, fig. 11

Hormosina ovicula BRADY, 1879a, p. 61, pl. 4, fig. 6. –BRADY, 1884, p. 327, pl. 39, figs 7-9 (ZF 1587). –CUSHMAN, 1920, p. 28, pl. 6, fig. 2. –HOFKER, 1972, p. 62, pl. 18, figs 13-15.
Reophanus oviculus (Brady). –LOEBLICH & TAPPAN, 1987, p. 61, pl. 46, fig. 10.
Hormosinella ovicula (Brady). –JONES, 1994, p. 44, pl. 39, figs 7-9.

Reophanus oviculus var. mexicanus (Cushman, 1920)

Hormosina ovicula Brady var. *mexicana* CUSHMAN, 1920, p. 29, pl. 6, fig. 3. –ZHENG, 1988, p. 54, pl. 8, figs 5-6.

Subfamily NODOSININAE Saidova, 1981
Genus **NODOSINUM** Hofker, 1930

Nodosinum gaussicum (Rhumbler, 1913)

Reophax nodulosa BRADY, 1879a, p. 52, pl. 4, figs 7-8. –BRADY, 1884, p. 294, pl. 31, figs 1-2, 5 (not figs 3-4, 6-9).
Nodosinella gaussica RHUMBLER, 1913, p. 452, pl. 20, figs 1-2.
Nodosinum gaussicum (Rhumbler). –HOFKER, 1930, p. 12, pl. 40, figs 2, 5-8; pl. 43, fig. 8; pl. 48, figs 1-10. –LOEBLICH & TAPPAN, 1987, p. 62, pl. 46, figs 14-17.
Reophax gaussicus (Rhumbler). –JONES, 1994, p. 38, pl. 31, figs 1, 2, ? 5.

Nodosinum mortenseni (Hofker, 1972)

Reophax nodulosa Brady. –BRADY, 1884 (not Brady, 1879a), p. 294, pl. 31, figs 3-4.
Hormosina mortenseni HOFKER, 1972, p. 62, pl. 18, figs 6-12.
Reophax mortenseni (Hofker). –JONES, 1994, p. 38, pl. 31, figs 3-4.
Pseudonodosinella mortenseni (Hofker). –HEß, 1998, p. 66, pl. 3, fig. 13.

Family HORMOSINELLIDAE Rauzer-Chernousova & Reitlinger, 1986
Genus **HORMOSINELLA** Shchedrina, 1969

Hormosinella distans (Brady, 1881)

pl. 3, fig. 8

Reophax distans BRADY, 1881, p. 50. –BRADY, 1884, p. 296, pl. 31, figs 18-22 (ZF 2270). –CUSHMAN, 1921, p. 66, pl. 12, fig. 2. –SCHRÖDER, 1986, p. 44, pl. 16, figs 3-5, 9. –ZHENG, 1988, p. 45, pl. 8, figs 13-14; pl. 12, fig. 7.
Nodosinella distans (Brady). –SAIDOVA, 1961, p. 21, pl. 6, fig. 23.
Hormosinella distans (Brady). –SHCHEDRINA, 1969, p. 170. –LOEBLICH & TAPPAN, 1987, p. 57, pl. 44, figs 6-9. –JONES, 1994, p. 38, pl. 31, figs 18-22. –LOEBLICH & TAPPAN, 1994, p. 16, pl. 5, figs 15-17. –HEß, 1998, p. 63, pl. 3, fig. 14.

Remarks: In the Sunda Shelf material a form slightly different from the typical *H. distans* was found. It resembles *Reophax turbo* Goës (1896), but differs in having a thick wall, more inflated chambers and smaller margin (swelling) at the base.

***Hormosinella distans* type 1**: Test almost straight composed of 4-5 subglobular chambers, with small swelling at the base and tapering to narrow, elongated tubular neck; usually proloculus is missing; aperture at the end of tubular neck; wall finely agglutinated, firmly cemented; colour grayish-white.

Hormosinella guttifera (Brady, 1881)

pl. 3, fig. 9

Reophax guttifera BRADY, 1881, p. 49. –BRADY, 1884, p. 295, pl. 31, figs 10-15. –HÖGLUND, 1947, p. 90, text-figs 65-68.
Nodosinella guttifer (Brady). –SAIDOVA, 1961, p. 21, pl. 6, fig. 24.
Reophax guttifer Brady. –SCHRÖDER, 1986, p. 44, pl. 15, figs 12-13. –ZHENG, 1988, p. 46, pl. 12, fig. 12.
Hormosinella guttifera (Brady). –JONES, 1994, p. 38, pl. 31, figs 10-15.
Subreophax guttifer (Brady). –HEß, 1998, p. 72, pl. 1, figs 11-12.

Key features: Test composed of 4-7 pyriform chambers, broadest at the base and tapering to narrow, tubular neck; aperture at the end of tubular neck of the last chamber, with small collar; rough wall; colour dark orange-brown.

Remarks: Almost all the SCS specimens are characterised by perpendicular change in growth direction after first 2-3 chambers which lack characteristic tubular part between them.

In the Sunda Shelf material besides the typical form of *H. guttifera* two varieties of this species were observed.

***Hormosinella guttifera* type 1**: Test almost straight composed of 4-5 pyriform chambers, broadest at the base and tapering to narrow, elongated tubular neck; aperture at the end of tubular neck of the last chamber; wall composed of varying in size grains with sponge spicules, arranged longitudinally; colour grayish-white.

***Hormosinella guttifera* type 2**: Test straight, uniserial; composed of 4-7 pyriform chambers; aperture terminal, round on the end of tapering neck; wall thick, composed of coarse grains, tests of foraminifera and radiolaria.

Superfamily LITUOLACEA de Blainville, 1827
Family HAPLOPHRAGMOIDIDAE Maync, 1952
Genus **BUZASINA** Loeblich & Tappan, 1985

Buzasina ringens (Brady, 1879)

pl. 3, figs 12-13

Trochammina ringens BRADY, 1879a, p. 57, pl. 5, fig. 12. –BRADY, 1884, p. 343, pl. 40, figs 17-18 (ZF 2512).
Haplophragmoides ringens (Brady). –CUSHMAN, 1910b, p. 107, fig. 166.
Alveolophragmium ringens (Brady). –BARKER, 1960, p. 82, pl. 40, figs 17-18.
Cribrostomoides ringens (Brady). –SAIDOVA, 1961, p. 31, pl. 9, fig. 44. –SCHRÖDER, 1986, p. 47, pl. 18, figs 13-14. –ZHENG, 1988, p. 60, pl. 16, figs 7-9; pl. 51, fig. 7; text-fig. 9.
Buzasina ringens (Brady). –JONES, 1994, p. 45, pl. 40, figs 17-18. –HEß, 1998, p. 58, pl. 8, fig. 5.

Genus **CRIBROSTOMOIDES** Cushman, 1910

Remarks: Following Jones (1994) *Labrospira* Höglund (1947) is regarded a junior synonym of genus *Cribrostomoides* Cushman (1910).

Cribrostomoides nitidus (Goës, 1896)

pl. 3, figs 14-15

Haplophragmium nitidum GOËS, 1896, p. 30, pl. 3, figs 8-9.
Haplophragmoides nitidus (Goës). –EARLAND, 1934, p. 88, pl. 3, figs 3-6.
Labrospira nitida (Goës). –HÖGLUND, 1947, p. 145, pl. 11, fig. 5; text-fig. 127.
Cribrostomoides nitidum (Goës). –POAG, 1981, p. 56, pl. 9, fig. 2; pl. 10, fig. 2. –ZHENG, 1988, p. 59, pl. 16, figs 10-11; pl. 51, fig. 6; text-fig. 7. –HEß, 1998, p. 59, pl. 7, fig. 9.

Cribrostomoides scitulus (Brady, 1881)

Haplophragmium scitulum BRADY, 1881, p. 50. –BRADY, 1884, p. 308, pl. 34, figs 11-13 (ZF 1551).
Alveolophragmium scitulum (Brady). –BARKER, 1960, p. 70, pl. 34, figs 11-13.
Cribrostomoides scitulus (Brady). –SAIDOVA, 1961, p. 31, pl. 9, fig. 46. –WANG *et al.*, 1988, p. 118, pl. 10, fig. 12.
Cribrostomoides scitulum (Brady). –ZHENG, 1988, p. 61, pl. 17, figs 4-5; pl. 18, figs 3-4.
Veleroninoides scitulus (Brady). –JONES, 1994, p. 41, pl. 34, figs 11-13.

Cribrostomoides subglobosus (G.O. Sars, 1872)

pl. 4, figs 1-2

Lituola subglobosa SARS, M. in Carpenter, 1869, p. 250. –SARS, G.O., 1872, p. 253.
Haplophragmium latidorsatum (Bornemann). –BRADY, 1884 (not Bornemann, 1855), p. 307, pl. 34, figs 8-10 (ZF 1542).
Haplophragmoides subglobosum (M. Sars). –CUSHMAN, 1910b, p. 105, text-figs 162-164.
Cribrostomoides bradyi CUSHMAN, 1910b, p. 108, text-fig. 167. –LOEBLICH & TAPPAN, 1987, p. 65, pl. 49, figs 1-3. –LOEBLICH & TAPPAN, 1994, p. 16, pl. 10, figs 10-13.
Cribrostomoides subglobosum (M. Sars). –SCHRÖDER, 1986, p. 48, pl. 18, figs 15-16.
Cribrostomoides subglobosus (M. Sars). –VAN MARLE, 1991, p. 240, pl. 25, figs 7-9.
Cribrostomoides subglobosus (Cushman). –JONES, 1994, p. 40, pl. 34, figs 8-10.

Genus **EVOLUTINELLA** Myatliuk, 1971

Evolutinella rotulata (Brady, 1881)

Haplophragmium rotulatum BRADY, 1881, p. 50. –BRADY, 1884, p. 306, pl. 34, figs 5-6 (ZF 1550).
Haplophragmoides rotulatum (Brady). –CUSHMAN, 1920, p. 47, pl. 9, figs 3-4. –BARKER, 1960, p. 70, pl. 34, figs 5-6.
Evolutinella rotulata (Brady). –JONES, 1994, p. 40, pl. 34, figs 5-6.

Genus **HAPLOPHRAGMOIDES** Cushman, 1910

Haplophragmoides bradyi (Robertson, 1891)

pl. 4, fig. 3

Trochammina bradyi ROBERTSON, 1891, p. 388.

Haplophragmoides bradyi (Robertson). –HÖGLUND, 1947, p. 134, pl. 10, fig. 1; text-fig. 111. –MURRAY, 1971, p. 25, pl. 5, figs 1-2. –SCHRÖDER, 1986, p. 46, pl. 18. fig. 8. –WANG *et al.*, 1988, p. 119, pl. 11, fig. 1. –ŌKI, 1989, p. 72.

Key features: Test small, planispiral, involute; 5-6 chambers in the last whorl; periphery rounded; sutures distinct and depressed; surface smooth, shining; aperture interiomarginal, crescentic slit; colour reddish brown.

Haplophragmoides grandiformis Cushman, 1910

pl. 4, fig. 8

Haplophragmoides grandiformis CUSHMAN, 1910a, p. 440, fig. 11. –CUSHMAN, 1921, p. 82, pl. 11, fig. 2. –ZHENG, 1988, p. 56, pl. 16, fig. 3; pl. 17, fig. 7.

Haplophragmoides quadratus Uchio, 1960

Haplophragmoides quadratus UCHIO, 1960, p. 52, pl. 1, fig. 17; pl. 5, fig. 14.

Haplophragmoides sphaeriloculum Cushman, 1910

pl. 4, figs 5-7

Haplophragmoides sphaeriloculum CUSHMAN, 1910b, p. 107, fig. 165. –CUSHMAN, 1921, p. 83, pl. 15, fig. 3. –SAIDOVA, 1961, p. 26, pl. 7, fig. 35. –SCHRÖDER, 1986, p. 47, pl. 18, figs 5-7. –ZHENG, 1988, p. 57, pl. 16, figs 1-2. –HEß, 1998, p. 62, pl. 6, fig. 10.

Haplophragmoides **sp. 1**

pl. 4, fig. 4

Haplophragmoides aff. *bulloides* (Beissel). –HEß, 1998 (non *Haplophragmium bulloides* Beissel, 1891), p. 61, pl. 7, fig. 10.

Key features: Test small, nearly circular, planispiral, involute; chambers inflated, five in the last whorl; periphery broadly rounded; sutures straight, slightly depressed near the periphery and more towards umbilicus; aperture a short, narrow slit at the base of the last chamber, with small lip; wall of firmly cemented fine sand grains; surface smooth, shining; colour reddish-brown.

Remarks: Resembles *Haplophragmoides neobradyi* Uchio (1960), but it does not have lobulate periphery or distinct sutures. By its outline, it resembles more *H. bulloides* (Beissel) as referred by Heß, but its chambers do not increase so rapidly in width.

Haplophragmoides **sp. 2**

Key features: Test usually small (<250 μm), planispiral, involute; chambers inflated, five in the last whorl; periphery rounded; sutures straight and depressed, deep umbilicus; aperture a slit at the base of the last chamber; wall of firmly cemented medium to coarse sand grains; colour orange-brown.

Genus **VELERONINOIDES** Saidova, 1981

Veleroninoides crassimargo (Norman, 1892)

Haplophragmium canariensis (d'Orbigny). –BRADY, 1884 (non *Nonionina canariensis* d'Orbigny, 1839), p. 310, pl. 35, fig. 4.
Haplophragmium crassimargo NORMAN, 1892, p. 17.
Labrospira crassimargo (Norman). –HÖGLUND, 1947, p. 141, pl. 11, fig. 1; text figs 121-125. –LOEBLICH & TAPPAN, 1987, p. 66, pl. 49, figs 10-11. –LOEBLICH & TAPPAN, 1994, p. 16, pl. 10, figs 1-3.
Cribrostomoides crassimargo (Norman). –ZHENG, 1988, p. 58, pl. 16, fig. 6.
Veleroninoides crassimargo (Norman). –JONES, 1994, p. 41, pl. 35, fig. 4.

Veleroninoides jeffreysii (Williamson, 1858)

pl. 4, figs 10-11

Nonionina jeffreysii WILLIAMSON, 1858, p. 34, pl. 3, figs 72-73.
Haplophragmium canariensis (d'Orbigny). –BRADY, 1884 (non *Nonionina canariensis* d'Orbigny, 1839), p. 310, pl. 35, figs 1-3, 5 (ZF 1526).
Cribrostomoides jeffreysii (Williamson). –ŌKI, 1989, p. 72, pl. 1, fig. 14. –YASSINI & JONES, 1995, p. 70, figs 70-71. –HAYWARD *et al.*, 1999, p. 83, pl. 1, figs 23-24.
Veleroninoides jeffreysii (Williamson). –JONES, 1994, p. 41, pl. 35, figs 1-3, 5.

Veleroninoides kosterensis (Höglund, 1947)

Labrospira kosterensis HÖGLUND, 1947, p. 147, pl. 11, fig. 4; text-figs 130-131.
Alveophragmium kosterense (Höglund). –GRAHAM & MILITANTE, 1959, p. 24, pl. 1, fig. 11.
Cribrostomoides kosterensis (Höglund). –ŌKI, 1989, p. 73, pl. 2, fig. 1.
Labrospira kosterense Höglund. –HATTA & UJIIÉ, 1992a, p. 55, pl. 1, fig. 4.

Veleroninoides wiesneri (Parr, 1950)

pl. 4, fig. 12

Trochammina trullissata BRADY, 1884 (not Brady, 1879a), p. 342, pl. 40, figs 14-15 (ZF 2519).
Labrospira wiesneri PARR, 1950, p. 272, pl. 4, figs 25-26.
Cribrostomoides wiesneri (Parr). –SCHRÖDER, 1986, p. 48, pl. 18, figs 10-12. –ZHENG, 1988, p. 63, pl. 18, fig. 2. –YASSINI & JONES, 1995, p. 70, figs 80, 85.

Veleroninoides wiesneri (Parr). –JONES, 1994, p. 45, pl. 40, figs 14-15.
Buzasina wiesneri (Parr). –HEß, 1998, p. 58, pl. 8, fig. 5.

Family DISCAMMINIDAE Mikhalevich, 1980
Genus **AMMOSCALARIA** Höglund, 1947

Ammoscalaria compressa (Cushman & McCulloch, 1939)

pl. 4, fig. 9

Ammofrondicularia compressa CUSHMAN & MCCULLOCH, 1939, p. 68, pl. 4, figs 7-13.
Reophax depressus Natland. –ZHENG, 1988 (not Natland, 1938), p. 44, pl. 12, figs 4-6.
Ammoscalaria (?) compressa (Cushman & McCulloch). –LOEBLICH & TAPPAN, 1994, p. 17, pl. 6, figs 3-14.

Ammoscalaria pseudospiralis (Williamson, 1858)

Proteonina pseudospiralis WILLIAMSON, 1858, p. 2, pl. 1, figs 2-3.
Haplophragmium pseudospirale (Williamson). –BRADY, 1884, p. 302, pl. 33, figs 1-4.
Ammoscalaria pseudospiralis (Williamson). –HÖGLUND, 1947, p. 159, pl. 31, fig. 1. –ZHENG, 1988, p. 67, text-fig. 11. –JONES, 1994, p. 39, pl. 33, figs 1-4. –HEß, 1998, p. 57, pl. 6, fig. 5.

Ammoscalaria tenuimargo (Brady, 1882)

pl. 4, fig. 13

Haplophragmium tenuimargo BRADY, 1882, p. 715. –BRADY, 1884, p. 303, pl. 33, figs 13-16 (ZF 1554).
Ammoscalaria tenuimargo (Brady). –HÖGLUND, 1947, p. 154, pl. 9, figs 16-22; pl. 31, fig. 2; text-figs 133-136, 138-139. –ZHENG, 1988, p. 68, pl. 24, fig. 4. –JONES, 1994, p. 40, pl. 33, figs 13-16. –HAYWARD *et al.*, 1999, p. 85, pl. 1, figs 17-18.

***Ammoscalaria* sp. 1**

Key features: Test planispiral, evolute in early stage, later uncoiled; wall thin, agglutinated with grains of varying sizes; chambers compressed; sutures and umbilical area depressed; colour orange-brown; apertural ends in all of the SCS specimens are broken.

Remarks: Specimens of this species resemble the early stage of *Glaphyrammina americana* (Cushman).

Genus **DISCAMMINA** Lacroix, 1932

Discammina compressa (Goës, 1882)

pl. 4, fig. 14

Lituolina irregularis Roemer var. *compressa* GOËS, 1882, p. 141, pl. 12, figs 421-423.
Haplophragmium emaciatum BRADY, 1884, p. 305, pl. 33, figs 26-28 (ZF 1531).
Discammina compressa (Goës). –LOEBLICH & TAPPAN, 1964, p. C226, fig. 136.10. –ZHENG, 1988, p. 65, pl. 21, fig. 1; pl. 51, fig. 12. –JONES, 1994, p. 40, pl. 33, figs 26-28.

Genus **GLAPHYRAMMINA** Loeblich & Tappan, 1984

Glaphyrammina americana (Cushman, 1910)

pl. 4, figs 15-16

Haplophragmium fontinense Terquem. –BRADY, 1884 (not Terquem, 1870), p. 305, pl. 34, figs 1-4 (ZF 1536).
Ammobaculites americanus CUSHMAN, 1910b, p. 117, figs 184-185.
Glaphyrammina americana (Cushman). –LOEBLICH & TAPPAN, 1987, p. 68, pl. 51, figs 7-10. –JONES, 1994, p. 40, pl. 34, figs 1-4.

Family LITUOTUBIDAE Loeblich & Tappan, 1984
Genus **LITUOTUBA** Rhumbler, 1895

Lituotuba lituiformis (Brady, 1879)

pl. 5, fig. 1

Trochammina lituiformis BRADY, 1879a, p. 59, pl. 5, fig. 16. –BRADY, 1884, p. 88, pl. 40, figs 4-7.
Lituotuba lituiformis (Brady). –CUSHMAN, 1910b, p. 114, fig. 175. –HOFKER, 1972, p. 58, pl. 17, figs 1-12. –ZHENG, 1988, p. 39, pl. 5, fig. 6. –JONES, 1994, p. 44, pl. 40, figs 4-7.

Family LITUOLIDAE de Blainville, 1827
Subfamily AMMOMARGINULININAE Podobina, 1978
Genus **AMMOBACULITES** Cushman, 1910

Ammobaculites agglutinans (d'Orbigny, 1846)

pl. 5, fig. 2

Spirolina agglutinans D'ORBIGNY, 1846, p. 137, pl. 7, figs 10-12.
Haplophragmium agglutinans (d'Orbigny). –BRADY, 1884, p. 301, pl. 32, figs 19-20, 24-26.
Ammobaculites agglutinans (d'Orbigny). –SCHRÖDER, 1986, p. 50, pl. 21, figs 1-4. –ZHENG, 1988, p. 66, pl. 23, fig. 7. –JONES, 1994, p. 39, pl. 32, figs 19-20, 24-26. –YASSINI & JONES, 1995, p. 70, figs 46-48, 50. –HEß, 1998, p. 55, pl. 4, fig. 4.

Ammobaculites baculusalsus Schiebel & Timm, 1996

pl. 5, fig. 3

Ammobaculites baculusalsus SCHIEBEL & TIMM, 1996, p. 97, pl. 1, figs 1-15.

Ammobaculites filiformis (Earland, 1934)

Haplophragmium agglutinans (d'Orbigny). –BRADY, 1884 (non *Spirolina agglutinans* d'Orbigny, 1846), p. 301, pl. 32, fig. 22 (ZF 387, 388).
Ammobaculites agglutinans (d'Orbigny) var. *filiformis* EARLAND, 1934, p. 92, pl. 3, figs 11, 13. –SCHRÖDER, 1986, p. 50, pl. 21, figs 5-6.
Ammobaculites filiformis (Earland). –JONES, 1994, p. 39, pl. 32, fig. 22.

***Ammobaculites* sp. 1**

pl. 5, fig. 4

Key features: Test small, early stage comprised of one planispiral coil, later uniserial; wall composed exclusively of broken tests of foraminifera, radiolaria or ostracoda, agglutinated with great amount of cement; chambers compressed; sutures hardly visible; colour white; aperture terminal slit on the end of the last tapering chamber.

Genus **AMMOMARGINULINA** Wiesner, 1931

Ammomarginulina* aff. *rostrata (Heron-Allen & Earland, 1929)

pl. 5, fig. 5

Ammobaculites rostratus HERON-ALLEN & EARLAND, 1929, p. 328, pl. 2, figs 14-17. –EARLAND, 1933, p. 80, pl. 5, figs 22-25.

Key features: Test planispiral, evolute in early stage, later uncoiled; wall thin, roughly agglutinated with grains of varying sizes; chambers inflated, but compressed near the peripheral edge; sutures deep; aperture terminal, rounded; colour orange-brown.

Remarks: Specimens of this species closely resemble specimens referred by Earland (1933) to *Ammobaculites rostratus* Heron-Allen & Earland, it differs only in much smaller size and colour of the test.

Genus **ERATIDUS** Saidova, 1975

Eratidus foliaceus (Brady, 1881)

Haplophragmium foliaceum BRADY, 1881, p. 50. –BRADY, 1884, p. 304, pl. 33, figs 20-25.
Ammobaculites foliaceus (Brady). –CUSHMAN, 1910b, p. 116, text-figs 177-179.
Eratidus foliaceus (Brady). –SAIDOVA, 1975, p. 94, pl. 26, fig. 4. –JONES, 1994, p. 40, pl. 33, figs 20-25.

Eratidus recurvus (Earland, 1934)

pl. 5, figs 6-7

Ammobaculites foliaceus (Brady) var. *recurva* EARLAND, 1934, p. 93, pl. 3, figs 14-17.
Ammomarginulina recurva (Earland). –SCHRÖDER, 1986, pl. 21, figs 15-17.

Family LITUOLINAE de Blainville, 1827
Genus **LITUOLA** Lamarck, 1804

Lituola lituilinoidea (Goës, 1896)

Haplophragmium lituolinoideum. –GOËS, 1896, p. 32, pl. 3, figs 17-20.
Lituola lituilinoidea (Goës). –LEROY & HODGKINSON, 1975, p. 428, pl. 5, figs 11-15. –HEß, 1998, p. 64, pl. 5, fig. 1.
Lituola hispida ZHENG, 1988, p. 65, pl. 23, figs 1-3.

***Lituola* sp. 1**

Lituola sp. ZHENG, 1988, p. 65, pl. 23, figs 4-5.

Key features: Test large, early portion planispirally enrolled, later uncoiled; chambers low and cylindrical, very slightly increasing in size as added; wall agglutinated with coarse grains; aperture multiple on the top of the last chamber; colour grayish-white.

Family PLACOPSILINIDAE Rhumbler, 1913
Subfamily PLACOPSILININAE Rhumbler, 1913
Genus **PLACOPSILINA** d'Orbigny, 1850

Placopsilina bradyi Cushman & McCulloch, 1939

pl. 5, figs 8-9

Placopsilina cenomana d'Orbigny. –BRADY, 1884 (not d'Orbigny, 1850), p. 315, pl. 36, fig. 1 (ZF 2094).
Placopsilina bradyi CUSHMAN & MCCULLOCH, 1939, p. 112, pl. 12, figs 14-15. –ZHENG, 1988, p. 73, pl. 24, fig. 7. –JONES, 1994, p. 42, pl. 36, fig. 1. –LOEBLICH & TAPPAN, 1994, p. 18, pl. 8, figs 4-9.

Placopsilina confusa Cushman, 1920

Placopsilina cenomana d'Orbigny. –BRADY, 1884, p. 315, pl. 36, figs 2-3 (ZF 2095-96).
Placopsilina confusa CUSHMAN, 1920, p. 71, pl. 14, fig. 6. –JONES, 1994, p. 42, pl. 36, figs 2-3.

***Placopsilina* sp. 1**

Remarks: *Placopsilina* sp. 1 resembles *Placopsilina bradyi* Cushman & McCulloch, but differs in more elongated chambers and usually is only partly or not at all attached to something.

Superfamily HAPLOPHRAGMIACEA Eimer & Fickert, 1899
Family AMMOSPHAEROIDINIDAE Cushman, 1927
Subfamily AMMOSPHAEROIDININAE Cushman, 1927

Genus **ADERCOTRYMA** Loeblich & Tappan, 1952

Adercotryma glomeratum (Brady, 1878)

pl. 5, figs 10-11

Lituola glomerata BRADY, 1878, p. 433, pl. 20, fig. 1.
Haplophragmium glomeratum BRADY, 1884, p. 309, pl. 34, figs 15-18 (ZF 1540).
Adercotryma glomerata (Brady). –BRÖNNIMANN & WHITTAKER, 1987, p. 19, figs 1-6.
Adercotryma glomeratum (Brady). –HATTA & UJIIÉ, 1992a, p. 56, pl. 1, fig. 5; pl. 19, fig. 3. –JONES, 1994, p. 41, pl. 34, figs 15-18. –HEß, 1998, p. 55, pl. 6, fig. 13.

Genus **AMMOSPHAEROIDINA** Cushman, 1910

Ammosphaeroidina sphaeroidiniformis (Brady, 1884)

pl. 5, fig. 12

Haplophragmium sphaeroidiniforme BRADY, 1884, p. 313.
Ammosphaeroidina sphaeroidiniformis (Brady). –CUSHMAN, 1910b, p. 128, text-fig. 202. –LOEBLICH & TAPPAN, 1987, p. 81, pl. 67, figs 13-16. –ZHENG, 1988, p. 69, pl. 41, figs 1-2. –LOEBLICH & TAPPAN, 1994, p. 18, pl. 9, figs 7-14.

Genus **CYSTAMMINA** Neumayr, 1889

Cystammina pauciloculata (Brady, 1879)

Trochammina pauciloculata BRADY, 1879a, p. 58, pl. 5, figs 13-14. –BRADY, 1884, p. 344, pl. 41, fig. 1 (not fig. 2) (ZF 2508).
Ammochilostoma pauciloculata (Brady). –CUSHMAN, 1910b, p. 126, text-fig. 197.
Cystammina pauciloculata (Brady). –RESIG, 1981, pl. 10, fig. 14. –SCHRÖDER, 1986, p. 54, pl. 18, figs 14-15. –LOEBLICH & TAPPAN, 1987, p. 82, pl. 68, figs 1-6. –ZHENG, 1988, p. 85, pl. 41, figs 4-7. –UJIIÉ, 1990, p. 13, pl. 2, fig. 1. –JONES, 1994, p. 45, pl. 41, fig. 1. –LOEBLICH & TAPPAN, 1994, p. 18, pl. 11, figs 3-5.

Subfamily RECURVOIDINAE Alekseychik-Mitskevich, 1973
Genus **RECURVOIDES** Earland, 1934

Recurvoides contortus Earland, 1934

pl. 5, figs 16-18

Recurvoides contortus EARLAND, 1934, p. 91, pl. 10, figs 7-19. –LEROY & HODGKINSON, 1975, p. 430, p. 3, figs 20-21. –RESIG, 1981, pl. 10, fig. 12. –LOEBLICH & TAPPAN, 1987, p. 83, pl. 68, figs 7-9. –ZHENG, 1988, p. 70, pl. 20, figs 4-5; pl. 51, figs 11-12. –LOEBLICH & TAPPAN, 1994, p. 18, pl. 12, figs 1-14. –HEß, 1998, p. 66, pl. 7, fig. 7.
Cribrostomoides contortus (Earland). –ECHOLS, 1971, p. 142, pl. 3, figs 3-4.

Recurvoides trochamminiformis Saidova, 1961

Recurvoides trochamminiformis SAIDOVA, 1961, p. 26, pl. 8, fig. 39. –ZHENG, 1988, p. 71, pl. 20, fig. 7.

***Recurvoides* sp. 1**

Key features: Test subglobular, irregularly enrolled, last whorl tend to be planispiral; wall agglutinated with coarse grains, roughly finished, but firmly cemented; aperture small, narrow, areal slit with a lip.

Superfamily LOFTUSIACEA Brady, 1884
Family CYCLAMMINIDAE Marie, 1941
Subfamily CYCLAMMININAE Marie, 1941
Genus **CYCLAMMINA** Brady, 1879

Cyclammina cancellata Brady, 1879

Cyclammina cancellata BRADY, 1879a, p. 62. –BRADY, 1884, p. 351, pl. 37, figs 8-16 (ZF 1360). –ZHENG, 1988, p. 73, pl. 21, figs 5-6; pl. 22, figs 1-3. –JONES, 1994, p. 43, pl. 37, figs 8-16.

Cyclammina pusilla Brady, 1881

pl. 5, fig. 14

Cyclammina pusilla BRADY, 1881, p. 53. –BRADY, 1884, p. 353, pl. 37, figs 20-23 (ZF 1365). –SCHRÖDER, 1986, p. 49, pl. 18, fig. 10. –ZHENG, 1988, p. 74, pl. 21, figs 3-4. –JONES, 1994, p. 43, pl. 37, figs 20-23. –HEß, 1998, p. 59, pl. 6, fig. 9.

Cyclammina subtrullissata (Parr, 1950)

pl. 5, fig. 15

Haplophragmoides subtrullissatus PARR, 1950, p. 271, pl. 4, fig. 27.
Cyclammina subtrullissata (Parr). –LOEBLICH & TAPPAN, 1994, p. 19, pl. 14, figs 1-6.

Cyclammina trullissata (Brady, 1879)

pl. 5, fig. 13

Trochammina trullissata BRADY, 1879a, p. 56, pl. 5, figs 10-11. –BRADY, 1884, p. 342, pl. 40, figs 13, 16 (ZF 2518).
Cyclammina bradyi CUSHMAN, 1910b, p. 113, text-fig. 174.
Cyclammina trullissata (Brady). –SAIDOVA, 1975, p. 84, pl. 24, figs 1-4. –RESIG, 1981, pl. 10, fig. 8. –SCHRÖDER, 1986, p. 50, pl. 18, fig. 9. –JONES, 1994, p. 45, pl. 40, figs 13, 16. –LOEBLICH & TAPPAN, 1994, p. 19, pl. 14, figs 7-8.
Reticulophragmium trullissatum (Brady). –HEß, 1998, p. 69, pl. 6, fig. 8.

Superfamily SPIROPLECTAMMINACEA Cushman, 1927

Family SPIROPLECTAMMINIDAE Cushman, 1927
Subfamily SPIROPLECTAMMININAE Cushman, 1927
Genus **SPIROPLECTINELLA** Kisel'man, 1972

Spiroplectinella higuchii (Takayanagi, 1953)

pl. 6, fig. 7

Spiroplectammina higuchii TAKAYANAGI, 1953, p. 27, pl. 4, fig. 1. –ŌKI, 1989, p. 78, pl. 2, fig. 8.

Spiroplectinella kerimbaensis (Said, 1949)

pl. 6, figs 1-2

Textularia kerimbaensis SAID, 1949, p. 6, pl. 1, fig. 8. –HOFKER, 1968, p. 15, pl. 1, figs 21-22.
Textularia corrugata Heron-Allen &Earland. –CUSHMAN, 1932a, p. 12, pl. 3, fig. 4.
Spiroplectammina kerimbaensis (Said). –HALICZ & REISS, 1979, p. 306, pl. 3, figs 9, 13, 15-21.
Spirorutilus kerimbaensis (Said). –ZHENG, 1988, p. 77, pl. 25, figs 11-12; text-fig. 16.
Spiroplectinella kerimbaensis (Said). –LOEBLICH & TAPPAN, 1994, p. 19, pl. 14, figs 9-14.

Spiroplectinella proxispira Vella, 1957

Textularia proxispira VELLA, 1957, p. 15, pl. 3, figs 48, 52.
Spiroplectinella proxispira (Vella). –HAYWARD *et al.*, 1999, p. 88, pl. 2, figs 9-11.

Spiroplectinella pseudocarinata (Cushman, 1921)

pl. 6, figs 3-6

Textularia carinata d'Orbigny. –BRADY, 1884 (not d'Orbigny, 1826), p. 360, pl. 42, figs 15-16. –CUSHMAN, 1911, p. 17, text-figs 26-27.
Textularia pseudocarinata CUSHMAN, 1921, p. 121, pl. 22, fig. 5.
Spirorutilus psudocarinata (Cushman). –ZHENG, 1988, p. 78, pl. 25, figs 6-8; pl. 52, figs 3-4; text-fig. 17.
Spirorutilus carinatus (d'Orbigny). –JONES, 1994, p. 47, pl. 42, figs 15-16.
Spiroplectinella pseudocarinata (Cushman). –LOEBLICH & TAPPAN, 1994, p. 19, pl. 15, figs 1-14.

Spiroplectinella wrightii (Silvestri, 1903)

pl. 6, fig. 8

Spiroplecta wrightii SILVESTRI, 1903, p. 59, text-figs 1-6.
Textularia sagittula Defrance. –BRADY, 1884 (not Defrance, 1824), p. 361, pl. 42, figs 17-18.
Spirorutilus wrightii (Silvestri). –BANNER & PEREIRA, 1981, p. 104, pl. 6, figs 7-8, 10; pl. 7, figs 1-2, 5. –ZHENG, 1988, p. 79, pl. 25, figs 9-10.
Spiroplectinella wrightii (Silvestri). –KISEL'MAN, 1972, p. 135, text-fig. 1. –LOEBLICH & TAPPAN, 1987, p. 112, pl. 120, figs 1-10. –JONES, 1994, p. 47, pl. 42, figs 17-18. –LOEBLICH & TAPPAN, 1994, p. 20, pl. 15, figs 15-18.

Subfamily SPIROTEXTULARIINAE Saidova, 1975
Genus **SPIROTEXTULARIA** Saidova, 1975

Spirotextularia fistulosa (Brady, 1884)

pl. 6, figs 9-10

Textularia sagittula Defrance var. *fistulosa* BRADY, 1884, p. 362, pl. 42, figs 20-22. –CUSHMAN, 1921, p. 104, pl. 20, fig. 6. –INOUE, 1989, pl. 19, fig. 1.
Spirotextularia fistulosa (Brady). –LOEBLICH & TAPPAN, 1987, p. 113, pl. 121, figs 7-10. –HATTA & UJIIÉ, 1992a, p. 56, pl. 1, fig. 7; pl. 19, fig. 4. –JONES, 1994, p. 47, pl. 42, figs 19-22. –LOEBLICH & TAPPAN, 1994, p. 20, pl. 16, figs 5-9. –HAYWARD *et al.*, 1999, p. 88, pl. 2, figs 12-13.
Spirorutilus fistulosa (Brady). –ZHENG, 1988, p. 76, pl. 25, figs 2-5; text-fig. 15.

Spirotextularia floridana (Cushman, 1922)

pl. 6, figs 11-13

Textularia floridana CUSHMAN, 1922b, p. 24, pl. 1, fig. 7. –CUSHMAN, 1922a, p. 18, pl. 2, figs 11-12.
Spirotextularia floridana (Cushman). –LOEBLICH & TAPPAN, 1985, p. 185, pl. 7, figs 4-6. –LOEBLICH & TAPPAN, 1987, p. 113, pl. 121, figs 11-12. –LOEBLICH & TAPPAN, 1994, p. 20, pl. 16, figs 10-16.

Family PSEUDOBOLIVINIDAE Wiesner, 1931
Genus **PARVIGENERINA** Vella, 1957

Parvigenerina sinensis (Zheng, 1988)

pl. 6, fig. 14

Bimonilina sinensis ZHENG, 1988, p. 131, pl. 36, figs 1-4.

Key features: Test small, biserial throughout, later loosely biserial; wall finely agglutinated; aperture terminal, with a small lip, with a slit-like depression extent to the base of last chamber.

Remarks: Figures of specimens referred by Zheng (1988) to *Bimonilina* Eicher resemble closely the SCS specimens, although in terms of generic identification *Parvigenerina* Vella (1957) is more adequate.

Genus **PSEUDOBOLIVINA** Wiesner, 1931

Pseudobolivina nasostoma Zheng, 1988

pl. 6, fig. 15

Pseudobolivina nasostoma ZHENG, 1988, p. 123, pl. 34, fig. 4; pl. 53, figs 13-14; text-fig. 37.

Pseudobolivina sp. 1

Key features: Test elongated, slender, biserial; 10-12 pair of chambers; chambers significantly increasing in size as added; globular in early stage, later pyriform; sutures deeply depressed; later stage loosely biserial; wall thin, finely agglutinated; aperture interiomarginal at the top of the last chamber; colour orange-brown.

Family NOURIIDAE Chapman & Parr, 1936
Genus **NOURIA** Heron-Allen & Earland, 1914

Nouria harrisii Heron-Allen & Earland, 1914

pl. 6, fig. 16

Nouria harrisii HERON-ALLEN & EARLAND, 1914, p. 376, pl. 37, figs 16-20. –ZHENG, 1988, p. 100, pl. 15, fig. 4.

Nouria polymorphinoides Heron-Allen & Earland, 1914

pl. 6, fig. 17

Nouria polymorphinoides HERON-ALLEN & EARLAND, 1914, p. 376, pl. 37, figs 1-15. –HERON-ALLEN & EARLAND, 1932b, p. 346, pl. 8, figs 25-26. –LOEBLICH & TAPPAN, 1987, p. 117, pl. 123, figs 11-12. –ZHENG, 1988, p. 100, pl. 15, figs 5-8. –SCHIEBEL, 1992, p. 19, pl. 8, figs 14-16. –HAYWARD *et al.*, 1999, p. 86, pl. 1, figs 9-10.

Family DUQUEPSAMMIIDAE Seiglie & Baker, 1987
Genus **DUQUEPSAMMIA** Seiglie & Baker, 1987

Duquepsammia bulbosa (Cushman, 1911)

Spiroplecta bulbosa CUSHMAN, 1911, p. 5, text-fig. 1. –CUSHMAN, 1921, p. 102, pl. 20, fig. 1.
Spiroplectammina bulbosa (Cushman). –HATTA & UJIIÉ, 1992a, p. 51, pl. 1, fig. 6.
Duquepsammia bulbosa (Cushman). –LOEBLICH & TAPPAN, 1994, p. 20, pl. 17, figs 5-6. –HEß, 1998, p. 60, pl. 8, fig. 4.

Superfamily VERNEUILINACEA Cushman, 1911
Family VERNEUILINIDAE Cushman, 1911
Subfamily VERNEUILININAE Cushman, 1911
Genus **GAUDRYINA** d'Orbigny, 1839

Gaudryina collinsi Cushman, 1936

Gaudryina collinsi CUSHMAN, 1936, p. 8, pl. 2, fig. 2. –CUSHMAN, 1937a, p. 57, pl. 9, figs 2-3.
Gaudryina collinsi Cushman var. *robustior* CUSHMAN, 1936, p. 9, pl. 2, fig. 3. –CUSHMAN, 1937a, p. 69, pl. 10, figs 4-5.

Key features: Large triserial early stage, with almost triangular shape in transverse section; biserial part, rounded in section is composed of 4-5 pairs of the same size chambers, with distinct, slightly depressed sutures; wall coarsely arenaceous; aperture a rounded opening, close to the inner margin of the last chamber.

Remarks: The SCS specimens match to those pictured as *G. collinsi* var. *robustior* (in Cushman, 1937a). According to Cushman *G. collinsi* var. *robustior* occurs near Borneo and Philippines and differs from *G. collinsi* in being larger and having more pronounced triserial portion, although difference in appearance can be only an environmental response of the species.

Gaudryina flintii Cushman, 1911

Gaudryina flintii CUSHMAN, 1911, p. 63, text-fig. 102. –CUSHMAN, 1921, p. 146, pl. 29, fig. 1. –CUSHMAN, 1937a, p. 62, pl. 10, figs 18-20.
Migros flintii (Cushman). –ZHENG, 1988, p. 92, pl. 39, figs 5-6; pl. 44, fig. 1; pl. 54, fig. 9; text-fig. 20. –LOEBLICH & TAPPAN, 1994, p. 32, pl. 19, figs 10-13; pl. 44, figs 11-13.

Gaudryina quadrangularis Bagg, 1908

pl. 6, fig. 18

Gaudryina quadrangularis BAGG, 1908, p. 133, pl. 5, fig. 1. –CUSHMAN, 1921, p. 147, pl. 29, fig. 2. –CUSHMAN, 1937a, p. 63, pl. 10, figs 11, 15-17. –ZHENG, 1988, p. 90, pl. 42, fig. 7. –LOEBLICH & TAPPAN, 1994, p. 21, pl. 17, figs 22-23.

Gaudryina robusta Cushman, 1913

Gaudryina robusta CUSHMAN, 1913b, p. 636, pl. 78, fig. 2. –CUSHMAN, 1937a, p. 67, pl. 9, fig. 15. –HEß, 1998, p. 61.

Family PROLIXOPLECTIDAE Loeblich & Tappan, 1985
Genus **KARRERULINA** Finlay, 1940

Karrerulina apicularis (Cushman, 1911)

pl. 6, fig. 19

Gaudryina siphonella Reuss. –BRADY, 1884, p. 382, pl. 46, figs 17-19 (ZF 1460).
Gaudryina apicularis CUSHMAN, 1911, p. 69, text-fig. 110.
Karreriella apicularis (Cushman). –SCHRÖDER, 1986, p. 55, pl. 22, fig. 14. –UJIIÉ, 1990, p. 14, pl. 1, fig. 2.
Karrerulina conversa (Grzybowski). –JONES, 1994 (non *Gaudryina conversa* Grzybowski, 1901), p. 51, pl. 46, figs 17-19.
Karrerulina apicularis (Cushman). –HEß, 1998, p. 63, pl. 8, fig. 1.

Karrerulina attenuata Collins, 1958

Karreriella (Karrerulina) attenuata COLLINS, 1958, p. 358, pl. 2, fig. 5.

Key features: Test arenaceous, early portion trochospiral, then biserial; sutures depressed; wall composed of big sand grains; colour orange-brown.

Karrerulina erigona (Saidova, 1975)

pl. 6, fig. 20

Gaudryinoides erigonum SAIDOVA, 1975, p. 104, pl. 30, fig. 5.
Karrerulina erigona (Saidova). –LOEBLICH & TAPPAN, 1987, p. 130, pl. 139, figs 10-13.

Superfamily ATAXOPHRAGMIACEA Schwager, 1877
Family GLOBOTEXTULARIIDAE Cushman, 1927
Subfamily GLOBOTEXTULARIINAE Cushman, 1927

Genus **RHUMBLERELLA** Brönnimann, 1981

Rhumblerella sepetibaensis Brönnimann, 1981

Rhumblerella sepetibaensis BRÖNNIMANN, 1981, p. 45. –LOEBLICH & TAPPAN, 1987, p. 144, pl. 151, figs 1-6.

Genus **VERNEUILINULLA** Saidova, 1975

Verneuilinulla affixa (Cushman, 1911)

Verneuilina propinqua BRADY, 1884, p. 387, pl. 47, figs 13-14 (not figs 8-12).
Verneuilina affixa CUSHMAN, 1911, p. 56, text-figs 90-91. –CUSHMAN, 1921, p. 142, pl. 27, fig. 6.
Eggerella affixa CUSHMAN, 1937, p. 54, pl. 5, figs 23-25.
Verneuilinulla affixa (Cushman). –JONES, 1994, p. 52, pl. 47, figs 13-14.

Verneuilinulla* cf. *superba (Earland, 1934)

pl. 6, fig. 21

Verneuilina superba EARLAND, 1934, p. 118, pl. 5, figs 30-34.

Key features: Test long, consisting of 5-7 series of inflated chambers; sutures deeply depressed; wall of the test smooth and very thin; large aperture; colour orange-brown.

Remarks: Differs from *Verneuilinulla advena* (Cushman) in having very inflated chambers and deeply depressed sutures.

Verneuilinulla propinqua (Brady, 1884)

Verneuilina propinqua BRADY, 1884, p. 387, pl. 47, figs 8-12 (not figs 13-14) (ZF 2600). –CUSHMAN, 1922a, p. 56, pl. 9, figs 10-11.
Eggerella propinqua (Brady). –BARKER, 1960, p. 96, pl. 47, figs 8-12.
Verneuilinulla propinqua (Brady). –JONES, 1994, p. 52, pl. 47, figs 8-12.
Globotextularia propinqua (Brady). –HEß, 1998, p. 61.

***Verneuilinulla* sp. 1**

Globotextularia sp. 1–HEß, 1998, p. 61, pl. 8, fig. 15.

Remarks: *Verneuilinulla* sp. 1 closely resembles *Verneuilinulla propinqua* (Brady), but differs in having lower part of the chambers ornamented with short spines and in much smaller size of the test.

Subfamily LIEBUSELLINAE Saidova, 1981
Genus **LIEBUSELLA** Cushman, 1933

Liebusella improcera Loeblich & Tappan, 1994

Liebusella improcera LOEBLICH & TAPPAN, 1994, p. 22, pl. 30, figs 1-3; pl. 49, figs 5-6.

***Liebusella* sp. 1**

Key features: Test trochospiral in early stage; 4-5 chambers per whorl; chambers slightly inflated; sutures distinct, but very slightly depressed; wall thick, agglutinated of fine grains; firmly cemented and smoothly finished; aperture terminal slit at the face of the last chamber; colour grayish-white. Sunda Shelf specimens usually lack the uniserial portion.

Order **TROCHAMMINIDA** Saidova, 1981
Superfamily TROCHAMMINACEA Schwager, 1877
Family TROCHAMMINIDAE Schwager, 1877
Subfamily TROCHAMMININAE Schwager, 1877
Genus **AMMOGLOBIGERINA** Eimer & Fickert, 1899

Ammoglobigerina globulosa (Cushman, 1920)

Trochammina globulosa CUSHMAN, 1920, p. 77, pl. 16, figs 3-4.
Globotrochamminopsis globulosus (Cushman). –BRÖNNIMANN & WHITTAKER, 1988, p. 32, figs 12A-C.
Ammoglobigerina globulosa (Cushman). –LOEBLICH & TAPPAN, 1987, p. 120, pl. 129, figs 7-8. –LOEBLICH & TAPPAN, 1994, p. 23, pl. 22, figs 1-6.

Genus **PARATROCHAMMINA** Brönnimann, 1979

Paratrochammina challengeri Brönnimann & Whittaker, 1988

pl. 7, figs 1-2

Haplophragmium globigeriniforme (Parker & Jones). –BRADY, 1884 (non *Lituolidea nautiloidea* var. *globigeriniformis* Parker & Jones, 1865), p. 312, pl. 35, fig. 10.
Trochammina cf. *globigeriniformis* (Parker & Jones). –SCHRÖDER, 1986, p. 52, pl. 19, figs 5-8.
Trochammina globigeriniformis (Parker & Jones). –ZHENG, 1988, p. 82, pl. 40, fig. 6.

Paratrochammina challengeri BRÖNNIMANN & WHITTAKER, 1988, p. 48, figs 16 H-K. –JONES, 1994, p. 41, pl. 35, fig. 10. –LOEBLICH & TAPPAN, 1994, p. 23, pl. 22, figs 7-12.

Paratrochammina madeirae Brönnimann, 1979

Paratrochammina madeirae BRÖNNIMANN, 1979, p. 7, fig. 7A-C, F, H; fig. 10B, E. –LOEBLICH & TAPPAN, 1987, p. 121, pl. 128, figs 5-8.

Paratrochammina simplissima (Cushman & McCulloch, 1948)

Trochammina pacifica Cushman var. *simplissima* CUSHMAN & MCCULLOCH, 1948, p. 76.

Paratrochammina simplissima (Cushman & McCulloch). –BRÖNNIMANN, 1979, p. 10, figs 2-3; 6A-J; 8A-H. –BRÖNNIMANN & WHITTAKER, 1993, p. 119, figs 1.9, 25-27.

***Paratrochammina* sp. 1**

Key features: Test low trochospiral; 10-12 chambers arranged in 2,5 whorls, with 5,5 chambers in the last whorl; early chambers subglobular, gradually increasing in size as added, later ones large, flattened on the umbilical side; spiral side low convex; periphery lobate; sutures depressed on both sides, almost straight; wall thin, agglutinated with fine grains, smoothly finished; aperture single, interiomarginal; colour brown.

***Paratrochammina* sp. 2**

Key features: Test trochospiral; 3,5 chambers in the last whorl; early chambers very small, subglobular, rapidly increasing in size as added, later ones large, inflated; periphery lobate, broadly rounded; sutures depressed on both sides; wall very thin, agglutinated with fine grains; aperture single, interiomarginal; colour brown.

Genus **TRITAXIS** Schubert, 1921

Tritaxis challengeri (Hedley, Hurdle & Burdett, 1964)

pl. 7, fig. 3

Trochammina squamata Jones & Parker. –BRADY, 1884 (not Jones & Parker, 1860), p. 337, pl. 41, fig. 3 (ZF 2516). –BARKER, 1960, p. 84, pl. 41, fig. 3.

Trochammina challengeri HEDLEY, HURDLE & BURDETT, 1964, p. 425. –ZHENG, 1988, p. 82, pl. 40, figs 1-2.

Tritaxis challengeri (Hedley, Hurdle & Burdett). –JONES, 1994, p. 46, pl. 41, fig. 3.

Tritaxis fusca (Williamson, 1858)

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

Valvulina fusca (Williamson). –BRADY, 1884, p. 392, pl. 49, figs 13-14.

Tritaxis fusca (Williamson). –SCHUBERT, 1921, p. 180. –HEDLEY, HURDLE & BURDETT, 1964, p. 420, fig. 1. –BRÖNNIMANN & WHITTAKER, 1984, p. 293, figs 1-10, 19-27. –ZHENG, 1988, p. 86, pl. 41, fig. 9; pl. 42, fig. 1. –INOUE, 1989, pl. 19, fig. 9. –JONES, 1994, p. 54, pl. 49, fig. 13. –HEß, 1998, p. 73, pl. 6, figs 11-12.

Tritaxis primitiva Brönnimann & Whittaker, 1988

pl. 7, figs 4-5

Tritaxis primitiva BRÖNNIMANN & WHITTAKER, 1988, p. 86, figs 30 A-C. –LOEBLICH & TAPPAN, 1994, p. 24, pl. 22, figs 13-18.

Genus **TROCHAMMINA** Parker & Jones, 1859

Trochammina inflata (Montagu, 1808)

pl. 7, fig. 6

Nautilus inflatus MONTAGU, 1808, p. 81, pl. 18, fig. 3.

Trochammina inflata (Montagu). –BRADY, 1884, p. 338, pl. 41, fig. 4. –EARLAND, 1934, p. 99, pl. 3, figs 41-43. –LOEBLICH & TAPPAN, 1987, p. 122, pl. 129, figs 20-23. –AKIMOTO, 1990, p. 214, pl. 11, fig. 4. –JONES, 1994, p. 46, pl. 41, fig. 4. –YASSINI & JONES, 1995, p. 71, figs 61-63. –HAYWARD *et al.*, 1999, p. 87, pl. 2, figs 6-8.

Trochammina nana (Brady, 1881)

Haplophragmium nanum BRADY, 1881, p. 50. –BRADY, 1884, p. 311, pl. 35, figs 7-8 (not fig. 6).

Trochammina nana (Brady). –BRÖNNIMANN & WHITTAKER, 1980a, p. 178, figs 1-9. –JONES, 1994, p. 41, pl. 35, figs 7-8.

Trochammina subglobigeriniformis Mikhalevich, 1972

Trochammina subglobigeriniformis MIKHALEVICH, 1972, p. 20, text-fig. 68. –BRÖNNIMANN & WHITTAKER, 1988, p. 30, figs 11 H-N.

Trochammina tasmanica Parr, 1950

Trochammina tasmanica PARR, 1950, p. 279, pl. 5, fig. 18.

Genus **TROCHAMMINOPSIS** Brönnimann, 1976

Trochamminopsis parvus Brönnimann & Whittaker, 1988

pl. 7, fig. 7

Trochamminopsis parvus BRÖNNIMANN & WHITTAKER, 1988, p. 91, figs 33E-K. –LOEBLICH & TAPPAN, 1994, p. 24, pl. 26, figs 10-12.

Trochamminopsis quadriloba (Höglund, 1948)

Trochammina quadriloba HÖGLUND, 1948, p. 46. –ZHENG, 1988, p. 83, pl. 39, fig. 2; pl. 40, fig. 5.
Trochamminopsis quadriloba (Höglund). –BRÖNNIMANN & BEURLEN, 1977, p. 260.

Subfamily POLYSTOMAMMININAE Brönnimann & Beurlen, 1977
Genus **POLYSTOMAMMINA** Seiglie, 1965

Polystomammina elongata (Zheng, 1979)

Trochamminula elongata ZHENG, 1979, p. 203, pl. 3, fig. 3.
Polystomammina elongata (Zheng). –ZHENG, 1988, p. 87, pl. 42, figs 2-3.

Genus **DEUTERAMMINA** Brönnimann, 1976

Deuterammina grisea (Earland, 1934)

pl. 7, figs 8-9

Trochammina grisea EARLAND, 1934, p. 100, pl. 3, figs 35-37.
Deuterammina grisea (Earland). –BRÖNNIMANN & WHITTAKER, 1988, p. 107, pl. 39, figs D-I.

Remarks: This form differs from originally described in being brown instead of dark gray colour. It's surface is smooth and shiny, the last chambers are very inflated.

Deuterammina montagui Brönnimann & Whittaker, 1988

pl. 7, figs 10-11

Trochammina inflata (Montagu). –EARLAND, 1934 (non *Nautilus inflatus* Montagu, 1808), p. 99, pl. 3, figs 41-43.
Deuterammina montagui BRÖNNIMANN & WHITTAKER, 1988, p. 112, figs 41A-k, 42A-H.

Remarks: Resembles form referred by Akimoto to *T. pacifica* Cushman, but the SCS specimens differs in having interiomarginal aperture placed at the base of the last chamber, close to the periphery and secondary umbilical apertures, hardly visible in umbilical depression. From *D. montagui* described by Brönnimann & Whittaker (1988) differs in being smaller and brown-orange in colour.

Subfamily TROCHAMMINELLINAE Brönnimann, Zaninetti & Whittaker, 1983

Genus **EARLANDAMMINA** Brönnimann & Whittaker, 1988

Earlandammina* cf. *drakensis Brönnimann & Whittaker, 1988

pl. 7, figs 13-14

Trochamminella bullata HÖGLUND, 1947, p. 213, pl. 17, fig. 5; text-figs 194-195.
Earlandammina drakensis BRÖNNIMANN & WHITTAKER, 1988, p. 131, figs 47J-L.

Key features: Test small, composed of 3.5 to 4 coils; chambers inflated, usually four per whorl, in high trochospiral coil, rapidly increasing in size; wall finely agglutinated with big particles, smooth, but not polished; colour orange-brown; aperture small interio-areal slit, surrounded by slightly raised lip.

Remarks: This species resembles *E. inconspicua* (Earland) figured by Höglund (1947) as *T. bullata* in having four chambers in the last whorl, and *E. drakensis* by its high conical trochospiral coil.

Genus **PSEUDOTROCHAMMINA** Frerichs, 1969

Pseudotrochammina atlantica (Parker, 1952)

Trochamminella atlantica PARKER, 1952, p. 409.
Atlantiella atlantica (Parker, F.L.). –LOEBLICH & TAPPAN, 1987, p. 124, pl. 131, figs 9-12.

Remarks: Brönnimann, *et al.* (1983) regarded *Atlantiella* Saidova (1981) as junior synonym of *Pseudotrochammina* Frerichs (1969).

Pseudotrochammina dehiscens (Frerichs, 1969)

Ammoglobigerinoides dehiscens, FRERICHS, 1969 in Loeblich & Tappan, 1987.
Pseudotrochammina dehiscens (Frerichs). –LOEBLICH & TAPPAN, 1987, p. 125, pl. 132, figs 6-11.

***Pseudotrochammina* sp. 1**

pl. 7, fig. 12

Key features: Test small, trochospiral; 3,5 subglobular chambers in the last whorl; chambers, rapidly increasing in size as added, later ones large and inflated; periphery lobate, broadly rounded; sutures depressed on both sides; wall thin, finely agglutinated, smooth and shiny; aperture an areal slit with a small lip above the umbilicus; colour orange-brown.

***Pseudotrochammina* sp. 2**

Key features: Test trochospiral; early chambers very small, subglobular, rapidly increasing in size as added, later ones large, inflated; sutures depressed;

wall agglutinated mainly with small calcareous foraminiferal tests and fine grains, firmly cemented; aperture an areal slit.

Order **TEXTULARIIDA** Lankester, 1885
Superfamily TEXTULARIACEA Ehrenberg, 1838
Family EGGERELLIDAE Cushman, 1937
Subfamily DOROTHIINAE Balakhmatova, 1972
Genus **DOROTHIA** Plummer, 1931

Dorothia arenata Cushman, 1936

Dorothia arenata CUSHMAN, 1936, p. 32, pl. 5, fig. 11. –CUSHMAN, 1937b, p. 101, pl. 11, fig. 9. –ZHENG, 1988, p. 97, pl. 44, figs 2-3. –YASSINI & JONES, 1995, p. 74, figs 78-79, 82.

Dorothia rotunda (Chapman, 1902)

Gaudryina rotunda CHAPMAN, 1902, p. 409, pl. 36, fig. 11.
Gaudryina paupercula CUSHMAN, 1911, p. 66, text-fig. 106. –CUSHMAN, 1921, p. 148, pl. 29, figs 4-5.
Dorothia rotunda (Chapman). –CUSHMAN, 1937b, p. 102, pl. 10, fig. 21. –LOEBLICH & TAPPAN, 1994, p. 25, pl. 29, figs 1-15.
Dorothia paupercula (Cushman). –ZHENG, 1988, p. 98, pl. 44, figs 7-11; pl. 54, fig. 10.

Remarks: Loeblich & Tappan (1994) regarded *Gaudryina paupercula* Cushman conspecific with *Gaudryina rotunda* Chapman, which is senior species.

Dorothia scabra (Brady, 1884)

pl. 8, figs 1-2

Gaudryina scabra BRADY, 1884, p. 381, pl. 46, fig. 7 (ZF 2435; ZF 1458). –CUSHMAN, 1921, p. 146, pl. 23, fig. 5.
Dorothia scabra (Brady). –LEROY & HODGKINSON, 1975, p. 436, pl. 6, figs 1-2. –ZHENG, 1988, p. 98, pl. 44, figs 4-6. –VAN MARLE, 1991, p. 234. –JONES, 1994, p. 50, pl. 46, fig. 7.

Subfamily EGGERELLINAE Cushman, 1937
Genus **EGGERELLA** Cushman, 1933

Eggerella bradyi (Cushman, 1911)

pl. 8, figs 3-4

Verneuilina pygmaea (Egger). –BRADY, 1884 (non *Bulimina pygmaea* Egger, 1857), p. 385, pl. 47, figs 4-7 (ZF 2603-05).
Verneuilina bradyi CUSHMAN, 1911, p. 54, pl. 6, fig. 4; text-fig. 87. –CUSHMAN, 1921, p. 141, pl. 27, fig. 4.
Eggerella bradyi (Cushman). –CUSHMAN, 1933c, p. 33, pl. 4, fig. 1. –SCHRÖDER, 1986, p. 55, pl. 22, figs 1-6. –LOEBLICH & TAPPAN, 1987, p. 170, pl. 189, figs 1-2. –ZHENG, 1988, p. 93, pl. 45, figs 2-3. –INOUE, 1989, p. 148, pl. 26, fig. 8. –UJIIÉ, 1990, p. 13, pl. 2, figs 3-5. –VAN MARLE, 1991, p. 235, pl. 25, figs 5-6. –JONES, 1994, p. 51, pl. 47, figs 4-7. –LOEBLICH & TAPPAN, 1994, p. 25, pl. 28, figs 9-14. –HEß, 1998, p. 60, pl. 8, fig. 8.

Genus **KARRERIELLA** Cushman, 1933

Karreriella bradyi (Cushman, 1911)

Gaudryina pupoides d'Orbigny. –BRADY, 1884 (not d'Orbigny, 1840), p. 378, pl. 46, figs 1-4.
Gaudryina bradyi CUSHMAN, 1911, p. 67, text-fig. 107. –CUSHMAN, 1921, p. 149, pl. 29, fig. 3.
Karreriella bradyi (Cushman). –CUSHMAN, 1937b, p. 135, pl. 16, figs 6-11. –HOFKER, 1951, p. 21, text-figs 2-4. –SCHRÖDER, 1986, p. 55, pl. 22, figs 8-9. –ZHENG, 1988, p. 94, pl. 45, fig. 10; pl. 46, fig. 1; pl. 54, fig. 6; text-fig. 21. –VAN MARLE, 1991, p. 235, pl. 25, figs 2-4. –JONES, 1994, p. 50, pl. 46, figs 1-4. –LOEBLICH & TAPPAN, 1994, p. 25, pl. 30, figs 8-16. –YASSINI & JONES, 1995, p. 73, figs 978-979.

Karreriella novangliae (Cushman, 1922)

pl. 8, fig. 7

Gaudryina baccata Schwager. –BRADY, 1884, p. 379, pl. 46, figs 8-10 (ZF 1448).
Gaudryina baccata Schwager var. *novangliae* CUSHMAN, 1922a, p. 76, pl. 13, fig. 4.
Karreriella novangliae (Cushman). –SCHRÖDER, 1986, p. 55, pl. 22, figs 12-13. –JONES, 1994, p. 51, pl. 46, figs 8-11. –HEß, 1998, p. 63, pl. 8, fig. 7.

Karreriella pupiformis Zheng, 1988

pl. 8, fig. 8

Karreriella pupiformis ZHENG, 1988, p. 96, 317, pl. 46, figs 2-3; pl. 54, fig. 7. –HEß, 1998, p. 63, pl. 8, fig. 2.

Karreriella cf. *siphonella* (Reuss, 1851)

pl. 8, figs 5-6

Gaudryina siphonella REUSS, 1851, p. 78, pl. 5, figs 40-42.
Karreriella siphonella (Reuss). –CUSHMAN, 1937b, p. 125, pl. 14, figs 27-32. –LOEBLICH & TAPPAN, 1987, p. 171, pl. 189, figs 8-15.

Key features: Test elongated; early stage trochospiral, later triserial; thin smooth wall; sutures visible, but slightly depressed; aperture on the small tubular neck above the base of the apertural face; colour orange-brown.

Remarks: Cushman's (1937) description match to the SCS specimens, although specimens with only triserial stage were found.

Genus **MARTINOTTIELLA** Cushman, 1933

Martinottiella communis (d'Orbigny, 1826)

pl. 8, figs 9-10

Clavulina communis D'ORBIGNY, 1826, p. 268. –BRADY, 1884, p. 394, pl. 48, figs 1-8 (not figs 9-13). –CUSHMAN, 1911, p. 72, text-figs 115-117.
Martinottiella communis (d'Orbigny). –LOEBLICH & TAPPAN, 1964, p. C282, fig. 188.10. –SCHRÖDER, 1986, p. 56, pl. 22, fig. 11. –ZHENG, 1988, p. 105, pl. 48, figs 2-3. –JONES, 1994, p. 52, pl. 48, figs 1-8. –HEß, 1998, p. 64, pl. 8, figs 13, 16.

Martinottiella milletti (Cushman, 1936)

pl. 8, fig. 11

Listerella milletti CUSHMAN, 1936, p. 41, pl. 6, fig. 10. –CUSHMAN, 1937b, p. 153, pl. 17, fig. 20.
Martinottiella milletti (Cushman). –ZHENG, 1988, p. 106, pl. 49, figs 9-10; pl. 50, fig. 1. –UJIIÉ, 1990, p. 14, pl. 1, fig. 9. –LOEBLICH & TAPPAN, 1994, p. 26, pl. 18, figs 14-15.

Family TEXTULARIIDAE Ehrenberg, 1838
Subfamily TEXTULARIINAE Ehrenberg, 1838
Genus **BIGENERINA** d'Orbigny, 1826

Bigenerina nodosaria d'Orbigny, 1826

pl. 8, figs 12-14

Bigenerina nodosaria D'ORBIGNY, 1826, p. 261, pl. 11, figs 9-11. –BRADY, 1884, p. 369, pl. 44, figs 14-18 (ZF 1132). –CUSHMAN, 1911, p. 27, text-figs 46-48. –HOFKER, 1968, p. 16, pl. 2, figs 1-6. –LOEBLICH & TAPPAN, 1987, p. 172, pl. 191, figs 1-2. –ZHENG, 1988, p. 120, pl. 32, figs 3-4; pl. 33, fig. 1. –WANG *et al.*, 1988, p. 119, pl. 10, figs 7, 14-15. –JONES, 1994, p. 49, pl. 44, figs 14-18. –LOEBLICH & TAPPAN, 1994, p. 27, pl. 31, figs 8-12; pl. 32, figs 11-12.

***Bigenerina* sp. 1**

pl. 8, fig. 15

Key features: Test small, elongated, early biserial stage (4 pair of chambers), later uniserial (6-9 chambers); wall finely agglutinated, firmly cemented, smoothly finished; chambers round with deeply depressed sutures; colour dark brow, lighter on the apertural end; aperture terminal, round.

Genus **SAHULIA** Loeblich & Tappan, 1985

Sahulia barkeri (Hofker, 1978)

pl. 8, figs 16-18

Textularia trochus d'Orbigny. –BRADY, 1884 (not d'Orbigny, 1840), p. 366, pl. 43, figs 15-16, 18-19 (not fig. 17).
Textularia barkeri HOFKER, 1978, p. 27, pl. 1, fig. 3.
Sahulia patelliformis LOEBLICH & TAPPAN, 1985, p. 203, pl. 14, figs 1-10.
Sahulia barkeri Hofker. –LOEBLICH & TAPPAN, 1987, p. 173, pl. 191, figs 9-12. –HATTA & UJIIÉ, 1992a, p. 57, pl. 2, fig. 2; pl. 19, fig. 6. –JONES, 1994, p. 48, pl. 43, figs 15-16, 18-19. –LOEBLICH & TAPPAN, 1994, p. 27, pl. 32, figs 1-8.

Sahulia conica (d'Orbigny, 1839)

pl. 8, figs 19-21

Textularia conica D'ORBIGNY, 1839a, p. 135, pl. 1, figs 19-20. –BRADY, 1884, p. 365, pl. 43, figs 13-14.
Textilina conica (d'Orbigny). –WHITTAKER & HODGKINSON, 1979, p. 15, pl. 1, fig. 1.
Sahulia conica (d'Orbigny). –JONES, 1994, p. 48, pl. 43, figs 13-14.

Genus **TEXTULARIA** Defrance, 1824

Textularia* aff. *abbreviata d'Orbigny, 1846

Textularia aff. *abbreviata* D'ORBIGNY, 1846, p. 249, pl. 15, figs 7-12. –ZHENG, 1988, p. 108, pl. 26, fig. 3; pl. 53, fig. 7; text-fig. 24.

Textularia agglutinans d'Orbigny, 1839

Textularia agglutinans D'ORBIGNY, 1839a, p. 136, pl. 1, figs 17-18, 32, 34. –BRADY, 1884, p. 363, pl. 43, figs 1-3. –CHENG & ZHENG, 1978, p. 159, pl. 1, figs 4-5. –BANNER & PEREIRA, 1981, p. 93, pl. 1, figs 6-7; pl. 2, fig. 1. –ZHENG, 1988, p. 108, pl. 26, fig. 6; pl. 53, fig. 3; text-fig. 25. –HATTA & UJIIÉ, 1992a, p. 58, pl. 2, fig. 3. –JONES, 1994, p. 48, pl. 43, figs 1-3. –LOEBLICH & TAPPAN, 1994, p. 27, pl. 33, figs 8-12.

Textularia bocki Höglund, 1947

pl. 9, figs 1-2

Textularia bocki HÖGLUND, 1947, p. 171, pl. 12, figs 5-7; text-figs 152-153.
Textilina bocki (Höglund). –HAYNES, 1973, p. 47, pl. 3, figs 6-7; pl. 8, fig. 8. –ZHENG, 1988, p. 117, pl. 31, figs 5-6; pl. 53, fig. 2.

Textularia* aff. *cuneata Hada, 1931

Textularia cuneata HADA, 1931, p. 71, text-fig. 24.

Textularia foliacea Heron-Allen & Earland, 1915

Textularia foliacea HERON-ALLEN & EARLAND, 1915, p. 628, pl. 47, figs 17-20. –CUSHMAN, 1932a, p. 8, pl. 1, figs 6-10. –ASANO, 1950, p. 5, figs 18, 20. –ZHENG, 1988, p. 109, pl. 28, figs 1-4; pl. 52, figs 11-12; text-fig. 26. –WANG *et al.*, 1988, p. 121, pl. 11, fig. 9. –HATTA & UJIIÉ, 1992a, p. 59, pl. 2, fig. 7. –LOEBLICH & TAPPAN, 1994, p. 28, pl. 34, figs 6-14.

Textularia hauerii d'Orbigny, 1846

pl. 9, figs 5-6

Textularia hauerii D'ORBIGNY, 1846, p. 250, pl. 15, figs 13-15. –CUSHMAN, 1921, p. 105, pl. 19, fig. 6. –HADA, 1931, p. 71, text-fig. 23.

Textularia lancea Lalicker & McCulloch, 1940

pl. 9, fig. 9

Textularia lancea LALICKER & MCCULLOCH, 1940, p. 130, pl. 14, fig. 14. –LOEBLICH & TAPPAN, 1994, p. 28, pl. 40, figs 1-5.

Textularia lateralis Lalicker, 1935

Textularia lateralis LALICKER, 1935, p. 1, pl. 1, figs 3-5. –ZHENG, 1988, p. 111, pl. 26, fig. 4. –LOEBLICH & TAPPAN, 1994, p. 28, pl. 33, figs 13-16.

Textularia* cf. *lythostrota (Schwager, 1866)

pl. 9, figs 3-4

Plecanium lythostrotum SCHWAGER, 1866, p. 194, pl. 4, fig. 4 (CNSC 48613).
Textularia lythostrotum (Schwager). –LALICKER & MCCULLOCH, 1940, p. 131, pl. 15, fig. 16.
Textularia lythostrota (Schwager). –SRINIVASAN & SHARMA, 1980, p. 13, pl. 1, figs 19-20.
Textilina lythostrota (Schwager). –ZHENG, 1988, p. 118, pl. 29, fig. 4; text-fig. 35.

Textularia* cf. *milletti Cushman, 1911

Textularia milletti CUSHMAN, 1911, p. 13, text-figs 18-19. –LOEBLICH & TAPPAN, 1994, p. 28, pl. 35, figs 5-7.

Textularia oceanica Cushman, 1932

Textularia foliacea Heron-Allen & Earland var. *oceanica* CUSHMAN, 1932a, p. 8, pl. 1, figs 11-12. –CUSHMAN, TODD & POST, 1954, p. 329, pl. 83, fig. 8. –GRAHAM & MILITANTE, 1959, p. 28, pl. 2, fig. 4.
Textularia oceanica Cushman. –CHENG & ZHENG, 1978, p. 161, pl. 2, fig. 1. –ZHENG, 1988, p. 111, pl. 31, figs 2-3; pl. 53, fig. 4. –LOEBLICH & TAPPAN, 1994, p. 29, pl. 40, figs 15-17.

Textularia parvula Cushman, 1922

Textularia parvula CUSHMAN, 1922a, p. 11, pl. 6, figs 1-2. –HADA, 1931, p. 72, text-fig. 25. –PHLEGER & PARKER, 1951, p. 5, pl. 2, fig. 8. –ZHENG, 1988, p. 112, pl. 29, fig. 1.

Textularia porrecta Brady, 1884

Textularia agglutinans d'Orbigny var. *porrecta* BRADY, 1884, p. 364, pl. 43, fig. 4.
Textularia porrecta Brady. –CUSHMAN, 1921, p. 109, pl. 22, fig. 1. –ZHENG, 1988, p. 113, pl. 27, figs 6-7. –JONES, 1994, p. 48, pl. 43, fig. 4. –YASSINI & JONES, 1995, p. 76, figs 104, 110. –HEß, 1998, p. 72, pl. 8, fig. 10.

Textularia pseudogramen Chapman & Parr, 1937

Textularia gramen d'Orbigny. –BRADY, 1884 (not d'Orbigny, 1846), p 365, pl. 43, figs 9-10.
Textularia pseudogramen CHAPMAN & PARR, 1937, p. 153. –ZHENG, 1988, p. 114, pl. 27, fig. 10; pl. 52, fig. 9; text-fig. 31. –JONES, 1994, p. 48, pl. 43, figs 9-10. –LOEBLICH & TAPPAN, 1994, p. 29, pl. 37, figs 5-6. –YASSINI & JONES, 1995, p. 76, figs 118-119, 123. –HAYWARD *et al.*, 1999, p. 91, pl. 2, figs 27-29.

Textularia* cf. *pseudosolita Zheng, 1988

Textularia pseudosolita ZHENG, 1988, p. 114, pl. 27, fig. 5; pl. 53, fig. 5; text-fig. 32. –LOEBLICH & TAPPAN, 1994, p. 29, pl. 36, figs 5-6; pl. 37, figs 9-12.

Textularia* cf. *scrupula Lalicker & McCulloch, 1940

Textularia scrupula LALICKER & MCCULLOCH, 1940, p. 141, pl. 16, fig. 25. –ZHENG, 1988, p. 115, pl. 27, fig. 8; pl. 53, fig. 6; text-fig. 33. –LOEBLICH & TAPPAN, 1994, p. 29, pl. 40, figs 12-14.

Textularia secasensis Lalicker & McCulloch, 1940

Textularia secasensis LALICKER & MCCULLOCH, 1940, p. 141, pl. 16, fig. 24. –LOEBLICH & TAPPAN, 1994, p. 29, pl. 39, figs 8-14.

Textularia stricta Cushman, 1911

pl. 9, figs 7-8

Textularia stricta CUSHMAN, 1911, p. 11, text-fig. 13. –CUSHMAN, 1921, p. 107, pl. 21, fig. 1. –LOEBLICH & TAPPAN, 1987, p. 173, pl. 192, figs 10-12. –LOEBLICH & TAPPAN, 1994, p. 30, pl. 38, figs 1-9.
Valvotextularia stricta (Cushman). –HOFKER, 1951, p. 33, text-fig. 11.
Textulina stricta (Cushman). –NØRVANG, 1966, p. 6, pl. 1, fig. 1; pl. 2, figs 1-2.

Textularia subantarctica Vella, 1957

Textularia subantarctica VELLA, 1957, p. 16, pl. 3, figs 49-51. –LOEBLICH & TAPPAN, 1994, p. 30, pl. 39, figs 1-5.

Textularia group

Remarks: *Textularia* group includes five taxa not determined on the specific level, but common in material from Sunda and Vietnam Shelf.

Textularia sp. 1

Key features: Test small, slender, biserial; 7-9 pairs of subglobular chambers, gradually increasing in size in early portion, later ones rather higher then wide; sutures slightly depressed, curved upwards; aperture a big slit at the base of last chamber; wall coarsely agglutinated, but smoothly finished; colour white.

Textularia sp. 2

Key features: Test biserial; 5 pairs of chambers, gradually increasing in size as added, wider than high; sutures slightly depressed, curved upwards; aperture a slit at the base of last chamber; very thin wall, agglutinated with particles varying in size, roughly finished; colour grayish-white.

Textularia sp. 3

Key features: Test biserial; 8-10 pairs of chambers, chambers from early stage wider than high, gradually increasing in size; sutures distinct, slightly depressed and curved upwards; aperture a slit at the base of last chamber; wall agglutinated with medium to coarse grains, thick and roughly finished; colour grayish-white.

Textularia sp. 4

pl. 9, figs 10-11

Key features: Test biserial; chambers inflated, rapidly increasing in width and thickness as added, but not height; sutures distinct; aperture a narrow slit at the base of last chamber; periphery broadly rounded; wall thick and roughly finished; colour grayish-white.

Textularia sp. 5

pl. 9, figs 12-14

Key features: Test biserial; 5-6 pairs of chambers gradually increasing in size; sutures distinct, slightly depressed, parallel and curved upwards; aperture a narrow slit at the base of last chamber; wall thick, coarsely agglutinated with sponge spicules incorporated at the base of early chambers and directed downwards.

Subfamily SIPHOTEXTULARIINAE Loeblich & Tappan, 1985

Genus **SIPHOTEXTULARIA** Finlay, 1939

Siphotextularia crassisepta (Cushman, 1911)

Textularia crassisepta CUSHMAN, 1911, p. 24, text-fig. 41. –CUSHMAN, 1921, p. 121, pl. 23, fig. 1.
Siphotextularia crassisepta (Cushman). –ZHENG, 1988, p. 125, pl. 34, fig. 6.

Siphotextularia curta (Cushman, 1922)

Textularia flintii Cushman var. *curta* CUSHMAN, 1922a, p. 14, pl. 2, figs 2-3.
Siphotextularia curta (Cushman). –ZHENG, 1988, p. 125, pl. 35, figs 3-4. –LOEBLICH & TAPPAN, 1994, p. 30, pl. 41, figs 5-7. –YASSINI & JONES, 1995, p. 77, figs 972-973.

Siphotextularia flintii (Cushman, 1911)

pl. 9, figs 15-16

Textularia flintii CUSHMAN, 1911, p. 21, text-fig. 36. –CUSHMAN, 1921, p. 113, pl. 22, fig. 4.
Siphotextularia flintii (Cushman). –BANNER & PEREIRA, 1981, p. 103, pl. 7, figs 3, 6-7, 13-14. –ZHENG, 1988, p. 125, pl. 35, figs 1-2. –UJIIÉ, 1990, p. 12, pl. 1, figs 6-8. –LOEBLICH & TAPPAN, 1994, p. 30, pl. 41, figs 8-15.

Siphotextularia foliosa Zheng, 1988

pl. 9, figs 17-18

Siphotextularia foliosa ZHENG, 1988, p. 126, pl. 38, figs 1-2. –LOEBLICH & TAPPAN, 1994, p. 30, pl. 42, figs 1-6.

Siphotextularia mestayerae Vella, 1957

pl. 10, figs 1-2

Siphotextularia mestayerae VELLA, 1957, p. 17, pl. 4, figs 55, 57. –ZHENG, 1988, p. 127, pl. 37, figs 5-8. –LOEBLICH & TAPPAN, 1994, p. 31, pl. 42, figs 11-23. –HAYWARD *et al.*, 1999, p. 90, pl. 2, figs 19-21.

Siphotextularia philippinensis (Keijzer, 1953)

Gaudryina pupoides d'Orbigny var. *chilostoma* BRADY, 1884, p. 379, pl. 46, fig. 5.
Textularia philippinensis KEIJZER, 1953, p. 271.
Siphotextularia philippinensis (Keijzer). –ZHENG, 1988, p. 128, pl. 37, fig. 1; text-fig. 38. –JONES, 1994, p. 50, pl. 46, fig. 5.

Siphotextularia rolshauseni (Phleger & Parker, 1951)

pl. 9, figs 19-20

Textularia concava (Karrer). –BRADY, 1884 (non *Plecanium concavum* Karrer, 1868), p. 360, pl. 43, fig. 11.

Siphotextularia rolshauseni PHLEGER & PARKER, 1951, p. 4, pl. 1, figs 23-24. –JONES, 1994, p. 48, pl. 43, fig. 11.

Siphotextularia subplanoides Zheng, 1988

pl. 10, figs 3-6

Siphotextularia subplanoides ZHENG, 1988, p. 130, pl. 38, fig. 5.
Textulina subplanoides (Zheng). –LOEBLICH & TAPPAN, 1994, p. 31, pl. 44, figs 1-7.

Siphotextularia* cf. *wairoana Finlay, 1939

pl. 10, figs 7-9

Siphotextularia wairoana FINLAY, 1939, p. 511, pl. 68, fig. 2. –LOEBLICH & TAPPAN, 1994, p. 31, pl. 43, figs 3-8.

***Siphotextularia* sp. 1**

pl. 10, figs 10-11

Key features: Test short, wide; periphery broadly rounded; chambers rapidly increasing in width and thickness; sutures indistinct; aperture an areal crescentic slit with lip; thick wall, firmly cemented with coarse grains.

Remarks: The appropriate generic assignment of this form is questionable, the shape of the test resembles *Textularia curtata* Zheng (1988), but it has an areal aperture with lip as *Siphotextularia*.

***Siphotextularia* sp. 2**

Key features: Test small, flattened; chambers gradually increasing in size as added, periphery rounded and lobulate; aperture an areal slit with distinct lip; wall finely agglutinated, smoothly finished.

Subfamily PLANCTOSTOMATINAE Loeblich & Tappan, 1984
Genus **CRIBROBIGENERINA** Andersen, 1961

Cribrobigenerina robustiformis Zheng, 1988

Cribrobigenerina robustiformis ZHENG, 1988, p. 121, pl. 33, figs 2-5.
Cribrogoesella robustiformis (Zheng). –LOEBLICH & TAPPAN, 1994, p. 34, pl. 49, figs 10-11.

Cribrobigenerina textularioidea (Goës, 1894)

pl. 10, figs 14-15

Clavulina textularioides GOËS, 1894, p. 42, pl. 8, figs 387-399.
Bigenerina nodosaria d'Orbigny var. *textularioidea* (Goës). –CUSHMAN, 1922a, p. 25, pl. 5, figs 8-9.
Cribrobigenerina textularioidea (Goës). –SELLIER DE CIVRIEUX, 1977b, p. 43, pl. 9, figs 1-3. –ZHENG, 1988, p. 121, pl. 33, figs 2-5.

***Cribrobigenerina* sp. 1**

pl. 10, fig. 12

Key features: Test large with long biserial portion and short uniserial part usually consisting of only one chamber; chambers rapidly increasing in size and thickness; periphery broadly rounded; sutures indistinct; aperture terminal; wall coarsely agglutinated.

Remarks: This form could represent an early stage of *Cribrobigenerina robusta*, but its size is often larger then the entire test of an adult specimens of *C. robusta* from this same location.

Family PSEUDOGAUDRYINIDAE Loeblich & Tappan, 1985
Subfamily PSEUDOGAUDRYININAE Loeblich & Tappan, 1985
Genus **PSEUDOCLAVULINA** Cushman, 1936

Pseudoclavulina serventyi (Chapman & Parr, 1935)

pl. 10, figs 16-17

Clavulina parisiensis d'Orbigny. –BRADY, 1884 (not d'Orbigny, 1826), p. 395, pl. 48, figs 14-16 (not figs 17-18) (ZF 1284).
Clavulina serventyi CHAPMAN & PARR, 1935, p. 5, pl. 1, fig. 7. –CUSHMAN, 1947, p. 7, pl. 1, fig. 12.
Pseudoclavulina serventyi (Chapman & Parr). –ZHENG, 1988, p. 104, pl. 47, fig. 8. –HATTA & UJIIÉ, 1992a, p. 60, pl. 3, fig. 4. –LOEBLICH & TAPPAN, 1994, p. 32, pl. 45, figs 12-19. –JONES, 1994, p. 53, pl. 48, figs 14-16. –YASSINI & JONES, 1995, p. 74, fig. 96.

Genus **PSEUDOGAUDRYINA** Cushman, 1936

Pseudogaudryina pacifica Cushman & Mc Culloch, 1939

pl. 10, figs 21-22

Gaudryina (Pseudogaudryina) atlantica (Bailey) var. *pacifica* CUSHMAN & MCCULLOCH, 1939, p. 94, pl. 9, figs 1-2.
Gaudryina (Pseudogaudryina) pacifica Cushman & McCulloch. –ZHENG, 1988, p. 91, pl. 43, figs 2-3.
Pseudogaudryina pacifica Cushman & McCulloch. –LOEBLICH & TAPPAN, 1994, p. 33, pl. 45, figs 20-23.

Family VALVULINIDAE Berthelin, 1880
Subfamily VALVULININAE Berthelin, 1880
Genus **CLAVULINA** d'Orbigny, 1826

Clavulina crustata (Cushman, 1937)

Pseudoclavulina crustata CUSHMAN, 1937a, p. 117, pl. 16, figs 1-2. –ZHENG, 1988, p. 102, pl. 46, figs 6-7.

Clavulina humilis Brady, 1884

pl. 10, fig. 19

Clavulina parisiensis d'Orbigny var. *humilis* BRADY, 1884, p. 395, pl. 48, figs 19-21 (ZF 1286).
Clavulina humilis Brady. –JONES, 1994, p. 53, pl. 48, figs 19-21.

Genus **CRIBROGOESELLA** Cushman, 1935

Cribrogoesella robusta (Brady, 1881)

Bigenerina robusta BRADY, 1881, p. 53. –BRADY, 1884, p. 371, pl. 45, figs 9-16.
Cribrogoesella robusta (Brady). –LOEBLICH & TAPPAN, 1987, p. 182, pl. 201, figs 1-4. –JONES, 1994, p. 49, pl. 45, figs 9-16.

Genus **CYLINDROCLAVULINA** Bermúdez & Key, 1952

Cylindroclavulina bradyi (Cushman, 1911)

pl. 10, fig. 18

Clavulina cylindrica Hantken. –BRADY, 1884 (not Hantken, 1875), p. 396, pl. 48, figs 32-33, 38 (not figs 34-37)
Clavulina bradyi CUSHMAN, 1911, p. 73, text-figs 118-119. –CUSHMAN, 1921, p. 155, pl. 31, fig. 4. –HOFKER, 1933, p. 90, pl. 2, figs 5-9, 14; text-fig. 15.
Cylindroclavulina bradyi (Cushman). –BERMÚDEZ & KEY, 1952, p. 76, text-figs 8-12. –LOEBLICH & TAPPAN, 1987, p. 182, pl. 201, figs 7-13. –ZHENG, 1988, p. 102, pl. 49, figs 1-4; pl. 54, fig 12. –HATTA & UJIIÉ, 1992a, p. 61, pl. 3, fig. 8; pl. 19, fig. 8. –JONES, 1994, p. 53, pl. 48, figs 32-33, 38 (not figs 34-37). –LOEBLICH & TAPPAN, 1994, p. 34, pl. 48, figs 7-19. –HEß, 1998, p. 60, pl. 8, fig. 3.

Cylindroclavulina ovata Zheng, 1988

Clavulina cylindrica Hantken. –BRADY, 1884 (not Hantken, 1875), p. 396, pl. 48, figs 34-37 (not figs 32-33, 38).
Cylindroclavulina ovata ZHENG, 1988, p. 103, pl. 39, figs 7-8. –LOEBLICH & TAPPAN, 1994, p. 34, pl. 49, figs 1-4.

Subfamily TRITAXILININAE Loeblich & Tappan, 1986
Genus **TRITAXILINA** Cushman, 1911

Tritaxilina atlantica Cushman, 1922

pl. 10, fig. 13

Tritaxia caperata (Brady). –BRADY, 1884 (non *Clavulina caperata* Brady, 1881), p. 390, pl. 49, fig. 3.
Tritaxilina caperata (Brady) var. *atlantica* CUSHMAN, 1922a, p. 79, pl. 15, figs 1-2.
Tritaxilina atlantica Cushman. –ZHENG, 1988, p. 101, pl. 50, fig. 4.
Tritaxilina caperata (Brady). –JONES, 1994, p. 53, pl. 49, fig. 3.

Tritaxilina caperata (Brady, 1881)

pl. 10, fig. 20

Clavulina caperata BRADY, 1881, p. 54.
Tritaxia caperata (Brady). –BRADY, 1884, p. 390, pl. 49, figs 1-2 & 4-7 (not fig. 3).
Tritaxilina caperata (Brady). –CUSHMAN, 1911, p. 71, text-figs 112-113. –CUSHMAN, 1921, p. 153, pl. 28, fig. 4. –LOEBLICH & TAPPAN, 1987, p. 184, pl. 202, figs 8-10. –ZHENG, 1988, p. 101, pl. 50, fig. 5. –JONES, 1994, p. 53, pl. 49, figs 1-2 & 4-7 (not fig. 3). –LOEBLICH & TAPPAN, 1994, p. 35, pl. 49, figs 12-14.

Order **CARTERINIDA** Mikhalevich, 1980
Family CARTERINIDAE Loeblich & Tappan, 1955
Genus **CARTERINA** Brady, 1884

Carterina spiculotesta (Brady, 1884)

Carterina spiculotesta (Carter). –BRADY, 1884 (non *Rotalia spiculotesta*, Carter, 1877), p. 346, pl. 41, figs 7-10.
Carterina spiculotesta (Brady). –BRÖNNIMANN & WHITTAKER, 1988, pl. 3, fig. 3. –JONES, 1994, p. 46, pl. 41, figs 7-10.

Remarks: According to Brönnimann & Whittaker (1988) this species belongs to the family Trochamminidae, to the contrary Loeblich & Tappan (1992) and Sen Gupta (1999) placed this species in separate order, since there is an evidence that spicules have been formed by the foraminifera.

Order **SPIRILLINIDA** Gorbachik & Mantsurova, 1980
Suborder SPIRILLININA Hohenegger & Piller, 1975
Family PLANISPIRILLINIDAE Piller, 1978
Genus **CONICOSPIRILLINOIDES** Cheng & Zheng, 1978

Conicospirillinoides inaequalis (Brady, 1879)

Spirillina inaequalis BRADY, 1879b, p. 278, pl. 8, fig. 25. –BRADY, 1884, p. 631, pl. 85, figs 8-11. –JONES, 1994, p. 92, pl. 85, figs 8-11.
Conicospirillinoides inaequalis (Brady). –LOEBLICH & TAPPAN, 1994, p. 35, pl. 51, figs 4-6.

Family PATELLINIDAE Rhumbler, 1906
Subfamily PATELLININAE Rhumbler, 1906
Genus **PATELLINA** Williamson, 1858

Patellina corrugata Williamson, 1858

Patellina corrugata WILLIAMSON, 1858, p. 46, pl. 3, figs 86-89. –BRADY, 1884, p. 634, pl. 86, figs 1-7. –HATTA & UJIIÉ, 1992b, p. 164, pl. 20, fig. 5. –JONES, 1994, p. 93, pl. 86, figs 1-7. –LOEBLICH & TAPPAN, 1994, p. 36, pl. 55, figs 1-9.

Order **MILIOLIDA** Lankester, 1885
Superfamily CORNUSPIRACEA Schultze, 1854
Family CORNUSPIRIDAE Schultze, 1854

Genus **CORNUSPIRA** Schultze, 1854

Cornuspira carinata (Costa, 1856)

Operculina carinata COSTA, 1856, p. 209, pl. 17, fig. 15.
Cornuspira carinata (Costa). –BRADY, 1884, p. 201, pl. 11, fig. 4. –CUSHMAN, 1921, p. 392, pl. 77, fig. 6. –JONES, 1994, p. 27, pl. 11, fig. 4.
Cyclogyra carinata (Costa). –ZHENG, 1988, p. 183, pl. 1, fig. 1.

Cornuspira foliacea (Philippi, 1844)

Orbis foliaceus PHILIPPI, 1844, p. 147, pl. 24, fig. 26.
Cornuspira foliacea (Philippi). –BRADY, 1884, p. 199, pl. 11, figs 5-6 (not figs 7-9). –CUSHMAN, 1921, p. 387, pl. 77, fig. 1. –JONES, 1994, p. 27, pl. 11, figs 5-6. –LOEBLICH & TAPPAN, 1994, p. 36, pl. 55, figs 10-11.
Cornuspiroides foliaceus (Philippi). –ZHENG, 1988, p. 186, pl. 1, fig. 7.

Cornuspira involvens (Reuss, 1850)

Operculina involvens REUSS, 1850, p. 370, pl. 46, fig. 20.
Cornuspira involvens (Reuss). –BRADY, 1884, p. 200, pl. 11, figs 1-3. –TAPPAN & LOEBLICH, 1982, pl. 48, fig. 1. –HATTA & UJIIÉ, 1992a, p. 61, pl. 4, fig. 1. –JONES, 1994, p. 26, pl. 11, figs 1-3. –LOEBLICH & TAPPAN, 1994, p. 36, pl. 56, figs 14-15.
Cyclogyra involvens (Reuss). –BOLTOVSKOY *et al.*, 1980, p. 26, pl. 10, figs 11-12. –ZHENG, 1988, p. 184, pl. 1, fig. 6.

Cornuspira planorbis Schultze, 1854

Cornuspira planorbis SCHULTZE, 1854, p. 40, pl. 2, fig. 21. –LOEBLICH & TAPPAN, 1994, p. 37, pl. 56, figs 1-7.
Cyclogyra planorbis (Schultze). –LOEBLICH & TAPPAN, 1964, p. C438, fig. 329.2. –BOLTOVSKOY *et al.*, 1980, p. 26, pl. 10, figs 13-15. –HAIG, 1988, p. 218, pl. 1, fig. 14. –ZHENG, 1988, p. 184, pl. 1, fig. 3; text-fig. 2.

Superfamily HEMIGORDIOPSACEA Nikitina, 1969
Family HEMIGORDIOPSIDAE Nikitina, 1969
Genus **GORDIOSPIRA** Heron-Allen & Earland, 1932

Gordiospira elongata Collins, 1958

Gordiospira elongata COLLINS, 1958, p. 347, pl. 1, figs 6-7. –LOEBLICH & TAPPAN, 1994, p. 37, pl. 56, figs 17-18; pl. 57, figs 1-4.

Superfamily NUBECULARIACEA T.R. Jones, 1875 (in Griffith & Henfrey)
Family FISCHERINIDAE Millett, 1898
Subfamily FISCHERININAE Millett, 1898
Genus **FISCHERINA** Terquem, 1878

Fischerina pellucida Millett, 1898

Fischerina pellucida MILLETT, 1898, p. 611, pl. 13, figs 14-15. –LOEBLICH & TAPPAN, 1994, p. 37, pl. 57, figs 5-6.

Genus **PLANISPIRINELLA** Wiesner, 1931

Planispirinella exigua (Brady, 1879)

Hauerina exigua BRADY, 1879b, p. 267.
Planispirina exigua (Brady). –BRADY, 1884, p. 196, pl. 12, figs 1-4; text-fig. 5b (ZF 2107).
Planispirinella exigua (Brady). –HATTA & UJIIÉ, 1992a, p. 62, pl. 4, fig. 3; pl. 18, fig. 8. –JONES, 1994, p. 27, pl. 12, figs 1-4; text-fig. 5b. –LOEBLICH & TAPPAN, 1994, p. 38, pl. 57, figs 7-8.

Family FISCHERINELLIDAE Saidova, 1981
Genus **FISCHERINELLA** Loeblich & Tappan, 1962

Fischerinella diversa McCulloch, 1977

Fischerinella diversa MCCULLOCH, 1977, p. 587, pl. 248, figs 9-10. –LOEBLICH & TAPPAN, 1994, p. 38, pl. 58, figs 1-12.

Family NUBECULARIIDAE T.R. Jones, 1875
Subfamily NODOPHTHALMIDIINAE Cushman, 1940
Genus **NODOPHTHALMIDIUM** Macfadyen, 1939

Nodophthalmidium simplex Cushman & Todd, 1944

Nubecularia tibia Jones & Parker. –BRADY, 1884 (not Jones & Parker, 1860), p. 135, pl. 1, figs 1-4 (ZF 2011).
Nodophthalmidium simplex CUSHMAN & TODD, 1944b, p. 67, pl. 11, fig. 8. –ZHENG, 1988, p. 191, pl. 3, figs 10-11. –JONES, 1994, p. 17, pl. 1, figs 1-4. –LOEBLICH & TAPPAN, 1994, p. 38, pl. 57, figs 11-17.

Subfamily NODOBACULARIINAE Cushman, 1927
Genus **NUBECULINA** Cushman, 1924

Nubeculina advena Cushman, 1924

pl. 11, fig. 2

Nubeculina divaricata (Brady) var. *advena* CUSHMAN, 1924, p. 53, pl. 19, figs 1-4.
Nubeculina advena Cushman. –LOEBLICH & TAPPAN, 1994, p. 38, pl. 59, figs 1-12.

Nubeculina divaricata (Brady, 1879)

pl. 11, fig. 1

Sagrina divaricata BRADY, 1879b, p. 276, pl. 8, figs 22-24.
Nubecularia divaricata (Brady). –BRADY, 1884, p. 136, pl. 76, figs 11-16.

Nubeculina divaricata (Brady). –LOEBLICH & TAPPAN, 1987, p. 321, pl. 331, figs 13-14. –JONES, 1994, p. 88, pl. 76, figs 11-16.

Subfamily NODOBACULARIELLINAE Bogdanovich, 1981
Genus **VERTEBRALINA** d'Orbigny, 1826

Vertebralina striata d'Orbigny, 1826

Vertebralina striata D'ORBIGNY, 1826, p. 283. –BRADY, 1884, p. 187, pl. 12, figs 14-16. –HAIG, 1988, p. 235, pl. 11, figs 25-26. –HATTA & UJIIÉ, 1992a, p. 62, pl. 4, fig. 6. –JONES, 1994, p. 28, pl. 12, figs 14-16. –LOEBLICH & TAPPAN, 1994, p. 39, pl. 60, figs 1-7.

Genus **WIESNERELLA** Cushman, 1933

Wiesnerella auriculata (Egger, 1893)

Planispirina auriculata EGGER, 1893, p. 245, pl. 3, figs 13-15. –CUSHMAN, 1932a, p. 72, pl. 16, fig. 6.
Wiesnerella auriculata (Egger). –ZHENG, 1979, p. 123, pl. 4, fig. 4. –HATTA & UJIIÉ, 1992a, p. 62, pl. 4, fig. 7. –LOEBLICH & TAPPAN, 1994, p. 39, pl. 62, figs 1-3. –HAYWARD *et al.*, 1999, p. 95, pl. 3, fig. 19.

Family OPHTHALMIDIIDAE Wiesner, 1920
Genus **CORNULOCULINA** Burbach, 1886

Cornuloculina inconstans (Brady, 1879)

Hauerina inconstans BRADY, 1879b, p. 268.
Ophthalmidium inconstans (Brady). –BRADY, 1884, p. 189, pl. 12, figs 5, 7-8 (ZF 2021).
Hauerinella inconstans (Brady). –BARKER, 1960, p. 24, pl. 12, figs 5, 7-8.
Cornuloculina inconstans (Brady). –LOEBLICH & TAPPAN, 1964, p. C448, fig. 340.3-7. –ZHENG, 1988, p. 188, pl. 1, fig. 10. –JONES, 1994, p. 27, pl. 12, figs 5, 7-8. –LOEBLICH & TAPPAN, 1994, p. 40, pl. 63, figs 6-7.

Genus **EDENTOSTOMINA** Collins, 1958

Edentostomina cultrata (Brady, 1881)

pl. 11, fig. 5

Miliolina cultrata BRADY, 1881, p. 45. –BRADY, 1884, p. 161, pl. 5, figs 1-2.
Edentostomina cultrata (Brady). –COLLINS, 1958, p. 371. –ZHENG, 1988, p. 218, pl. 1, fig. 11. –HATTA & UJIIÉ, 1992a, p. 63, pl. 5, fig. 2. –JONES, 1994, p. 21, pl. 5, figs 1-2. –LOEBLICH & TAPPAN, 1994, p. 41, pl. 63, figs 8-12. –HAYWARD *et al.*, 1999, p. 95, pl. 3, figs 20-21.

Edentostomina milletti (Cushman, 1917)

Biloculina milletti CUSHMAN, 1917a, p. 81, pl. 34, figs 4-5.
Edentostomina milletti (Cushman). –ZHENG, 1988, p. 219, pl. 2, fig. 1.

Edentostomina rupertiana (Brady, 1881)

Miliolina rupertiana BRADY, 1881, p. 46. –BRADY, 1884, p. 178, pl. 7, figs 7-12; text-fig. 4.
Triloculina rupertiana (Brady). –CUSHMAN, 1921, p. 464, pl. 93, fig. 2.
Rupertianella rupertiana (Brady). –LOEBLICH & TAPPAN, 1987, p. 354, p. 354, pl. 361, figs 13-19. –LOEBLICH & TAPPAN, 1994, p. 60, pl. 106, figs 1-14.
Edentostomina rupertiana (Brady, 1884). –HAIG, 1988, p. 218, pl. 1, figs 18-21. –JONES, 1994, p. 23, pl. 7, figs 7-12.

Remarks: Jones (1994) regarded *Rupertianella* Loeblich & Tappan (1985) as junior synonym of *Edentostomina* Collins, 1958.

Genus **SPIROPHTHALMIDIUM** Cushman, 1927

Spirophthalmidium acutimargo (Brady, 1884)

Spiroloculina acutimargo BRADY, 1884, p. 154, pl. 10, fig. 13 (not figs 12, 14-15).
Spiropthalmidium acutimargo (Brady). –CUSHMAN, 1929a, p. 90, pl. 22, fig. 1. –JONES, 1994, p. 26, pl. 10, fig. 13.
Ophthalmidium acutimargo (Brady). –LOEBLICH & TAPPAN, 1964, C448, figs 340.2. –VAN MARLE, 1991, p. 58.

Spirophthalmidium concava (Wiesner, 1913)

pl. 11, figs 8-9

Spiroloculina acutimargo Brady var. *concava* WIESNER, 1913 (after Heron-Allen & Earland, 1916), p. 521. –HERON-ALLEN & EARLAND, 1916, p. 208, pl. 39, figs 1-3.
Spiropthalmidium acutimargo var. *concava* (Wiesner). –CUSHMAN, 1929a, p. 91, pl. 22, fig. 2.

Superfamily MILIOLACEA Ehrenberg, 1839
Family SPIROLOCULINIDAE Wiesner, 1920
Subfamily SPIROLOCULININAE Wiesner, 1920
Genus **ADELOSINA** d'Orbigny, 1826

Adelosina laevigata d'Orbigny, 1826

pl. 11, fig. 4

Adelosina laevigata D'ORBIGNY, 1826, p. 303. –SCHLUMBERGER, 1886, p. 549, pl. 16, figs 19-21; text-fig. 6. –LOEBLICH & TAPPAN, 1987, p. 328, pl. 337, figs 5-12. –LOEBLICH & TAPPAN, 1994, p. 41, pl. 64, figs 9-10.

Adelosina litoralis Martinotti, 1921

pl. 11, fig. 3

Adelosina litoralis MARTINOTTI, 1921, p. 326, pl. 4, figs 17-20; text-figs 167-169. –LOEBLICH & TAPPAN, 1994, p. 41, pl. 65, figs 1-3.

Adelosina spp.

Remarks: Forms referred to *Adelosina* spp. resemble 'juvenile' *Quinqueloculina* ex gr. *philippinensis* Cushman.

Genus **INAEQUALINA** Łuczkowska, 1971

Remarks: Distinguishing features of this genera are: an elongated, flattened neck and terminal, slit-like aperture.
Jones (1994) regarded *Inaequalina* Łuczkowska as a junior synonym of *Spiroloculina* d'Orbigny.

Inaequalina disparilis (Terquem, 1878)

Spiroloculina disparilis TERQUEM, 1878, p. 55, pl. 5, fig. 12. –CUSHMAN & TODD, 1944a, p. 35, pl. 5, figs 22-23, 29-31 (not figs 24-28).
Spiroculina acutimargo BRADY, 1884, p. 154, pl. 10, fig. 12 (not figs 13-15) (ZF 2388, ZF 2389).
Spiroloculina elevata WIESNER, 1923, p. 36. –JONES, 1994, p. 26, pl. 10, fig. 12.
Inaequalina disparilis (Terquem). –ZHENG, 1988, p. 188, pl. 2, figs 11-12; pl. 29, figs 3-4; text-fig. 6. –LOEBLICH & TAPPAN, 1994, p. 41, pl. 64, figs 11-18. –HAYWARD *et al.*, 1999, p. 107, pl. 6, figs 1-3.

Remarks: *Inaequalina disparilis* Terquem differs from *Spiroloculina affixa* Terquem in being convex-concave, rather than palno-concave, but those two herein are regarded as synonyms.

Inaequalina venusta (Cushman & Todd, 1944)

Spiroculina acutimargo BRADY, 1884, p. 154, pl. 10, fig. 15.
Spiroloculina venusta CUSHMAN & TODD, 1944a, p. 60, pl. 8, figs 16-17. –JONES, 1994, p. 26, pl. 10, fig. 15. –YASSINI & JONES, 1995, p. 82, fig. 151.

Genus **NUMMULOPYRGO** Hofker, 1983

Nummulopyrgo anomala (Schlumberger, 1891)

Biloculina anomala SCHLUMBERGER, 1891, p. 569, pl. 11, figs 84-86; pl. 12, fig. 101; text-figs 32-34. –CUSHMAN, 1921, p. 474, pl. 96, fig. 1.
Pyrgo anomala (Schlumberger). –ZHENG, 1988, p. 222, pl. 11, fig. 1; pl. 27, fig. 3.
Nummulopyrgo anomala (Schlumberger). –LOEBLICH & TAPPAN, 1994, p. 42, pl. 91, figs 4-10.

Nummulopyrgo globulus (Hofker, 1983)

Pseudopyrgo globulus (Bornemann). –HOFKER, 1976 (non *Biloculina globulus* Bornemann, 1855), p. 112, fig. 106.
Nummulopyrgo globulus (Bornemann). –HOFKER, 1983, p. 26.
Nummulopyrgo globulus (Hofker). –LOEBLICH & TAPPAN, 1987, p. 330, pl. 339, figs 7-14. –LOEBLICH & TAPPAN, 1994, p. 42, pl. 65, figs 8-16.
Pseudopyrgo toddae (Andersen). –ZHENG, 1988 (non *Biloculinella toddae* Andersen, 1961), p. 272, pl. 14, figs 3-7; pl. 32, fig. 8; text-fig. 85.

Genus **SPIROLOCULINA** d'Orbigny, 1826

Spiroloculina communis Cushman & Todd, 1944

pl. 11, figs 6-7

Spiroloculina excavata d'Orbigny. –BRADY, 1884 (not d'Orbigny, 1846), p. 151, pl. 9, figs 5-6 (ZF 2399).
Spiroloculina communis CUSHMAN & TODD, 1944a, p. 63, pl. 9, figs 4-5, 7-8. –ZHENG, 1988, p. 237, pl. 2, figs 15-16; text-fig. 54. –VAN MARLE, 1991, p. 70, pl. 4, figs 5-6. –HATTA & UJIIÉ, 1992a, p. 63, pl. 5, fig. 4. –JONES, 1994, p. 25, pl. 9, figs 5-6. –HAYWARD *et al.*, 1999, p. 108, pl. 6, figs 8-9.

Spiroloculina depressa d'Orbigny, 1826

pl. 11, fig. 17

Spiroloculina limbata d'Orbigny. –BRADY, 1884 (not d'Orbigny, 1826), p. 150, pl. 9, fig. 17 (ZF 2410).
Spiroloculina depressa D'ORBIGNY, 1826, p. 298. –CUSHMAN, 1921, p. 394, pl. 81, fig. 2; pl. 100, figs 4-5. –LOEBLICH & TAPPAN, 1964, C453, figs 343, 1-2. –VAN MARLE, 1991, p. 71, pl. 4, fig. 7. –JONES, 1994, p. 25, pl. 9, fig. 17.

Spiroloculina excisa Cushman & Todd, 1944

pl. 11, fig. 15

Spiroloculina communis Cushman & Todd var. *excisa* CUSHMAN & TODD, 1944a, p. 67, pl. 9, figs 15-17.
Spiroloculina excisa Cushman & Todd. –ZHENG, 1988, p. 238, pl. 3, figs 1-3; p. 29, fig. 8; text-fig. 56. –LOEBLICH & TAPPAN, 1994, p. 43, pl. 66, figs 19-20.

Spiroloculina eximia Cushman, 1922

Spiroloculina eximia CUSHMAN, 1922b, p. 61, pl. 11, fig. 2. –CUSHMAN, 1924, p. 56, pl. 21, fig. 2. –WHITTAKER & HODGKINSON, 1979, p. 18, pl. 1, fig. 6.

Spiroloculina manifesta Cushman & Todd, 1944

pl. 11, figs 10-11

Spiroloculina impressa Terquem. –BRADY, 1884 (not Terquem, 1878), p. 151, pl. 10, figs 3-4 (ZF 2407).
Spiroloculina manifesta CUSHMAN & TODD, 1944a, p. 62, pl. 8, figs 26-28. –WHITTAKER & HODGKINSON, 1979, p. 19, pl. 1, figs 8-9; text-figs 10-11. –ZHENG, 1988, p. 239, pl. 3, fig. 5. –HATTA & UJIIÉ, 1992a, p. 64, pl. 5, fig. 7. –LOEBLICH & TAPPAN, 1994, p. 44, pl. 68, figs 5-8.
Spiroloculina communis Cushman & Todd. –JONES, 1994, p. 25, pl. 10, figs 3-4.

Key features: This form is characterised by having rough, but almost transparent and fragile wall, strongly keeled margins with concave shape in transverse section.

Remarks: Resembles form referred by Loeblich & Tappan (1994) to *Spiroloculina subimpressa* Parr.

Spiroloculina* cf. *regularis Cushman & Todd, 1944

Spiroloculina regularis CUSHMAN & TODD, 1944a, p. 51, pl. 7, figs 26-27. –LOEBLICH & TAPPAN, 1994, p. 44, pl. 68, figs 1-2.

Spiroloculina* cf. *robusta Brady, 1884

pl. 11, fig. 14

Spiroloculina robusta BRADY, 1884, p. 150, pl. 9, figs 7-8. –CUSHMAN, 1921, p. 404, pl. 79, fig. 2. –ZHENG, 1988, p. 240, pl. 26, figs 2-4; pl. 29, figs 9-10. –JONES, 1994, p. 25, pl. 9, figs 7-8.
Flintia robusta (Brady). –BARKER, 1960, p. 18, pl. 9, figs 7-8.

Spiroloculina scrobiculata Cushman, 1921

pl. 11, fig. 16

Spiroloculina scrobiculata CUSHMAN, 1921, p. 406, pl. 81, fig. 1. –CUSHMAN & TODD, 1944a, p. 55, pl. 7, figs 28-29. –LOEBLICH & TAPPAN, 1994, p. 44, pl. 67, figs 10-17.

Remarks: Resembles *Spiroloculina rugosa* Cushman & Todd, but differs in showing a more rapid increase in chamber thickness, resulting in a strongly biconcave test (after Loeblich & Tappan, 1994). Resembles also form referred by Hatta & Ujiié (1992a) to *S. hadai* Thalmann.

Spiroloculina tenuiseptata Brady, 1884

Spiroloculina tenuiseptata BRADY, 1884, p. 153, pl. 10, figs 5-6 (ZF 2417). –SIDEBOTTOM, 1918, p. 5, pl. 1, fig. 7. –CUSHMAN, 1921, p. 401, pl. 82, figs 1-3. –JONES, 1994, p. 26, pl. 10, figs 5-6.
Ophthalmidium tenuiseptatum (Brady). –ZHENG, 1988, p. 187, pl. 1, fig. 9; pl. 29, fig. 2; text-fig. 4.

Family HAUERINIDAE Schwager, 1876
Subfamily SIPHONAPERTINAE Saidova, 1975
Genus **AGGLUTINELLA** El-Nakhal, 1983

Agglutinella agglutinans (d'Orbigny, 1839)

pl. 11, fig. 18

Quinqueloculina agglutinans D'ORBIGNY, 1839a, p. 195, pl. 12, figs 11-13. –GRAHAM & MILITANTE, 1959, p. 41, pl. 4, fig. 10.
Agglutinella agglutinans (d'Orbigny). –LOEBLICH & TAPPAN, 1994, p. 44, pl. 70, figs 1-9.

Agglutinella arenata (Said, 1949)

pl. 11, fig. 19

Quinqueloculina anguina Terquem var. *arenata* SAID, 1949, p. 9, pl. 1, fig. 25.
Quinqueloculina arenata Said. –HAIG, 1988, p. 218, pl. 1, figs 3-6. –HATTA & UJIIÉ, 1992a, p. 65, pl. 6, fig. 1.
Agglutinella arenata (Said). –LOEBLICH & TAPPAN, 1994, p. 45, pl. 69, figs 9-11; pl. 70, figs 10-15; pl. 74, figs 10-13.

Agglutinella reinemunde (Haque, 1959)

Triloculina reinemunde HAQUE, 1959 (*fide* Ellis & Messina, *et seq.*), p. 19, pl. 2, fig. 5.
Agglutinella reinemunde (Haque). –ZHENG, 1988, p. 217, pl. 20, figs 3-4.

Genus **AMMOMASSILINA** Cushman, 1933

Ammomassilina alveoliniformis (Millett, 1898)

pl. 11, figs 20-21

Spiroloculina asperula Karrer. –BRADY, 1884 (not Karrer, 1868), p. 152, pl. 8, fig. 13.
Massilina alveoliniformis MILLETT, 1898, p. 609, pl. 8, figs 5-7. –HOFKER, 1933, p. 102, text-figs 21-22.
Ammomassilina alveoliniformis (Millett). –HAIG, 1988, p. 218, pl. 1, figs 3-6. –HATTA & UJIIÉ, 1992a, p. 65, pl. 6, fig. 1. –JONES, 1994, p. 24, pl. 8, fig. 13. –LOEBLICH & TAPPAN, 1994, p. 45, pl. 5, figs 1-5; pl. 69, figs 1-2. –HEß, 1998, p. 56, pl. 8, fig. 14.

Genus **PSEUDOFLINTINA** Saidova, 1981

Pseudoflintina laculata Loeblich & Tappan, 1994

pl. 12, fig. 1

Pseudoflintina laculata LOEBLICH & TAPPAN, 1994, p. 46, pl. 72, figs 5-8.

Pseudoflintina triquetra (Brady, 1879)

pl. 12, fig. 2

Miliolina triquetra BRADY, 1879a, p. 54. –BRADY, 1884, p. 181, pl. 8, figs 8-10.
Pseudoflintina triquetra (Brady). –ZHENG, 1988, p. 262, pl. 9, figs 6-8; pl. 31, fig. 9. –JONES, 1994, p. 24, pl. 8, figs 8-10.

Genus **SCHLUMBERGERINA** Munier-Chalmas, 1882

Schlumbergerina alveoliniformis (Brady, 1879)

Miliolina alveoliniformis BRADY, 1879a, p. 54. –BRADY, 1884, p. 181, pl. 8, figs 15-20.
Schlumbergerina alveoliniformis (Brady). –HAIG, 1988, p. 234, pl. 9, figs 18-19. –HATTA & UJIIÉ, 1992a, p. 65, pl. 6, fig. 2. –JONES, 1994, p. 24, pl. 8, figs 15-20. –LOEBLICH & TAPPAN, 1994, p. 46, pl. 72, figs 9-11.

Genus **SIPHONAPERTA** Vella, 1957

Siphonaperta crassatina (Brady, 1884)

pl. 12, fig. 3

Miliolina crassatina BRADY, 1884, p. 180, pl. 8, fig. 5 (ZF 1861).
Quinqueloculina crassatina (Brady). –CUSHMAN, 1921, p. 443, pl. 84, fig. 4.
Flintina crassatina (Brady). –BARKER, 1960, p. 16, pl. 8, fig. 5.
Siphonaperta crassatina (Brady). –ZHENG, 1988, p. 236, pl. 8, figs 7-8. –JONES, 1994, p. 24, pl. 8, fig. 5.

Subfamily HAUERININAE Schwager, 1876
Genus **HAUERINA** d'Orbigny, 1839

Hauerina fragilissima (Brady, 1884)

pl. 12, fig. 6

Spiroloculina fragilissima BRADY, 1884, p. 149, pl. 9, figs 12-14 (ZF 2401).
Hauerina fragilissima (Brady). –HERON-ALLEN & EARLAND, 1915, p. 587, pl. 46, figs 1-2. –CUSHMAN, 1924, p. 68, pl. 25, figs 2-3. –HOFKER, 1952, p. 119, text-fig. 63. –WHITTAKER & HODGKINSON, 1979, p. 38, pl. 3, fig. 11. –HAIG, 1988, p. 220, pl. 2, figs 3-4. –JONES, 1994, p. 25, pl. 9, figs 12-14.
Sigmoihauerina fragilissima (Brady). –ZHENG, 1979, p. 135, pl. 8, fig. 7; text-fig. 11.
Parahauerinoides fragilissimus (Brady). –LOEBLICH & TAPPAN, 1994, p. 51, pl. 87, figs 1-6.

Remarks: Referred by Loeblich & Tappan (1994) to *Pseudohauerinoides* McCulloch, as being planispiral throughout. The SCS specimens have quinqueloculine initial chamber arrangement, therefore this form is referred to *Hauerina* d'Orbigny.

Genus **LACHLANELLA** Vella, 1957

Lachlanella compressiostoma (Zheng, 1988)

pl. 12, figs 9-10

Quinqueloculina compressiostoma ZHENG, 1988, p. 197, pl. 5, fig. 6; pl. 30, figs 7-9; text-fig. 14.
Lachlanella compressiostoma (Zheng). –LOEBLICH & TAPPAN, 1994, p. 46, pl. 73, figs 1-15.
Quinqueloculina lamarckiana d'Orbigny. –YASSINI & JONES, 1995 (not d'Orbigny, 1839a), p. 84, figs 203-205, 208.

Key features: Test with quinqueloculine chamber arrangement, nearly triangular in transverse section; characteristic elongate slit-like aperture with narrow elongate tooth.

Genus **PROEMASSILINA** Lacroix, 1938

Proemassilina arenaria (Brady, 1884)

pl. 12, fig. 4

Spiroloculina arenaria BRADY, 1884, p. 153, pl. 8, fig. 12 (ZF 2392).
Massilina arenaria (Brady). –VAN MARLE, 1991, p. 59, pl. 3, fig. 1.
Proemassilina arenaria (Brady). –JONES, 1994, p. 24, pl. 8, fig. 12.

***Proemassilina* sp. 1**

Spiroloculina asperula Karrer. –BRADY, 1884 (not Karrer, 1868), p. 152, pl. 8, fig. 11 (not figs 13-14) (ZF 2393).
Proemassilina sp. nov. –JONES, 1994, p. 24, pl. 8, fig. 11.

Genus **PSEUDOLACHLANELLA** Langer, 1992

Pseudolachlanella artusoris (Zheng, 1988)

Quinqueloculina artusoris ZHENG, 1988, p. 194, pl. 4, figs 4-5; pl. 30, figs 3-4; text-fig. 10.

Key features: Test with quinqueloculine arrangement; short apertural neck; elongate slit-like aperture with narrow elongate tooth.

Pseudolachlanella slitella Langer, 1992

pl. 12, figs 7-8

Quinqueloculina oblonga (Montagu). –ZHENG, 1988 (non *Vermiculum oblongum* Montagu, 1803), p. 206, pl. 6, fig. 12; pl. 23, fig. 6.
Pseudolachlanella slitella LANGER, 1992, p. 90, pl. 2, figs 4-6. –LOEBLICH & TAPPAN, 1994, p. 48, pl. 73, figs 16-18; pl. 101, figs 1-3.

Genus **QUINQUELOCULINA** d'Orbigny, 1826

Quinqueloculina adiazeta Loeblich & Tappan, 1994

pl. 12, fig. 22

Quinqueloculina adiazeta LOEBLICH & TAPPAN, 1994, p. 48, pl. 85, figs 1-18.

Quinqueloculina akneriana d'Orbigny, 1846

Quinqueloculina akneriana D'ORBIGNY, 1846, p. 290, pl. 18, figs 16-21. –GALLOWAY & HEMINWAY, 1941, p. 301, pl. 2, fig. 1. –ZHENG, 1988, p. 192, pl. 3, figs 12-13; pl. 4, figs 1-4; pl. 6, fig. 4; pl. 23, figs 7-8; pl. 30, figs 1-2; text-fig. 9.

Quinqueloculina* ex gr. *auberiana d'Orbigny, 1839

pl. 12, fig. 13

Quinqueloculina auberiana D'ORBIGNY, 1839a, p. 193, pl. 12, figs 1-3.
Miliolina auberiana (d'Orbigny). –BRADY, 1884, p. 162, pl. 5, figs 8-9 (ZF 1847).
Quinqueloculina cuvieriana d'Orbigny. –WHITTAKER & HODGKINSON, 1979, p. 23, pl. 1, fig. 14; pl. 2, figs 12-13; text-fig. 19.
Quinqueloculina auberiana d'Orbigny. –JONES, 1994, p. 21, pl. 5, figs 8-9.

Remarks: The SCS specimens closely resemble those from Challenger Collection (no. ZF 1847), referred herein to *Q. auberiana*, although based on Whittaker & Hodgkinson (1979) suggestions some may represent *Q. cuvieriana* d'Orbigny.

Quinqueloculina bicarinata d'Orbigny, 1826

pl. 12, fig. 14

Quinqueloculina bicarinata D'ORBIGNY, 1826, p. 302. –CUSHMAN, 1921, p. 428, pl. 86, figs 2-3; pl. 100, fig. 7.

Quinqueloculina collumnosa Cushman, 1922

pl. 12, figs 19-20

Miliolina cuvieriana d'Orbigny. –HERON-ALLEN & EARLAND, 1915 (not d'Orbigny, 1839a), p. 571, pl. 4, figs 33-36.
Quinqueloculina collumnosa CUSHMAN, 1922b, p. 65, pl. 10, fig. 10. –CUSHMAN, 1924, p. 27, pl. 3, fig. 2. –TU & ZHENG, 1991, p. 170, pl. 2, fig. 13.

Remarks: Resembles *Quinqueloculina semistriata* d'Orbigny in Yassini & Jones (1995).

Quinqueloculina fichteliana (d'Orbigny, 1839)

pl. 12, fig. 21

Triloculina fichteliana D'ORBIGNY, 1839a, p. 171, pl. 9, figs 8-10. –CUSHMAN, 1924, p. 63, pl. 17, fig. 1.
Quinqueloculina fichteliana (d'Orbigny). –ZHENG, 1988, p. 200, pl. 18, fig. 8; text-fig. 17.

Quinqueloculina laevigata d'Orbigny, 1826

Quinqueloculina laevigata D'ORBIGNY, 1826, p. 143, pl. 3, figs 31-33. –GALLOWAY & HEMINWAY, 1941, p. 302, pl. 1, fig. 8. –ZHENG, 1988, p. 203, pl. 6, figs 10-11.

Quinqueloculina lamarckiana d'Orbigny, 1839

Quinqueloculina lamarckiana D'ORBIGNY, 1839a p. 189, pl. 11, figs 14-15. –CUSHMAN, 1921, p. 418, pl. 87, figs 2-3. –ASANO, 1951a, p. 5, text-figs 29-31. –WHITTAKER & HODGKINSON, 1979, p. 24, text-fig. 18. –JONES, 1994, p. 21, pl. 5, fig. 12.

Remarks: Resembles *Quinqueloculina crassicarinata* Collins, but differs in less carinate peripheries and shorter neck.

Quinqueloculina* ex gr. *philippinensis Cushman, 1921

pl. 12, figs 17-18

Quinqueloculina kerimbatica (Heron-Allen & Earland) var. *philippinensis* CUSHMAN, 1921, p. 438, pl. 89, figs 2-3; text-fig. 34.
Quinqueloculina philippinensis Cushman. –PONDER, 1974, p. 224, pl. 13, figs 1-31; text-figs 1-10. –WHITTAKER & HODGKINSON, 1979, p. 27, pl. 2, figs 3-6. –LOEBLICH & TAPPAN, 1994, p. 50, pl. 81, figs 4-7 (not figs 1-3, 8-10).

Remarks: Specimens of this species are highly variable, therefore all specimens with similar growth pattern, long apertural neck and prominent lateral carine are grouped together.

Quinqueloculina pseudoreticulata Parr, 1941

Miliolina reticulata (d'Orbigny). –BRADY, 1884 (non *Triloculina reticulata* d'Orbigny, 1826), p. 177, pl. 9, figs 2-3 (not fig. 4).
Quinqueloculina pseudoreticulata PARR, 1941, p. 305. –WHITTAKER & HODGKINSON, 1979, p. 28, pl. 2, fig. 9. –ZHENG, 1988, p. 207, pl. 7, figs 4-9. –VAN MARLE, 1991, p. 64, pl. 3, figs 9-10. –JONES, 1994, p. 25, pl. 9, figs 2-3.

Quinqueloculina pygmaea Reuss, 1850

Quinqueloculina pygmaea REUSS, 1850, p. 384, pl. 50, fig. 3. –GALLOWAY & HEMINWAY, 1941, p. 304, pl. 2, fig. 7.

Remarks: Resembles *Quinqueloculina tubilocula* Zheng in Loeblich & Tappan (1994).

Quinqueloculina quinquecarinata Collins, 1958

Quinqueloculina quinquecarinata COLLINS, 1958, p. 360, pl. 2, fig. 8. –HAIG, 1988, p. 234, pl. 7, figs 21-25. –LOEBLICH & TAPPAN, 1994, p. 50, pl. 79, figs 13-18.

Key features: This species is characterised by a narrow elongate test, prominent lateral carinae and smooth neck.

Quinqueloculina sagamiensis Asano, 1936

pl. 12, fig. 24

Quinqueloculina sagamiensis ASANO, 1936, p. 612, pl. 30, fig. 5. –ASANO, 1956b, p. 61, pl. 7, fig. 16. –ZHENG, 1988, p. 208, pl. 13, figs 1-3; pl. 30, figs 23-26; text-fig. 26.

Quinqueloculina seminulum (Linné, 1758)

pl. 12, figs 11-12

Serpula seminulum LINNÉ, 1758, p. 786.
Miliolina seminulum (Linné). –BRADY, 1884, p. 157, pl. 5, fig. 6.
Quinqueloculina seminulum (Linné). –LOEBLICH & TAPPAN, 1987, pl. 344, figs 8-13. –VAN MARLE, 1991, p. 65, pl. 3, figs 11-13. –JONES, 1994, p. 21, pl. 5, fig. 6.
Quinqueloculina seminula (Linné). –HAYWARD *et al.*, 1999, p. 103, pl. 5, figs 9-10.

Quinqueloculina subcurta Zheng, 1988

pl. 12, figs 15-16

Quinqueloculina subcurta ZHENG, 1988, p. 330, pl. 5, figs 4-5; pl. 30, figs 12-13; text-fig. 29.

Quinqueloculina tropicalis Cushman, 1924

pl. 12, fig. 23

Miliolina gracilis (d'Orbigny). –BRADY, 1884 (non *Triloculina gracilis* d'Orbigny, 1839a), p. 160, pl. 5, fig. 3 (ZF 1866).
Quinqueloculina tropicalis CUSHMAN, 1924, p. 63, pl. 23, figs 9-10. –WHITTAKER & HODGKINSON, 1979, p. 31, pl. 1, fig. 13; text-figs 22-23. –ZHENG, 1988, p. 214, pl. 6, figs 5-6; pl. 24, fig. 2; pl. 31, fig. 4; text-fig. 32. –JONES, 1994, p. 21, pl. 5, fig. 3. –LOEBLICH & TAPPAN, 1994, p. 50, pl. 78, figs 13-15.

Quinqueloculina venusta Karrer, 1868

Quinqueloculina venusta KARRER, 1868, p. 147, pl. 2, fig. 16.
Miliolina venusta (Karrer). –BRADY, 1884, p. 162, pl. 5, fig. 7.
Quinqueloculina venusta Karrer. –CUSHMAN, 1917a, p. 45, pl. 11, fig. 1. –UJIIÉ, 1990, p. 15, pl. 3, figs 3-4. –JONES, 1994, p. 21, pl. 5, fig. 7.

***Quinqueloculina* sp. 1**

Key features: Test elongated; chambers in quinqueloculine arrangement, strongly compressed and carinate. This form resembles *Adelosina litoralis* Martinotti, but differs in a final chamber arrangement.

Subfamily MILIOLINELLINAE Vella, 1957
Genus **BILOCULINELLA** Wiesner, 1931

Biloculinella inflata (Wright, 1902)

pl. 13, figs 2-3

Biloculina inflata WRIGHT, 1902, p. 183, pl. 13, figs 1-4.
Biloculinella inflata (Wright). –ZHENG, 1988, p. 253, pl. 22, figs 4-6.

Biloculinella labiata (Schlumberger, 1891)

pl. 13, fig. 9

Biloculina labiata SCHLUMBERGER, 1891, p. 556, pl. 9, figs 60-62; text-figs 13-14.
Biloculinella labiata (SCHLUMBERGER). –ŁUCZKOWSKA, 1974, p. 113, pl. 21, figs 8-9. –LOEBLICH & TAPPAN, 1987, p. 337, pl. 348, figs 1-4. –LOEBLICH & TAPPAN, 1994, p. 51, pl. 86, figs 5-11.
Biloculinella labiata var. *elongata* (SCHLUMBERGER). –TU & ZHENG, 1991, p. 172, pl. 2, fig. 5.

Remarks: The SCS forms are elongated and not much inflated in side view. Resembles form referred by Tu & Zheng (1991) to *Biloculinella labiata* var. *elongata* (Schlumberger).

Genus **MILIOLINELLA** Wiesner, 1931

Miliolinella suborbicularis (d'Orbigny, 1839)

Triloculina suborbicularis D'ORBIGNY, 1839a, p. 177, pl. 10, figs 9-11.
Miliolinella suborbicularis (d'Orbigny). –LOEBLICH & TAPPAN, 1994, p. 52, pl. 89, figs 1-9, pl. 96, figs 11-16.

Miliolinella subrotunda (Montagu, 1803)

Vermiculum subrotunda MONTAGU, 1803, p. 521, pl. 1, fig. 4.
Miliolina circularis (Bornemann). –BRADY, 1884 (non *Triloculina circularis* Bornemann, 1855), p. 169, pl. 4, fig. 3; pl. 5, figs 13-14.
Miliolinella subrotunda (Montagu). –LOEBLICH & TAPPAN, 1987, p. 340, pl. 350, figs 1-12. –ZHENG, 1988, p. 252, pl. 21, fig. 5. –JONES, 1994, p. 20, pl. 4, fig. 3; pl. 5, figs 13-14.

Genus **PSEUDOTRILOCULINA** Cherif, 1970

Pseudotriloculina cyclostoma (Reuss, 1850)

Biloculina cyclostoma REUSS, 1850, p. 382, pl. 49, fig. 6.
Pseudotriloculina cyclostoma (Reuss). –LOEBLICH & TAPPAN, 1987, p. 342, pl. 352, figs 6-14.

Sinuloculina cyclostoma (Reuss). –ZHENG, 1988, p. 275, pl. 13, fig. 6; pl. 32, fig. 4; text-fig. 88.

Pseudotriloculina lunata (Zheng, 1988)

pl. 13, figs 4, 7-8

Sinuloculina lunata ZHENG, 1988, p. 275, pl. 15, figs 3, 6; pl. 21, fig. 9; pl. 24, fig. 4; pl. 32, figs 5-6; text-fig. 89.

Genus **PYRGO** Defrance, 1824

Pyrgo bougainvillei (d'Orbigny, 1839)

Biloculina bougainvillei D'ORBIGNY, 1839a, p. 67, pl. 8, figs 22-24.
Pyrgo bougainvillei (d'Orbigny). –GALLOWAY & HEMINWAY, 1941, p. 310, pl. 4, fig. 1. –ZHENG, 1988, p. 223, pl. 11, figs 6-7; pl. 31, fig. 10; text-fig. 40.

Pyrgo depressa (d'Orbigny, 1826)

Biloculina depressa D'ORBIGNY, 1826, p. 298. –BRADY, 1884, p. 145, pl. 2, figs 12, 16-17 (not fig. 15; pl. 3, figs 1-2) (ZF 1146). –CUSHMAN, 1917a, p. 74, pl. 28, figs 1-2.
Pyrgo depressa (d'Orbigny). –ZHENG, 1988, p. 225, pl. 11, figs 4-5; pl. 31, fig. 13; text-fig. 42. –JONES, 1994, p. 19, pl. 2, figs 12, 16-17.
Biloculinella depressa (d'Orbigny). –LOEBLICH & TAPPAN, 1994, p. 51, pl. 86, figs 1-4.

Pyrgo murrhina (Schwager, 1866)

pl. 13, fig. 10

Biloculina murrhina SCHWAGER, 1866, p. 203, pl. 4, fig. 15.
Biloculina depressa d'Orbigny var. *murrhyna* Schwager. –BRADY, 1884, p. 145, pl. 2, figs 10-11, 15.
Pyrgo murrhina (Schwager). –SRINIVASAN & SHARMA, 1980, p. 22, pl. 3, figs 6-7. –VAN MORKHOVEN *et al.*, 1986, p. 50, pl. 15. –ZHENG, 1988, p. 227, pl. 12, fig. 4 (not fig. 5); pl. 28, fig. 2; pl. 31, figs 17-18; text-fig. 45. –UJIIÉ, 1990, p. 16, pl. 4, figs 3-5. –VAN MARLE, 1991, p. 61, pl. 3, fig. 3. –JONES, 1994, p. 18, pl. 2, figs 10-11, 15. –LOEBLICH & TAPPAN, 1994, p. 54, pl. 91, figs 11-15.

Pyrgo nasuta Cushman, 1935

Pyrgo nasutus CUSHMAN, 1935, p. 7, pl. 3, figs 1-4.
Pyrgo cf. *nasutus* Cushman. –PHLEGER & PARKER, 1951, p. 7, pl. 3, figs 12-14.
Pyrgo nasuta Cushman. –BOLTOVSKOY *et al.*, 1980, p. 44, pl. 25, figs 18-21.

Pyrgo pacifica Asano, 1956

Pyrgo pacifica ASANO, 1956b, p. 78, pl. 9, fig. 3. –ZHENG, 1988, p. 228, pl. 11, fig. 8.

Remarks: Referred by Brady to *Biloculina depressa* d'Orbigny (collection no. ZF 1145) and by Jones (1994) to *Biloculinella* sp. nov..

Pyrgo sarsi (Schlumberger, 1891)

pl. 13, figs 11-12

Biloculina sarsi SCHLUMBERGER, 1891, p. 166, pl. 9, figs 55-59; text-figs 10-11. –CUSHMAN, 1921, p. 471, pl. 97, fig. 1; text-figs 48-50.
Pyrgo sarsi (Schlumberger). –SAIDOVA, 1961, p. 56, pl. 16, fig. 105. –ZHENG, 1988, p. 229, pl. 12, figs 6-10; pl. 13, figs 1-2; pl. 31, figs 19-22; text-fig. 46. –LOEBLICH & TAPPAN, 1994, p. 54, pl. 94, figs 1-9.

Remarks: Form referred by Jones (1994) to *Pyrgo sarsi* (Schlumberger) resembles rather those referred by Zheng (1988) and Barker (1960) to *Pyrgo fornasini* (Chapman & Parr).

Pyrgo serrata (Bailey, 1863)

Biloculina serrata BAILEY, 1863, p. 350, pl. 8, fig. E.
Biloculina depressa d'Orbigny var. *serrata* Bailey. –BRADY, 1884, p. 146, pl. 3, fig. 3.
Pyrgo serrata (Bailey). –ZHENG, 1988, p. 230, pl. 13, fig. 3; pl. 31, fig. 23; text-fig. 47. –TU & ZHENG, 1991, p. 171, pl. 2, fig. 2. –JONES, 1994, p. 19, pl. 3, fig. 3. –LOEBLICH & TAPPAN, 1994, p. 54, pl. 92, figs 3-6.
Biloculina serrata Bailey. –UJIIÉ, 1990, p. 16, pl. 4, figs 6-7.

***Pyrgo* sp. 1**

Pyrgo sp. –LOEBLICH & TAPPAN, 1994, p. 55, pl. 92, figs 7-8.

Key features: Test elongated in front view; apertural end with short elongated protrusion with bifid tooth; sutures deeply depressed; peripheral edges of chambers angular; wall smooth.

***Pyrgo* sp. 2**

Remarks: This form resembles *Pyrgo sarsi* (Schlumberger), but differs in having flattened, trapezoidal aperture with small tooth.

Genus **PYRGOELLA** Cushman &White, 1936

Pyrgoella irregularis (d'Orbigny, 1839)

Biloculina irregularis D'ORBIGNY, 1839c, p. 67, pl. 8, figs 20-21. –BRADY, 1884, p. 140, pl. 1, figs 17-18.
Pyrgoella irregularis (d'Orbigny). –JONES, 1994, p. 18, pl. 1, figs 17-18.

Pyrgoella tenuiaperta (Huang, 1970)

pl. 13, figs 5-6

Biloculinella tenuiaperta HUANG, 1970, p. 112, pl. 1, fig. 4.
Pyrgoella tenuiaperta (Huang). –ZHENG, 1988, p. 273, pl. 14, figs 1-2; text-fig. 87. –LOEBLICH & TAPPAN, 1994, p. 55, pl. 94, figs 10-14; pl. 99, figs 10-17.

Genus **TRILOCULINA** d'Orbigny, 1826

Triloculina affinis d'Orbigny, 1826

Triloculina affinis D'ORBIGNY, 1826 (*fide* Ellis & Messina, 1940 *et seq.*). –GRAHAM & MILITANTE, 1959, p. 52, p. 7, figs 5-6. –ZHENG, 1988, p. 242, pl. 19, fig. 7; text-fig. 60. –HATTA & UJIIÉ, 1992a, p. 73, pl. 11, fig. 4.

Triloculina elliptica Galloway & Heminway, 1941

Triloculina elliptica GALLOWAY & HEMINWAY, 1941, p. 307, pl. 2, fig. 9.

Triloculina marshallana Todd, 1954

Triloculina marshallana TODD in Cushman *et al.*, 1954, p. 339, pl. 85, fig. 13. –ZHENG, 1988, p. 243, pl. 18, fig. 7. –HATTA & UJIIÉ, 1992a, p. 74, pl. 12, fig. 5.

Remarks: Specimens referred by Loeblich & Tappan (1994) to *T. marshallana* Todd do not resemble neither the SCS specimens nor those referred above.

Triloculina cf. *pentagonalis* Wang et al., 1978

pl. 13, figs 17-18

Triloculina pentagonalis WANG *et al.*, 1978 (after Zheng, 1988), p. 77, figs 13-15; text-fig. 102. –ZHENG, 1988, p. 243, pl. 19, figs 1, 6; pl. 32, figs 23-24; pl. 33, fig. 1; text-fig. 61.

Remarks: The SCS specimens have strongly inflated chambers.

Triloculina tricarinata d'Orbigny, 1826

pl. 13, figs 13-15

Triloculina tricarinata D'ORBIGNY, 1826, p. 299, pl. 7, fig. 94.
Miliolina tricarinata (d'Orbigny). –BRADY, 1884, p. 165, pl. 3, fig. 17 (ZF 1906).
Triloculina tricarinata d'Orbigny. –CUSHMAN, 1917a, p. 66, pl. 25, figs 1-2. –WHITTAKER & HODGKINSON, 1979, p. 36, pl. 3, fig. 9. –ZHENG, 1988, p. 246, pl. 19, fig. 2; pl. 33, figs 2-4; text-fig. 63. –VAN MARLE, 1991, p. 67, pl. 4, figs 1-2. –HATTA & UJIIÉ, 1992a, p. 74, pl. 12, fig. 8. –LOEBLICH & TAPPAN, 1994, p. 56, pl. 96, figs 1-7.
Triloculina tricarinata sensu Parker, Jones & Brady. –JONES, 1994, p. 20, pl. 3, fig. 17.

Triloculina trigonula (Lamarck, 1804)

Miliola trigonula LAMARCK, 1804, p. 351.
Triloculina trigonula (Lamarck). –D'ORBIGNY, 1826, p. 299, pl. 16, figs 5-9.
Miliolina trigonula (Lamarck). –BRADY, 1884, p. 164, pl. 3, figs 15-16 (ZF 1909; ZF 1910).
Triloculina trigonula (Lamarck). –CUSHMAN, 1917a, p. 65, pl. 25, fig. 3. –CUSHMAN, 1932a, p. 56, pl. 13, fig. 1. –WHITTAKER & HODGKINSON, 1979, p. 34, pl. 3, fig. 8. –ZHENG, 1988, p. 242, pl. 19, fig. 3; pl. 23, fig. 9; pl. 33, fig. 5; text-fig. 59. –JONES, 1994, p. 20, pl. 3, figs 15-16. –HAYWARD *et al.*, 1999, p. 106, pl. 5, figs 31-32.

Genus **TRILOCULINELLA** Riccio, 1950

Triloculinella californica (Rhumbler, 1936)

Miliolinella californica RHUMBLER, 1936, p. 215. –ZHENG, 1988, p. 248, pl. 21, fig. 1.

Triloculinella hornibrooki (Vella, 1957)

Quinqueloculina hornibrooki VELLA, 1957, p. 21, pl. 7, figs 127-129.
Scutuloris hornibrooki (Vella). –LOEBLICH & TAPPAN, 1964, p. C468, fig. 356, 2.
Triloculinella hornibrooki (Vella). –LOEBLICH & TAPPAN, 1987, p. 344, pl. 353, figs 7-9. –HAYWARD *et al.*, 1999, p. 106, pl. 5, figs 33-35.
Miliolinella hornibrooki (Vella). –ZHENG, 1988, p. 250, pl. 24, fig. 7.

Triloculinella parisa Loeblich & Tappan, 1994

Triloculinella parisa LOEBLICH & TAPPAN, 1994, p. 57, pl. 88, figs 1-3; pl. 95, figs 8-10.

Key features: Test subrectangular in outline, ovate in section; chambers of nearly equal diameter throughout length; sutures straight, depressed; aperture terminal, rounded, with flap-like tooth.

Triloculinella pilasensis (McCulloch, 1977)

Miliolinella pilasensis MCCULLOCH, 1977, p. 566, p. 238, fig. 16.
Miliolinella corrugata ZHENG, 1988, p. 249, pl. 21, figs 7-8; pl. 33, figs 11-12; text-fig. 66.
Triloculinella pilasensis (McCulloch). –LOEBLICH & TAPPAN, 1994, p. 57, pl. 99, figs 1-9.

Triloculinella cf. *pseudooblonga* (Zheng, 1980)

Miliolinella pseudooblonga ZHENG, 1980, p. 158, pl. 2, fig. 5.
Triloculinella pseudooblonga (Zheng). –LOEBLICH & TAPPAN, 1994, p. 57, pl. 88, figs 7-18; pl. 97, figs 10-12; pl. 98, figs 1-3, 7-9.

Triloculinella robusta (Cushman & Todd, 1948)

Miliolinella robusta CUSHMAN & TODD, 1948, p. 2, pl. 1, fig. 3. –ZHENG, 1988, p. 250, pl. 24, figs 5-6; text-fig. 67.

Triloculinella sp. 1

Key features: The shape of the test resembles this of *Triloculina tricarinata*, but differs in having less acute periphery of chambers and aperture covered by an apertural flap.

Subfamily SIGMOILINITINAE Łuczkowska, 1974
Genus **SIGMOIHAUERINA** S.Y.Zheng, 1979

Sigmoihauerina bradyi (Cushman, 1917)

Hauerina compressa d'Orbigny. –BRADY, 1884 (not d'Orbigny, 1846), p. 190, pl. 11, figs 12-13 (ZF 1566; ZF 1567).
Hauerina bradyi CUSHMAN, 1917a, p. 62, pl. 23, fig. 2.
Sigmoihauerina bradyi (Cushman). –JONES, 1994, p. 27, pl. 11, figs 12-13.

Genus **SIGMOILINITA** Seiglie, 1965

Sigmoilinita asperula (Karrer, 1868)

pl. 13, fig. 19

Spiroloculina asperula KARRER, 1868, p. 136, pl. 1, fig. 10. –BRADY, 1884, p. 152, pl. 8, fig. 14 (not figs 11, 13) (ZF 2395).
Sigmoilinita asperula (Karrer). –LOEBLICH & TAPPAN, 1987, p. 348, pl. 356, figs 14-18.
Sigmoilopsis asperula (Karrer). –ZHENG, 1988, p. 265, pl. 16, figs 10-11; pl. 32, fig. 15; text-fig. 79.
Spiroglutina asperula (Karrer). –JONES, 1994, p. 24, pl. 8, fig. 14.

Genus **SIGMOPYRGO** Hofker, 1983

Sigmopyrgo vespertilio (Schlumberger, 1891)

Biloculina ringens (Lamarck). –BRADY, 1884 (non *Miliolites ringens* Lamarck, 1804), p. 142, pl. 2, fig. 8 (not fig. 7).
Biloculina vespertilio SCHLUMBERGER, 1891, p. 174, pl. 10, figs 74-76; text-figs 20-22.
Sigmopyrgo vespertilio (Schlumberger). –LOEBLICH & TAPPAN, 1987, p. 349, pl. 357, figs 14-18. –JONES, 1994, p. 18, pl. 2, fig. 8.

Genus **SPIROSIGMOILINA** Parr, 1942

Spirosigmoilina bradyi Collins, 1958

Spiroloculina crenata Karrer. –BRADY, 1884 (not Karrer, 1868), p. 156, pl. 10, figs 24-26 (ZF 2397; ZF 2398).
Spirosigmoilina bradyi COLLINS, 1958, p. 365. –HAIG, 1988, p. 235, p. 11, figs 1-6. –JONES, 1994, p. 26, pl. 10, figs 24-26. –LOEBLICH & TAPPAN, 1994, p. 58, pl. 102, figs 1-8.
Spirosigmoilina speciosa (Karrer). –HATTA & UJIIÉ, 1992a (non *Spiroloculina speciosa* Karrer, 1868), p. 76, pl. 14, fig. 1.

Spirosigmoilina parri Collins, 1958

Spirosigmoilina parri COLLINS, 1958, p. 365, pl. 3, figs 3-4. –HAIG, 1988, p. 235, pl. 11, figs 7-10. –LOEBLICH & TAPPAN, 1994, p. 58, pl. 102, figs 9-17; pl. 103, figs 1-5.

Spirosigmoilina pusilla (Earland, 1934)

pl. 13, fig. 20

Spiroloculina tenuis (Czjžek). –BRADY, 1884 (non *Quinqueloculina tenuis* Czjžek, 1848), p. 152, pl. 10, figs 9-10.
Spiroloculina pusilla EARLAND, 1934, p. 47, pl. 1, figs 3-4.
Spirophthalmidium pusillum (Earland). –BARKER, 1960, p. 20, pl. 10, figs 9-10.
Spirolocammina tenuis (Earland). –LOEBLICH & TAPPAN, 1964, p. C222, fig. 134, 3a.
Ophthalmidium pussillum (Earland). –CORLISS, 1979, p. 5, pl. 1, figs 7-8.
Spirosigmoilina pusilla (Earland). –ZHENG, 1988, p. 269, pl. 16, fig. 9; text-fig. 81. –JONES, 1994, p. 26, pl. 10, figs 9-10.

Spirosigmoilina tenuis (Czjžek, 1848)

Quinqueloculina tenuis CZJŽEK, 1848, p. 149, pl. 13, figs 31-34.
Spiroloculina tenuis (Czjžek). –BRADY, 1884, p. 152, pl. 10, figs 7-8, 11 (ZF 2415).
Sigmoilina tenuis (Czjžek). –PHLEGER & PARKER, 1951, p. 8, pl. 4, fig. 7.
Spirosigmoilina tenuis (Czjžek). –ZHENG, 1988, p. 269, pl. 23, fig. 3; pl. 32, fig. 13; text-fig. 82. –JONES, 1994, p. 26, pl. 10, figs 7-8, 11. –HAYWARD *et al.*, 1999, p. 104, pl. 5, figs 21-22.

Subfamily SIGMOILOPSINAE Vella, 1957
Genus **SIGMOILOPSIS** Finlay, 1947

Sigmoilopsis carinata Zheng, 1988

pl. 13, fig. 16

Sigmoilopsis carinata ZHENG, 1988, p. 266, pl. 16, fig. 12; pl. 32, figs 16-17; text-fig. 80.

Sigmoilopsis moyi Atkinson, 1968

Sigmoilopsis moyi ATKINSON, 1968, p. 161, pl. 18, fig. 3. –HAYNES, 1973, p. 77, pl. 4, figs 1-8; pl. 8, figs 5, 7. –ZHENG, 1988, p. 267, pl. 17, figs 6-8.

Sigmoilopsis orientalis Zheng, 1988

Sigmoilopsis orientalis ZHENG, 1988, p. 268, pl. 17, figs 9-10.

Sigmoilopsis schlumbergeri (Silvestri, 1904)

Planispirina celata (Costa). –BRADY, 1884 (non *Spiroloculina celata* Costa, 1855), p. 197, pl. 8, figs 1-4 (ZF 2099).
Sigmoilina schlumbergeri SILVESTRI, 1904, p. 267, pl. 7, figs 12-14; text-figs 6-7.
Sigmoilopsis schlumbergeri (Silvestri). –SCHRÖDER, 1986, p. 56, pl. 21, fig. 9. –VAN MORKHOVEN *et al.*, 1986, p. 57, pl. 18, fig. 1. –ZHENG, 1988, p. 268, pl. 18, figs 4-5. –UJIIÉ, 1990, p. 16, pl. 3, fig. 10. –VAN MARLE, 1991, p. 68, pl. 4, fig. 4. –JONES, 1994, p. 23, pl. 8, figs 1-4. –LOEBLICH & TAPPAN, 1994, p. 59, pl. 103, figs 9-12.

Family TUBINELLIDAE Rhumbler, 1906
Genus **ARTICULINA** d'Orbigny, 1826

Articulina alticostata Cushman, 1944

Articulina sulcata Reuss. –BRADY, 1844 (not Reuss, 1850), p. 183, pl. 12, figs 12-13.
Articulina sagra d'Orbigny. –BRADY, 1844 (not d'Orbigny, 1839a), p. 184, pl. 12, figs 22-24.
Articulina pacifica CUSHMAN, 1944, p. 17, pl. 4, figs 14-18. –JONES, 1994, p. 28, pl. 12, figs 12-13, 22, ? 23-24.
Articulina alticostata CUSHMAN, 1944, p. 16, pl. 4, figs 10-13. –HATTA & UJIIÉ, 1992a, p. 76, pl. 14, fig. 2. –LOEBLICH & TAPPAN, 1994, p. 59, pl. 104, figs 5-10.

Remarks: Loeblich & Tappan (1994) regarded *A. alticostata* and *A. pacifica* as conspecific.

Articulina mayori Cushman, 1944

Articulina conico-articulata (Batsch). –BRADY, 1884 (non *Nautilus (Orthoceras) conico-auriculatus* Batsch, 1791), p. 185, pl. 13, figs 1-2.
Articulina mayori CUSHMAN, 1944, p. 14, pl. 1, fig. 28, pl. 3, figs 15-17. –JONES, 1994, p. 28, pl. 13, figs 1-? 2.

Genus **ARTICULARIA** Łuczkowska, 1974

Articularia sagra (d'Orbigny, 1839)

Articulina sagra D'ORBIGNY, 1839a, p. 183, pl. 9, figs 23-26.
Articulina conico-articulata (Batsch). –BRADY, 1884 (non *Nautilus (Orthoceras) conico-auriculatus* Batsch, 1791), p. 185, pl. 12, figs 17-18.
Articularia sagra (d'Orbigny). –JONES, 1994, p. 28, pl. 12, figs 17-18.

Remarks: Following Jones (1994) forms with quinqueloculine initial chamber arrangement are referred to *Articularia* Łuczkowska.

Superfamily AUSTROTRILLINACEA Loeblich & Tappan, 1986
Family BREBINIDAE Mikhalevich, 1988
Subfamily PSEUDOHAUERININAE Mikhalevich, 1988
Genus **PSEUDOHAUERINA** Ponder, 1972

Pseudohauerina orientalis (Cushman, 1946)

pl. 12, fig. 5

Hauerina ornatissima (Karrer). –BRADY, 1884 (non *Quinqueloculina ornatissima* Karrer, 1868), p. 192, pl. 7, figs 18-22.
Hauerina orientalis CUSHMAN, 1946, p. 12, pl. 2, figs 22-24.
Pseudohauerina orientalis (Cushman). –PONDER, 1972, p. 153, text-figs 17-18. –HATTA & UJIIÉ, 1992a, p. 77, pl. 14, fig. 10. –JONES, 1994, p. 23, pl. 7, figs 18-22.

Superfamily ALVEOLINACEA Ehrenberg, 1839
Family ALVEOLINIDAE Ehrenberg, 1839
Genus **BORELIS** de Montfort, 1808

Borelis melo (Fichtel & Moll, 1798)

Nautilus melo FICHTEL & MOLL, 1798, p. 118.
Alveolina melo (Fichtel & Moll). –BRADY, 1884, p. 223, pl. 17, figs 13-15.
Borelis melo (Fichtel & Moll). –JONES, 1994, p. 31, pl. 17, figs 13-15.

Superfamily SORITACEA Ehrenberg, 1839
Family PENEROPLIDAE Schultze, 1854
Genus **DENDRITINA** d'Orbigny, 1826

Dendritina **sp.**

Remarks: Only three specimens of this genera were found in the Vietnam Shelf material, all of them reworked.

Genus **MONALYSIDUM** Chapman, 1900

Monalysidum politum Chapman, 1900

Peneroplis pertusus (Forskål) var. *e* (*Peneroplis lituus* (Gmelin)). –BRADY, 1884 (non *Nautilus lituus* Gmelin, 1788), p. 204, pl. 13, figs 24-25.
Peneroplis (Monolysidum) politum CHAPMAN, 1900, p. 4, pl. 1, fig. 5.
Monalysidum politum Chapman. –HATTA & UJIIÉ, 1992a, p. 78, pl. 15, fig. 7. –JONES, 1994, p. 29, pl. 13, figs 24-25.
Euthymonacha polita (Chapman). –LOEBLICH & TAPPAN, 1994, p. 61, pl. 109, figs 1-6.

Genus **PENEROPLIS** de Montfort, 1808

Peneroplis carinatus d'Orbigny, 1839

Peneroplis carinatus D'ORBIGNY, 1839c, p. 33, pl. 3, figs 7-8.
Peneroplis pertusus (Forskål) var. f (type *Peneroplis carinatus* d'Orbigny). –BRADY, 1884, p. 205, pl. 13, fig. 14.
Peneroplis carinatus d'Orbigny. –JONES, 1994, p. 29, pl. 13, fig. 14.

Peneroplis pertusus (Forskål, 1775)

Nautilus pertusus FORSKÅL, 1775, p. 125.
Peneroplis pertusus (Forskål). –BRADY, 1884, p. 204, pl. 13, figs 16-17 (not figs 12-15; 18-25). –VAN MARLE, 1991, p. 72, pl. 4, fig. 10. –HATTA & UJIIÉ, 1992a, p. 78, pl. 16, fig. 1. –JONES, 1994, p. 29, pl. 13, figs 16-17. –LOEBLICH & TAPPAN, 1994, p. 62, pl. 110, figs 1-5.

Peneroplis planatus (Fichtel & Moll, 1798)

Nautilus planatus FICHTEL & MOLL, 1798, p. 91.
Peneroplis pertusus (Forskål) var. *a* . –BRADY, 1884 (non *Nautilus pertusus* Forskål, 1775), p. 203, pl. 13, fig. 15.
Peneroplis planatus (Fichtel & Moll). –LOEBLICH & TAPPAN, 1987, p. 371, pl. 391, figs 7-8, 11-12. –HATTA & UJIIÉ, 1992a, p. 79, pl. 16, fig. 2. –JONES, 1994, p. 29, pl. 13, fig. 15.

Genus **SPIROLINA** Lamarck, 1804

Spirolina acicularis (Batsch, 1791)

Nautilus (Lituus) acicularis BATSCH, 1791, p. 3, pl. 6, fig. 16.
Peneroplis pertusus (Forskål) var. d (type *Peneroplis cylindraceus* (Lamarck). –BRADY, 1884, p. 204, pl. 13, figs 20-21.
Spirolina cylindracea (Lamarck). –JONES, 1994, p. 29, pl. 13, figs 20-21.
Coscinospira acicularis (Batsch). –LOEBLICH & TAPPAN, 1994, p. 61, pl. 107, figs 5-10.

Spirolina arietina (Batsch, 1791)

Nautilus (Lituus) arietinus BATSCH, 1791, p. 4, pl. 6, fig. 15c.
Peneroplis arietinus (Batsch). –BRADY, 1884, p. 204, pl. 13, figs 18-19, 22.
Spirolina arietina (Batsch). –HATTA & UJIIÉ, 1992a, p. 79, pl. 16, fig. 4. –LOEBLICH & TAPPAN, 1994, p. 62, pl. 108, figs 11-12.
Coscinospira arietina (Batsch). –JONES, 1994, p. 29, pl. 13, figs 18-19, 22.

Family SORITIDAE Ehrenberg, 1939
Subfamily CYCLEDOMIINAE Mikhalevich, 1988

Genus **CYCLORBICULINA** Silvestri, 1937

Cyclorbiculina compressa (d'Orbigny, 1839)

Orbiculina compressa D'ORBIGNY, 1839a, p. 66, pl. 8, figs 4-7. –BRADY, 1884, p. 209, pl. 14, fig. 9.
Orbiculina adunca (Fichtel & Moll). –BRADY, 1884 (non *Nautilus aduncus* Fichtel & Moll, 1798), p. 209, pl. 14, figs 7-8.
Cyclorbiculina compressa (d'Orbigny). –JONES, 1994, p. 30, pl. 14, figs 7-9. –LOEBLICH & TAPPAN, 1994, p. 62, pl. 111, figs 1-4.

Subfamily SORITINAE Ehrenberg, 1939
Genus **SORITES** Ehrenberg, 1939

Sorites marginalis (Lamarck, 1816)

Orbulites marginalis LAMARCK, 1816, p. 196.
Orbitolites marginalis (Lamarck). –BRADY, 1884, p. 214, pl. 15, figs 1-3, 5 (ZF 2040).
Sorites marginalis (Lamarck). –CUSHMAN, 1930, p. 49, pl. 18, figs 1-4. –HAIG, 1988, p. 234, pl. 9, figs 20-21. –VAN MARLE, 1991, p. 75. –LOEBLICH & TAPPAN, 1994, p. 62, pl. 112, figs 1-5.
Parasorites marginalis (Lamarck). –JONES, 1994, p. 30, pl. 15, figs 1-3, 5.

Order **LAGENIDA** Lankester, 1885
Superfamily NODOSARIACEA Ehrenberg, 1838
Family NODOSARIIDAE Ehrenberg, 1838
Subfamily NODOSARIINAE Ehrenberg, 1838
Genus **DENTALINA** Risso, 1826

Dentalina albatrossi (Cushman, 1923)

pl. 14, fig. 2

Nodosaria vertebralis (Batsch). –BRADY, 1884 (non *Nautilus (Orthoceras) vertebralis*, Batsch, 1791), p. 514, pl. 63, fig. 35; pl. 64, figs 11-14 (ZF 1988; ZF 1989).
Nodosaria vertebralis (Batsch) var. *albatrossi* CUSHMAN, 1923, p. 87, pl. 15, fig. 1.
Nodosaria vertebralis (Batsch). –BARKER, 1960, p. 134, pl. 63, fig. 35.
Nodosaria albatrossi Cushman. –BARKER, 1960, p. 134, pl. 64, figs 11-14.
Dentalina albatrossi (Cushman, 1923). –JONES, 1994, p. 75, pl. 63, fig. 35; pl. 64, figs 11-14.

Dentalina catenulata (Brady, 1884)

pl. 14, fig. 3

Nodosaria catenulata BRADY, 1884, p. 515, pl. 63, figs 32-34.
Dentalina catenulata (Brady). –JONES, 1994, p. 75, pl. 63, figs 32-34. –LOEBLICH & TAPPAN, 1994, p. 63, pl. 113, figs 1-4.

Dentalina flintii (Cushman, 1923)

Nodosaria obliqua (Linné). –BRADY, 1884 (non *Nautilus obliquus* Linné, 1767), p. 513, pl. 64, figs 20-22.
Nodosaria flintii CUSHMAN, 1923, p. 85, pl. 14, fig. 1.

Dentalina flintii (Cushman). –JONES, 1994, p. 76, pl. 64, figs 20-22.

Dentalina mutsui Hada, 1931

Dentalina mutsui HADA, 1931, p. 97, text-fig. 50. –LOEBLICH & TAPPAN, 1994, p. 63, pl. 113, figs 5-9.

Dentalina ruidarostrata Loeblich & Tappan, 1994

pl. 14, fig. 4

Dentalina ruidarostrata LOEBLICH & TAPPAN, 1994, p. 63, pl. 113, figs 20-22.

Dentalina plebeia Reuss, 1855

Dentalina plebeia REUSS, 1855, p. 267, pl. 8, fig. 9.
Nodosaria (Dentalina) plebeia (Reuss). –BRADY, 1884, p. 502, pl. 63, fig. 2 (ZF 1964).
Dentalina plebeia Reuss. –JONES, 1994, p. 74, pl. 63, fig. 2.

Dentalina sp. 1

Nodosaria (Dentalina) farcimen Soldani, sp. "not typical". –BRADY, 1884, p. 498, pl. 62, figs 17-18 (ZF 1942).
Dentalina farcimen (Soldani). –BARKER, 1960, p. 130, pl. 62, figs 17-18.
Dentalina sp. nov. –JONES, 1994, p. 73, pl. 62, figs 17-18.

Dentalina sp. 2

Key features: Test uniserial, slender consisting of 6 chambers; sutures straight, depressed between last two globular chambers; first four chambers covered with longitudinal costae like those of *Dentalina albatrossi*; initial part of test equipped with strong spike; aperture radiate, terminal on the elongated neck; wall of the last chamber getting very glassy in upper part of the chamber.

Genus **ENANTIODENTALINA** Marie, 1941

Enantiodentalina muraii Uchio, 1953

Enantiodentalina muraii UCHIO, 1953, p. 152, pl. 14, figs 1-2. –LOEBLICH & TAPPAN, 1987, p. 396, pl. 438, figs 21-23. –LOEBLICH & TAPPAN, 1994, p. 64, pl. 115, figs 7-10.
Paradentalina muraii (Uchio). –UCHIO, 1960, p. 60, pl. 4, fig. 2.

Genus **GRIGELIS** Mikhalevich, 1981

Grigelis orectus Loeblich & Tappan, 1994

Nodosaria pyrula d'Orbigny. –SCHWAGER, 1866 (not d'Orbigny, 1826), p. 217, pl. 5, fig. 38. –BRADY, 1884, p. 497, pl. 62, figs 10-12. –CUSHMAN, 1921, p. 187, pl. 33, figs 3-5.
Dentalina guttifera d'Orbigny. –BARKER, 1960 (not d'Orbigny, 1846), p. 130, pl. 62, figs 10-12.
Grigelis guttifera (d'Orbigny). –LOEBLICH & TAPPAN, 1987, p. 396, pl. 441, figs 2-3.
Grigelis sp. nov. –JONES, 1994, p. 73, pl. 62, figs 10-12.
Grigelis orectus LOEBLICH & TAPPAN, 1994, p. 64, pl. 115, fig. 22. –HAYWARD *et al.*, 1999, p. 109, pl. 6, figs 14-15.

Grigelis semirugosus (d'Orbigny, 1846)

pl. 14, fig. 1

Nodosaria semirugosa D'ORBIGNY, 1846, p. 34, pl. 1, figs 20-23.
Nodosaria costulata Reuss. –BRADY, 1884 (non *Nodosaria stipitata* var. *costulata* Reuss, 1870), p. 515, pl. 63, figs 23-27 (ZF 1985).
Nodosaria pyrula d'Orbigny var. *semirugosa* d'Orbigny. –CUSHMAN, 1921, p. 187, pl. 33, figs 6-7. –HADA, 1931, p. 99, text-fig. 52.
Dentalina guttifera d'Orbigny var. *semirugosa* (d'Orbigny). –BARKER, 1960, p. 134, pl. 63, figs 23-27.
Grigelis semirugosa (d'Orbigny). –LOEBLICH & TAPPAN, 1987, p. 396, pl. 441, fig. 1. –JONES, 1994, p. 75, pl. 63, figs 23-27.

Remarks: According to the comment of Loeblich & Tappan (1994) *Grigelis* is a patronymic for Dr. Algimantas Grigelis, therefore the species cited by Loeblich & Tappan (1987) should be written as *G. semirugosus* .

Genus **LAEVIDENTALINA** Loeblich & Tappan, 1986

Laevidentalina bradyensis (Dervieux, 1893)

Nodosaria communis (d'Orbigny). –BRADY, 1884 (non *Nodosaria (Dentalina) communis* d'Orbigny, 1826), p. 504, pl. 62, figs 19-20 (not figs 21, 22) (ZF 1934).
Nodosaria inornata d'Orbigny var. *bradyensis* DERVIEUX, 1893, p. 610, pl. 5, figs 30-31.
Dentalina bradyensis (Dervieux). –TAPPAN & LOEBLICH, 1982, pl. 49, fig. 4. –JONES, 1994, p. 73, pl. 62, figs 19-20.
Laevidentalina bradyensis (Dervieux). –LOEBLICH & TAPPAN, 1994, p. 64, pl. 114, figs 1-9, pl. 115, fig. 5. –HAYWARD *et al.*, 1999, p. 109, pl. 6, figs 16-17.

Laevidentalina filiformis (d'Orbigny, 1826)

pl. 14, fig. 7

Nodosaria filiformis D'ORBIGNY, 1826, p. 253, no. 14.
Nodosaria (D.) filiformis d'Orbigny. –BRADY, 1884, p. 500, pl. 63, figs 3-5 (ZF 1935 some).
Dentalina filiformis (d'Orbigny). –VAN MARLE, 1991, p. 34, pl. 1, fig. 14. –JONES, 1994, p. 74, pl. 63, figs 3-5.

Laevidentalina filiformis (d'Orbigny). –HAYWARD *et al.*, 1999, p. 109, pl. 6, figs 18-19.

Laevidentalina inflexa (Reuss, 1866)

pl. 14, fig. 5

Nodosaria inflexa REUSS, 1866, p. 131, pl. 2, fig. 1. –BRADY, 1884, p. 498, pl. 62, fig. 9. –VAN MARLE, 1991, p. 37.
Dentalina inflexa (Reuss). –ASANO, 1956a, p. 20, pl. 4, figs 36-37. –JONES, 1994, p. 73, pl. 62, fig. 9.
Laevidentalina inflexa (Reuss). –LOEBLICH & TAPPAN, 1994, p. 65, pl. 114, figs 10-16, pl. 115, fig. 6. –HAYWARD *et al.*, 1999, p. 109, pl. 6, figs 20-21.

Laevidentalina sidebottomi (Cushman, 1933)

pl. 14, fig. 6

Nodosaria radicula (Linné), dentaline form. –SIDEBOTTOM, 1918 (non *Nautilus radicula* Linné, 1758), p. 132, pl. 4, figs 1-5.
Dentalina sidebottomi CUSHMAN, 1933a, p. 12, pl. 3, fig. 4.
Laevidentalina sidebottomi (Cushman). –LOEBLICH & TAPPAN, 1994, p. 65, pl. 113, figs 13-19.

Laevidentalina subemaciata Parr, 1950

Nodosaria consobrina (d'Orbigny) var. *emacita* Reuss. –BRADY, 1884 (not Reuss, 1866), p. 502, pl. 62, figs 25-26 (ZF 1939). –CUSHMAN, 1921, p. 195, pl. 34, fig. 8; pl. 35, fig. 1.
Dentalina subemaciata PARR, 1950, p. 329, pl. 12, fig. 1. –JONES, 1994, p. 74, pl. 62, figs 25-26.
Laevidentalina subemaciata (Parr). –HAYWARD *et al.*, 1999, p. 110, pl. 6, figs 22-23.

Remarks: The SCS forms are much smaller and fragile in comparison to ones in Challenger Collection.

Laevidentalina subsoluta (Cushman, 1923)

Nodosaria (Dentalina) soluta Reuss. –BRADY, 1884 (not Reuss, 1851), p. 503, pl. 62, figs 13-16.
Nodosaria subsoluta CUSHMAN, 1923, p. 74, pl. 13, fig. 1.
Dentalina subsoluta (Cushman). –VAN MARLE, 1991, p. 35, pl. 1, fig. 15. –JONES, 1994, p. 73, pl. 62, figs 13-16.

Laevidentalina sp. 1

Laevidentalina sp. –LOEBLICH & TAPPAN, 1994, p. 65, pl. 114, figs 17-20.

Key features: Test very elongated, slender, arcuate; distinct, inflated chambers uniserially arranged, increasing in height as added; wall transparent, fragile and smooth; radiate aperture on the end of the last chamber tapering to elongated neck.

Laevidentalina sp. 2

Remarks: Test small, uniserial; five chambers wider then higher; gradually and slightly increasing in size as added; wall transparent and very thin; sutures oblique; aperture radiate; the initial part of test equipped with small spike.

Genus **NODOSARIA** Lamarck, 1812

Nodosaria lamnulifera Thalmann, 1950

Nodosaria raphanus (Linné). –BRADY, 1884 (non *Nautilus raphanus* Linné, 1767), p. 512, pl. 64, figs 6-10 (ZF 1973).
Nodosaria lamnulifera THALMANN, 1950, p. 42. –JONES, 1994, p. 76, pl. 64, figs 6-10.

Nodosaria sp. 1

Key features: Test large, uniserial; first chamber broadly rounded, followed by 3 globular chambers slightly increasing in size; sutures depressed and horizontal; surface covered with 13 strong, longitudinal costae; aperture terminal, radiate.

Genus **PSEUDONODOSARIA** Boomgaart, 1949

Pseudonodosaria discreta (Reuss, 1850)

Glandulina discreta REUSS, 1850, p. 336, pl. 46, fig. 3.
Pseudonodosaria discreta (Reuss). –BOOMGAART, 1949, p. 81, pl. 7, figs 3-4. –LOEBLICH & TAPPAN, 1987, p. 398, pl. 439, figs 6-8. –LOEBLICH & TAPPAN, 1994, p. 66, pl. 117, figs 1-6.

Pseudonodosaria glanduliniformis (Dervieux, 1893)

Nodosaria radicula (Linné). –BRADY, 1884 (non *Nautilus radicula* Linné, 1767), p. 495, pl. 61, figs 28-31.
Nodosaria radicula var. *glanduliniformis* DERVIEUX, 1893, p. 599.
Pseudonodosaria radicula (Linné). –VAN MARLE, 1991, p. 42, pl. 1, fig. 17.
Pseudoglandulina glanduliniformis (Dervieux). –JONES, 1994, p. 72, pl. 61, figs 28-31.

Genus **PYRAMIDULINA** Fornasini, 1894

Pyramidulina catesbyi (d'Orbigny, 1839)

Nodosaria catesbyi D'ORBIGNY, 1839a, p. 16, pl. 1, figs 8-10.
Lagenonodosaria catesbyi (d'Orbigny). –LE CALVEZ, 1977, p. 47, figs 1-5, 8-10.
Pyramidulina catesbyi (d'Orbigny). –LOEBLICH & TAPPAN, 1994, p. 66, pl. 116, figs 10-12.

Pyramidulina luzonensis (Cushman, 1921)

pl. 14, fig. 11

Nodosaria pauciloculata Cushman var. *luzonensis* CUSHMAN, 1921, p. 206, text-fig. 8.
Pyramidulina luzonensis (Cushman). –LOEBLICH & TAPPAN, 1994, p. 66, pl. 117, figs 9-11.

Subfamily FRONDICULARIINAE Reuss, 1860
Genus **FRONDICULARIA** Defrance, 1826

Frondicularia kiensis Barker, 1960

Frondicularia spathulata Williamson. –BRADY, 1884 (not Williamson, 1858), p. 519, pl. 65, fig. 18.
Frondicularia kiensis BARKER, 1960, p. 138, pl. 65, fig. 18.
Pseudolingulina kiensis (Barker). –LOEBLICH & TAPPAN, 1994, p. 67, pl. 118, figs 11-20.

Subfamily PLECTOFRONDICULARIINAE Cushman, 1927
Genus **PROXIFRONS** Vella, 1963

Proxifrons advena (Cushman, 1923)

Frondicularia inaequalis Costa. –BRADY, 1884 (not Costa, 1855), p. 521, pl. 66, figs 8-12.
Frondicularia advena CUSHMAN, 1923, p. 141, pl. 20, figs 1-2.
Proxifrons advena (Cushman). –LOEBLICH & TAPPAN, 1987, p. 403, pl. 444, figs 7-9.
Plectofrondicularia advena (Cushman). –JONES, 1994, p. 78, pl. 66, figs 8-12.

Family VAGINULINIDAE Reuss, 1861
Subfamily LENTICULININAE Chapman, Parr & Collins, 1934
Genus **DIMORPHINA** d'Orbigny, 1826

Dimorphina nodosaria d'Orbigny, 1846

Dimorphina nodosaria D'ORBIGNY, 1846, p. 221, pl. 12, figs 21-22. –LOEBLICH & TAPPAN, 1994, p. 68, pl. 119, figs 8-12.

Genus **LENTICULINA** Lamarck, 1804

Lenticulina anaglypta (Loeblich & Tappan, 1987)

pl. 15, fig. 9

Nautilus costatus FICHTEL & MOLL, 1798, p. 47, pl. 4, figs G-I.
Cristellaria costata (Fichtel & Moll). –BRADY, 1884, p. 555, pl. 71, fig. 9 (not fig. 8) (ZF 1314). –CUSHMAN, 1921, p. 239, pl. 46, fig. 4; pl. 47, fig. 1.
Lenticulina costata (Fichtel & Moll). –RÖGL & HANSEN, 1984, p. 38, pl. 9, figs 1-2; text-fig. 11.
Spincterules anaglyptus LOEBLICH & TAPPAN, 1987, p. 407, pl. 449, figs 7-8. –LOEBLICH & TAPPAN, 1994, p. 70, pl. 122, figs 3-8.
Lenticulina anaglypta (Loeblich & Tappan). –JONES, 1994, p. 82, pl. 71, fig. 9.

Remarks: *Nautilus costatus* Fichtel & Moll is a junior homonym of *Nautilus (Orthoceras) costatus* Batsch. Loeblich & Tappan (1987) have renamed it to *Spincterules* Montfort *anaglyptus* Loeblich & Tappan. *Spincterules* de Montfort is regarded by Jones (1994) as a junior synonym of *Lenticulina* Lamarck.

Lenticulina antillea (Cushman, 1923)

Cristellaria antillea CUSHMAN, 1923, p. 116, pl. 31, fig. 1; pl. 32, fig. 1; pl. 33, fig. 1; pl. 34, fig. 1.

Remarks: Differs from *L. echinata* (d'Orbigny) in smaller size, less inflated test and rich ornaments on the surface of chambers.

Lenticulina atlantica (Barker, 1960)

pl. 15, fig. 4

Cristellaria articulata (Reuss). –BRADY, 1884 (non *Robulina articulata* Reuss, 1863), p. 547, pl. 69, figs 10-12.
Robulus atlanticus BARKER, 1960, p. 144, pl. 69, figs 10-12.
Lenticulina atlantica (Barker). –JONES, 1994, p. 81, pl. 69, figs 10-12.

Lenticulina calcar (Linné, 1758)

pl. 15, figs 5-6

Nautilus calcar LINNÉ, 1758, p. 709, pl. 1, figs 3-4.
Cristellaria calcar (Linné). –BRADY, 1884, p. 551, pl. 70, figs 9-12 (not figs 13-15) (ZF 1306; ZF 1307). –CUSHMAN, 1923, p. 115, pl. 31, figs 4-5.
Robulus calcar (Linné). –SAIDOVA, 1975, p. 190, pl. 52, fig. 1. –TU & ZHENG, 1991, p. 174, pl. 6, fig. 4.
Lenticulina calcar (Linné). –ŌKI, 1989, p. 97, pl. 7, fig. 3. –JONES, 1994, p. 81, pl. 70, figs 9-12. –LOEBLICH & TAPPAN, 1994, p. 68, pl. 120, figs 1-8.

Lenticulina compressa (Loeblich & Tappan, 1994)

Spincterules compressus LOEBLICH & TAPPAN, 1994, p. 70, pl. 126, figs 8-13; pl. 134, figs 8-9.

Remarks: Differs from *L. anaglypta* (Loeblich & Tappan) in flattened test and regular, continuous costae.
Following Jones (1994) *Spincterules* Montfort is regarded as a junior synonym of *Lenticulina* Lamarck.

Lenticulina convergens (Bornemann, 1855)

Cristellaria convergens BORNEMANN, 1855, p. 327, pl. 13, figs 16-17. –BRADY, 1884, p. 546, pl. 69, figs 6-7. (ZF 1311)

Lenticulina convergens (Bornemann). –JONES, 1994, p. 80, pl. 69, figs 6-7.

Lenticulina echinata (d'Orbigny, 1846)

pl. 15, fig. 3

Robulina echinata D'ORBIGNY, 1846, p. 100, pl. 4, figs 21-22*Cristellaria echinata* (d'Orbigny). –BRADY, 1884, p. 554, pl. 71, figs 1-3 (ZF 1306). –CUSHMAN, 1921, p. 233, pl. 45, fig. 4, pl. 46, fig. 1.

Cristellaria papillosoechinata FORNASINI, 1894, p. 222, pl. 3, fig. 33.

Lenticulina tumida (Asano). –WANG *et al.*, 1988, p. 141, pl. 18, figs 9-10.

Lenticulina papillosoechinata (Fornasini). –BARKER, 1960, p. 148, pl. 71, figs 1-3. –LOEBLICH & TAPPAN, 1994, p. 68, pl. 119, figs 6-7.

Lenticulina echinata (d'Orbigny). –JONES, 1994, p. 82, pl. 71, figs 1-3.

Remarks: Following Jones (1994) *Cristellaria papillosoechinata* Fornasini is regarded as a junior synonym of *Robulina echinata* d'Orbigny.

Lenticulina gibba (d'Orbigny, 1839)

pl. 15, figs 1-2

Cristellaria gibba D'ORBIGNY, 1839a, p. 40, pl. 7, figs 20-21. –BRADY, 1884, p. 546, pl. 69, figs 8-9 (ZF 1329). –CUSHMAN, 1923, p. 105, pl. 25, fig. 4.

Lenticulina gibba (d'Orbigny). –VAN MARLE, 1991, p. 47, pl. 1, fig. 1. –JONES, 1994, p. 81, pl. 69, figs 8-9.

Lenticulina iota (Cushman, 1923)

Cristellaria cultrata (Montfort). –BRADY, 1884 (non *Robulus cultratus* Montfort, 1808), p. 550, pl. 70, figs 4-6.

Cristellaria iota CUSHMAN, 1923, p. 111, pl. 29, fig. 2; pl. 30, fig. 1.

Lenticulina iota (Cushman). –JONES, 1994, p. 81, pl. 70, figs 4-6.

Lenticulina melvilli (Cushman & Renz, 1941)

Robulus melvilli CUSHMAN & RENZ, 1941, p. 12, pl. 2, fig. 12. –RENZ, 1948, p. 159, pl. 3, fig. 11.

Lenticulina* cf. *nicobariensis (Schwager, 1866)

Cristellaria nikobariensis SCHWAGER, 1866, p. 243, pl. 6, fig. 87.

Robulus nicobariensis (Schwager). –SRINIVASAN & SHARMA, 1980 (CNSC: P 48601).

Remarks: The SCS specimens are identical with a specimen referred by Srinivasan & Sharma (1980) to *Robulus nicobariensis* (Schwager) from Car Nicobar Collection (collection no. P 48601), but differs from originally described by Schwager.

Lenticulina orbicularis var. subumbonata (Cushman, 1917)

Cristellaria orbicularis (d'Orbigny) var. *subumbonata* CUSHMAN, 1917b, p. 657. –CUSHMAN, 1921, p. 226, pl. 44, fig. 3.

Lenticulina submamilligera (Cushman, 1917)

pl. 15, fig. 8

Cristellaria mamilligera Karrer. –BRADY, 1884 (not Karrer, 1865), p. 553, pl. 70, figs 17-18. –CUSHMAN, 1913a, p. 74, pl. 34, fig. 6a (not fig. 6b).

Cristellaria submamilligera CUSHMAN, 1917b, p. 657. –CUSHMAN, 1921, p. 235.

Robulus submamilligerus (Cushman). –THALMANN, 1932, p. 305. –ASANO, 1951f, p. 8, figs 36-37. –ASANO, 1956a, p. 50, pl. 2, figs 1-2; pl. 6, figs 31-33, 35, 38, 42.

Lenticulina submamilligera (Cushman). –JONES, 1994, p. 82, pl. 70, figs 17-18. –LOEBLICH & TAPPAN, 1994, p. 68, pl. 120, figs 9-14.

Lenticulina suborbicularis Parr, 1950

Lenticulina (Robulus) suborbicularis PARR, 1950, p. 321, pl. 11, figs 5-6.

Robulus suborbicularis (Parr). –SAIDOVA, 1975, p. 190, pl. 52, fig. 5.

Lenticulina suborbicularis Parr. –LOEBLICH & TAPPAN, 1994, p. 68, pl. 123, figs 1-9.

Lenticulina thalmanni (Hessland, 1943)

Cristellaria rotulata (Lamarck). –BRADY, 1884 (non *Lenticulites rotulata*, Lamarck, 1804), p. 547, pl. 69, fig. 13.

Lenticulina thalmanni (Hessland). –JONES, 1994, p. 81, pl. 69, fig. 13.

Lenticulina vortex (Fichtel & Moll, 1798)

pl. 15, fig. 7

Nautilus vortex FICHTEL & MOLL, 1798, p. 33, pl. 2, figs d-i.

Cristellaria vortex (Fichtel & Moll). –BRADY, 1884, p. 548, pl. 69, figs 14-16 (ZF 1357). –CUSHMAN, 1913a, p. 68, pl. 32, fig. 3.

Lenticulina vortex (Fichtel & Moll). –RÖGL & HANSEN, 1984, p. 30, pl. 2, figs 3-4; text-fig. 8. –JONES, 1994, p. 81, pl. 69, figs 14-16. –LOEBLICH & TAPPAN, 1994, p. 68, pl. 121, figs 9-14.

***Lenticulina* sp. 1**

Remarks: Resembles *Lenticulina gibba* (d'Orbigny), but differs in having more chambers (11) and big, non penetrable umbo.

Lenticulina sp. 2

Key features: Test lenticular, biumbonate, closely coiled; 6 chambers, increasing rapidly in size as added; sutures elevated and curved backwards, those of early chambers not reaching umbilical area; periphery subangular and keeled; aperture radiate.

Genus **MARGINULINOPSIS** Silvestri, 1904

Marginulinopsis cf. *philippinensis* (Cushman, 1921)

pl. 14, fig. 12

Marginulina philippinensis CUSHMAN, 1921, p. 257, pl. 53, figs 2-3. –LEROY, 1941b, p. 76, pl. 5, fig. 30.
Marginulinopsis philippinensis (Cushman). –LOEBLICH & TAPPAN, 1994, p. 69, pl. 123, figs 10-13.

Remarks: The last chamber(s) of specimens are always broken, but the lower portion closely resembles as well *Marginulinopsis philippinensis* (Cushman) as *Vaginulinopsis* sp. nov. in Jones (1994) referred by Brady to *Cristellaria wetherelli* Jones.

Marginulinopsis tenuis (Bornemann, 1855)

pl. 14, figs 9-10

Marginulina tenuis BORNEMANN, 1855, p. 326, pl. 13, fig. 14.
Cristellaria tenuis (Bornemann). –BRADY, 1884, p. 535, pl. 66, figs 21-23. –CUSHMAN, 1921, p. 250, pl. 50, fig. 2.
Vaginulinopsis tenuis (Bornemann). –JONES, 1994, p. 78, pl. 66, figs 21-23.
Marginulinopsis tenuis (Bornemann). –LOEBLICH & TAPPAN, 1994, p. 69, pl. 122, figs 9-12.

Genus **NEOLENTICULINA** McCulloch, 1977

Neolenticulina peregrina (Schwager, 1866)

pl. 15, fig. 10

Cristellaria peregrina SCHWAGER, 1866, p. 245, pl. 7, fig. 89. –CUSHMAN, 1923, p. 113, pl 30, figs 3-4.
Cristellaria variabilis Reuss. –BRADY, 1884 (not Reuss, 1850), p. 541, pl. 68, figs 11-16 (ZF 1353-56).
Lenticulina peregrina (Schwager). –CUSHMAN & MCCULLOCH, 1950, p. 302, pl. 39, fig. 5. –VAN MORKHOVEN *et al.*, 1986, p. 92, pl. 27, figs 1-2.
Dimorphina peregrina (Schwager). –HOFKER, 1978, p. 37, pl. 3, figs 3-4, 7-8.
Neolenticulina variabilis (Reuss). –JONES, 1994, p. 80, pl. 68, figs 11-16.
Neolenticulina peregrina (Schwager). –LOEBLICH & TAPPAN, 1987, p. 406, pl. 447, figs 9-12, 16. –LOEBLICH & TAPPAN, 1994, p. 69, pl. 124, figs 1-11. –HAYWARD *et al.*, 1999, p. 114, pl. 6, figs 36-37.

Remarks: According to van Morkhoven *et al.* (1986) *Cristellaria variabilis* Reuss was senior synonym of *Cristellaria peregrina* Schwager, but unfortunately none of holotypes are available and since species has been neotypified by Srinivasan & Sharma (1980) *N. peregrina* is regarded as valid name.

Genus **SARACENARIA** Defrance, in de Blainville, 1824

Saracenaria altifrons (Parr, 1950)

Cristellaria acutauricularis (Fichtel & Moll). –BRADY, 1884 (non *Nautilus acutauricularis* Fichtel & Moll, 1798), p. 543, pl. 114, fig. 17 (ZF 1301).
Lenticulina altifrons PARR, 1950, p. 323, pl. 11, fig. 12.
Saracenaria altifrons (Parr). –JONES, 1994, p. 113, pl. 114, fig. 17.

Saracenaria angularis Natland, 1938

Saracenaria angularis NATLAND, 1938, p. 143, pl. 5, figs 1-2. –CUSHMAN & MCCULLOCH, 1950, p. 326, pl. 42, figs 8-12. –LOEBLICH & TAPPAN, 1994, p. 69, pl. 125, figs 1-8.

Saracenaria italica Defrance, 1824

Saracenaria italica DEFRANCE, 1824, p. 177.
Cristellaria italica (Defrance). –BRADY, 1884, p. 544, pl. 68, figs 18, 20-23 (not fig. 17) (ZF 1301; ZF 1332). –CUSHMAN, 1931, p. 78, pl. 33, fig. 3.
Saracenaria italica Defrance. –BOOMGAART, 1949, p. 82, pl. 6, fig. 18. –LOEBLICH & TAPPAN, 1987, p. 407, pl. 448, figs 16-17. –VAN MARLE, 1991, p. 43. –JONES, 1994, p. 80, pl. 68, figs 18, 20-23. –LOEBLICH & TAPPAN, 1994, p. 69, pl. 125, figs 9-16. –HAYWARD *et al.*, 1999, p. 114, pl. 6, figs 42-46.

Subfamily MARGINULININAE Wedekind, 1937
Genus **AMPHICORYNA** Schlumberger, in Milne-Edwards, 1881

Amphicoryna hirsuta (d'Orbigny, 1826)

pl. 14, fig. 15

Nodosaria hirsuta D'ORBIGNY, 1826, p. 252. –CUSHMAN, 1921, p. 213, pl. 38, figs 5-6.
Nodosaria hispida D'ORBIGNY, 1846, p. 35, pl. 1, figs 24-25. –BRADY, 1884, p. 507, pl. 63, figs 12-16 (ZF 1948; ZF 1947). –LOEBLICH & TAPPAN, 1994, p. 65, pl. 116, figs 7-8.
Lagenonodosaria hirsuta (d'Orbigny). –ASANO, 1951f, p. 19, fig. 89.
Amphicoryna hirsuta (d'Orbigny). –JONES, 1994, p. 75, pl. 63, figs 12-15.

Amphicoryna intercellularis (Brady, 1881)

Nodosaria intercellularis BRADY, 1881, p. 63. –BRADY, 1884, p. 515, pl. 65, figs 1-4. –CUSHMAN, 1923, p. 89, pl. 14, figs 2-4; pl. 17, fig. 3.
Amphicoryna intercellularis (Brady). –JONES, 1994, p. 76, pl. 65, figs 1-4.

Amphicoryna meringella Loeblich & Tappan, 1994

Amphicoryna meringella LOEBLICH & TAPPAN, 1994, p. 71, pl. 128, figs 1-7.

Key features: Short test consisting of two chambers with apiculate base; surface covered with spines; aperture terminal, round.

Remarks: This species resembles early portion of *Amphicoryna sublineata* (Brady), but differs in more spinous surface.

Amphicoryna papillosa (O. Silvestri, 1872)

pl. 14, figs 19-20

Nodosaria papillosa SILVESTRI, O., 1872, p. 79, pl. 8, figs 201-206. –BRADY, 1884, p. 508, pl. 63, figs 10-11 (ZF 1945). –LOEBLICH & TAPPAN, 1994, p. 66, pl. 116, figs 1-5.
Amphicoryna papillosa (Silvestri, O.). –JONES, 1994, p. 75, pl. 63, figs 10-11.

Amphicoryna scalaris (Batsch, 1791)

pl. 14, fig. 18

Nautilus (Orthoceras) scalaris BATSCH, 1791, p. 1-4.
Nodosaria scalaris (Batsch). –BRADY, 1884, p. 510, pl. 63, figs 28-31 (ZF 1976). –CUSHMAN, 1913a, p. 58, pl. 24, fig. 7. –CUSHMAN, 1921, p. 199, pl. 35, fig. 6.
Amphicoryna scalaris (Batsch). –VAN MARLE, 1991, p. 31, pl. 2, figs 3-4. –HATTA & UJIIÉ, 1992b, p. 166, pl. 21, fig. 8. –JONES, 1994, p. 75, pl. 63, figs 28-31.

Amphicoryna separans (Brady, 1884)

pl. 14, fig. 17

Nodosaria scalaris (Batsch) var. *separans* BRADY, 1884, p. 511, pl. 64, figs 16-19 (ZF 1979).
Lagenonodosaria separans (Brady). –ASANO, 1956a, p. 28, pl. 6, figs 8-9.
Amphicoryna scalaris (Batsch). –HATTA & UJIIÉ, 1992b (non *Nautilus (Orthoceras) scalaris* Batsch, 1791), p. 166, pl. 21, fig. 8.
Amphicoryna separans (Brady). –JONES, 1994, p. 76, pl. 64, figs 16-19. –LOEBLICH & TAPPAN, 1994, p. 71, pl. 127, figs 1-18.

Amphicoryna sublineata (Brady, 1884)

pl. 14, fig. 16

Nodosaria hispida d'Orbigny var. *sublineata* BRADY, 1884, p. 508, pl. 63, figs 19-22 (ZF 1950).
Amphicoryna sublineata (Brady). –JONES, 1994, p. 75, pl. 63, figs 19-22. –LOEBLICH & TAPPAN, 1994, p. 72, pl. 128, figs 8-14.

Remarks: The SCS specimens are much smaller, transparent and more fragile in comparison to forms in Challenger Collection.

Amphicoryna substriatula (Cushman, 1917)

Nodosaria (Dentalina) subcanaliculata Neugeboren. –BRADY, 1884 (not Neugeboren, 1856), p. 512, pl. 64, figs 23-24 (ZF 1985).
Nodosaria substriatula CUSHMAN, 1917b, p. 655. –CUSHMAN, 1921, p. 204, pl. 36, figs 8-9; pl. 52, figs 7-9.
Amphicoryna substriatula (Cushman). –JONES, 1994, p. 76, pl. 64, figs 23-24.

Genus **ASTACOLUS** de Montfort, 1808

Astacolus crepidulus (Fichtel & Moll, 1798)

Nautilus crepidula FICHTEL & MOLL, 1798, p. 107, pl. 19, figs g-i.
Astacolus crepidulus (Fichtel & Moll). –LOEBLICH & TAPPAN, 1994, p. 72, pl. 130, figs 1-10.

Genus **MARGINULINA** d'Orbigny, 1826

Marginulina glabra d'Orbigny, 1826

Marginulina glabra D'ORBIGNY, 1826, p. 259. –CUSHMAN & MCCULLOCH, 1950, p. 308, pl. 40, figs 7-8. –LOEBLICH & TAPPAN, 1994, p. 73, pl. 129, figs 13-16.

Marginulina musai Saidova, 1975

Marginulina musai SAIDOVA, 1975, p. 179, pl. 49, fig. 18. –LOEBLICH & TAPPAN, 1994, p. 73, pl. 131, figs 6-11.

Marginulina obesa Cushman, 1923

Marginulina glabra d'Orbigny. –BRADY, 1884 (not d'Orbigny, 1826), p. 527, pl. 65, figs 5-6 (ZF 1810). –VAN MARLE, 1991, p. 51, pl. 1, figs 5-6.
Marginulina glabra var. *obesa* CUSHMAN, 1923, p. 128, pl. 37, fig. 1.
Marginulina cf. *obesa* (Cushman). –UJIIÉ, 1990, p. 20, pl. 6, figs 2-3.
Marginulina obesa (Cushman). –JONES, 1994, p. 77, pl. 65, figs 5-6.

Marginulina striata d'Orbigny, 1852

Marginulina striata D'ORBIGNY, 1852, p. 153. –LOEBLICH & TAPPAN, 1994, p. 74, pl. 131, figs 14-20.

Genus **VAGINULINOPSIS** Silvestri, 1904

Vaginulinopsis reniformis (d'Orbigny, 1846)

Cristellaria reniformis D'ORBIGNY, 1846, p. 88, pl. 3, figs 39-40. –BRADY, 1884, p. 539, pl. 70, fig. 3.
Vaginulinopsis reniformis (d'Orbigny). –JONES, 1994, p. 81, pl. 70, fig. 3.

Vaginulinopsis sublegumen Parr, 1950

pl. 14, fig. 8

Vaginulina legumen (Linné). –BRADY, 1884 (non *Nautilus legumen* Linné, 1758), p. 530, pl. 66, fig. 13.
Vaginulinopsis sublegumen PARR, 1950, p. 325, pl. 11, fig. 18. –JONES, 1994, p. 78, pl. 66, fig. 13. –LOEBLICH & TAPPAN, 1994, p. 74, pl. 131, figs 12-13; pl. 133, figs 10-19.
Astacolus sublegumen (Parr). –HATTA & UJIIÉ, 1992b, p. 166, pl. 22, figs 1-2.

***Vaginulinopsis* sp. 1**

Key features: Test elongate, early stage planispirally enrolled, involute, and wider then following uncoiled part composed of 7 chambers; in uncoiled stage chambers slightly increasing in height rather than width; test laterally slightly compressed; sutures straight, not depressed; aperture terminal radiate.

Remarks: This form is difficult to assign, since the chambers arrangement of an initial part is hardly visible. It is possible to observe it only in bigger and well preserved tests.

Subfamily VAGINULININAE Reuss, 1860
Genus **PLANULARIA** Defrance, in de Blainville, 1824

Planularia californica (Galloway & Wissler, 1927)

pl. 14, fig. 13

Cristellaria tricarinella Reuss. –BRADY, 1884 (not Reuss, 1863), p. 540, pl. 68, figs 3-4 (ZF 1352). –CUSHMAN, 1921, p. 230, pl. 50, fig. 3.
Astacolus californicus GALLOWAY & WISSLER, 1927, p. 46, pl. 8, fig. 4.
Planularia californica (Galloway & Wissler). –CUSHMAN & MCCULLOCH, 1950, p. 303, pl. 39, figs 6-9. –LOEBLICH & TAPPAN, 1994, p. 75, pl. 130, fig. 11; pl. 133, figs 1-9.
Planularia australis CHAPMAN, 1941, p. 158, pl. 9, fig. 1. –VAN MARLE, 1991, p. 40. –JONES, 1994, p. 80, pl. 68, figs 3-4. –HAYWARD *et al.*, 1999, p. 114, pl. 6, figs 40-41.

Remarks: *Planularia australis* Chapman is regarded as a junior synonym of *Planularia californica* (Galloway & Wissler).

Planularia gemmata (Brady, 1881)

pl. 14, fig. 14

Cristellaria gemmata BRADY, 1881, p. 64. –BRADY, 1884, p. 554, pl. 71, figs 6-7 (ZF 1327).
Hemicristellaria gemmata (Brady). –LEROY, 1941a, p. 28, pl. 3, figs 78-79. –TU & ZHENG, 1991, p. 175, pl. 3, fig. 20.
Planularia gemmata (Brady). –JONES, 1994, p. 82, pl. 71, fig. 6. –LOEBLICH &TAPPAN, 1994, p. 75, pl. 134, figs 1-5.

Planularia patens (Brady, 1884)

Vaginulina patens BRADY, 1884, p. 533, pl. 67, figs 15-16.
Planularia patens (Brady). –JONES, 1994, p. 79, pl. 67, figs 15-16.
Astacolus patens (Brady). –LOEBLICH &TAPPAN, 1994, p. 72, pl. 129, figs 1-6.

Planularia perculta McCulloch, 1977

Planularia perculta MCCULLOCH, 1977, p. 10, pl. 96, fig. 14. –HATTA & UJIIÉ, 1992b, p. 166, pl. 22, fig. 3. –LOEBLICH &TAPPAN, 1994, p. 75, pl. 134, figs 10-13.

Genus **VAGINULINA** d'Orbigny, 1826

Vaginulina subelegans Parr, 1950

Vaginulina legumen (Linné). –BRADY, 1884 (non *Nautilus legumen* Linné, 1758), p. 530, pl. 66, figs 14-15.
Vaginulina subelegans PARR, 1950, p. 326, pl. 11, fig. 20. –JONES, 1994, p. 78, pl. 66, figs 14-15.

Family LAGENIDAE Reuss, 1861
Genus **HYALINONETRION** Patterson & Richardson, 1987

Hyalinonetrion distomapolitum (Parker & Jones, 1865)

Lagena sulcata (Walker & Jacob) var. *distomapolita* PARKER & JONES, 1865, p. 357, pl. 13, fig. 21; pl. 21, fig. 8.
Hyalinonetrion distomapolitum (Parker & Jones). –LOEBLICH & TAPPAN, 1994, p. 77, pl. 137, figs 10-12.

Hyalinonetrion sahulense Patterson & Richardson, 1987

Hyalinonetrion sahulense PATTERSON & RICHARDSON in: Loeblich & Tappan, 1987, p. 415, pl. 455, figs 6-8. –PATTERSON & RICHARDSON, 1988, p. 243, figs 5-6. –LOEBLICH & TAPPAN, 1994, p. 77, pl. 137, figs 13-14.

Genus **LAGENA** Walker & Jacob, 1798

Lagena alticostata Cushman, 1913

Lagena sulcata (Walker & Jacob) var. *alticostata* CUSHMAN, 1913a, p. 23, pl. 9, fig. 5.
Lagena alticostata Cushman. –JONES, 1984, p. 131, pl. 6, fig. 20. –HERMELIN, 1989, p. 41, pl. 4, fig. 6. –UJIIÉ, 1990, p. 19, pl. 5, fig. 12.

Lagena annellatrachia Loeblich & Tappan, 1994

Lagena striata (d'Orbigny). –BRADY, 1884 (non *Oolina striata* d'Orbigny, 1839c), p. 460, pl. 57, fig. 28 (ZF 1773).
Lagena sp. –JONES, 1994, p. 64, pl. 57, fig. 28.
Lagena annellatrachia LOEBLICH & TAPPAN, 1994, p. 77, pl. 142, figs 1-8, 11-12.

Lagena dorbignyi Jones, 1984

Lagena sulcata (Walker & Jacob) var. *interrupta* Williamson. –BRADY, 1884 (not Williamson, 1848), p. 463, pl. 57, figs 25, 27 (ZF 1785).
Lagena semistriata (Williamson) var. *dorbignyi* JONES, 1984, p. 133, pl. 7, figs 13-14.
Lagena sulcata (Walker & Jacob). –JONES, 1994, p. 64, pl. 57, figs 25, 27.
Lagena dorbignyi Jones. –LOEBLICH & TAPPAN, 1994, p. 78, pl. 138, figs 6-9.

Lagena gibbera Buchner, 1940

Lagena aspera Reuss. –BRADY, 1884 (not Reuss, 1861), p. 457, pl. 57, figs 8-10.
Lagena gibbera BUCHNER, 1940, p. 423, pl. 3, figs 48-50. –JONES, 1994, p. 63, pl. 57, figs 8-9, ?10.

Lagena hispida Reuss, 1858

Lagena hispida REUSS, 1858, p. 118, pl. 11, figs 13-14. –BRADY, 1884, p. 459, pl. 57, figs 1-2 (not figs 3-4). –WANG *et al.*, 1988, p. 135, pl. 16, fig. 12. –UJIIÉ, 1990, p. 18, pl. 5, fig. 2. –JONES, 1994, p. 63, pl. 57, figs 1-2. –HAYWARD *et al.*, 1999, p. 115, pl. 7, figs 1-2.
Pygmaeoseistron hispidum (Reuss). –LOEBLICH & TAPPAN, 1994, p. 80, pl. 141, figs 4-6.

Lagena hispidula Cushman, 1913

Lagena laevis (Montagu). –BRADY, 1884 (non *Vermiculum laeve* Montagu, 1803), p. 455, pl. 56, figs 10-12, 13 (ZF 1699).
Lagena hispidula CUSHMAN, 1913a, p. 14, pl. 5, figs 2-3. –JONES, 1984, p. 132, pl. 7, fig. 4. –WANG *et al.*, 1988, p. 135, pl. 16, fig. 13. –UJIIÉ, 1990, p. 18, pl. 5, fig. 3. –JONES, 1994, p. 62, pl. 56, figs 10-11, ?13. –YASSINI & JONES, 1995, p. 105, figs 306-308.

Lagena perlucida (Montagu, 1803)

Vermiculum perlucidum MONTAGU, 1803, p. 525, pl. 14, fig. 3.
Lagena perlucida (Montagu). –MURRAY, 1971, p. 85, pl. 33, figs 1-3. –HAYNES, 1973, p. 86, pl. 12, fig. 5. –WHITTAKER & HODGKINSON, 1979, p. 46, pl. 3, fig. 14. –JONES, 1984, p. 132, pl. 7, fig. 10.

Lagena semistriata Williamson, 1848

Lagena striata (Montagu) var. *semistriata* WILLIAMSON, 1848, p. 14, pl. 1, figs 9-10.
Lagena semistriata Williamson. –BRADY, 1884, p. 465, pl. 57, fig. 14 (ZF 1640). –CUSHMAN, 1933a, p. 32, pl. 8, fig. 1. –WHITTAKER & HODGKINSON, 1979, p. 47, text-figs 38-39. –JONES, 1984, p. 133, pl. 7, fig. 12. –JONES, 1994, p. 64, pl. 57, fig. 14.

Lagena stelligera Brady, 1881

Lagena stelligera BRADY, 1881, p. 60. –BRADY, 1884, p. 466, pl. 57, figs 35-36.
Cushmanina stelligera (Brady). –JONES, 1994, p. 64, pl. 57, figs 17, 35-36.

Lagena striata (d'Orbigny, 1839)

Oolina striata D'ORBIGNY, 1839c, p. 21, pl. 5, fig. 12.
Lagena striata (d'Orbigny). –BRADY, 1884, p. 460, pl. 57, figs 22, 24. –HERON-ALLEN & EARLAND, 1932b, p. 366, pl. 10, figs 10-12. –WHITTAKER & HODGKINSON, 1979, p. 47, pl. 3, fig. 16. –JONES, 1994, p. 64, pl. 57, figs 22, 24.

Lagena substriata Williamson, 1848

Lagena striata (d'Orbigny). –BRADY, 1884 (non *Oolina striata* d'Orbigny, 1839c), p. 460, pl. 57, fig. 19 (ZF 1784). –VAN MARLE, 1991, p. 30, pl. 2, fig. 8.
Lagena substriata WILLIAMSON, 1848, p. 15, pl. 2, fig. 12. –CUSHMAN, 1923, p. 56, pl. 10, fig. 11. –HADA, 1931, p. 108, text-fig. 64. –UJIIÉ, 1990, p. 19, pl. 5, fig. 7. –JONES, 1994, p. 64, pl. 57, fig. 19. –LOEBLICH & TAPPAN, 1994, p. 79, pl. 138, figs 1-5.

Lagena* cf. *sulcata (Walker & Jacob, 1798)

Serpula (Lagena) sulcata WALKER & JACOB in Kanmacher, 1798, p. 634, pl. 14, fig. 5.
Lagena sulcata (Walker & Jacob). –BRADY, 1884, p. 462, pl. 57, fig. 18 (ZF 1783). –JONES, 1994, p. 65, pl. 58, fig. 18.

***Lagena* sp. 1**

Lagena ? sp. –UJIIÉ, 1990, p. 20, pl. 5, fig. 14.

Key features: Test globular, tapering into the short wide neck; wall calcareous; surface smooth; radiate aperture at the end of the neck.

Remarks: Resembles specimen figured by Ujiié (1990) and some specimens figured by Loeblich & Tappan (1994) referred to *Reussoolina* Colom.

Genus **PYGMAEOSEISTRON** Patterson & Richardson, 1988

Pygmaeoseistron nebulosa (Cushman, 1923)

Lagena laevis (Montagu). –BRADY, 1884 (non *Vermiculum laeve* Montagu, 1803), p. 455, pl. 56, fig. 12 (ZF 1700).
Lagena laevis (Montagu) var. *nebulosa* CUSHMAN, 1923, p. 29, pl. 5, figs 4-5.
Lagena nebulosa Cushman. –JONES, 1984, p. 132, pl. 7, fig. 6. –UJIIÉ, 1990, p. 20, pl. 5, fig. 5. –JONES, 1994, p. 62, pl. 56, fig. 12.

Pygmaeoseistron setigera (Millett, 1901)

Lagena laevis (Montagu). –BRADY, 1884 (non *Vermiculum laeve* Montagu, 1803), p. 455, pl. 56, fig. 30.
Lagena clavata d'Orbigny var. *setigera* MILLETT, 1901, p. 491, pl. 8, fig. 9. –WHITTAKER & HODGKINSON, 1979, p. 43, text-figs 29-37.
Lagena perlucida (Montagu). –CUSHMAN, 1933a, p. 20, pl. 4, figs 6-8. –CUSHMAN & MCCULLOCH, 1950, p. 342, pl. 46, figs 3-4.
Lagena setigera Millett. –ŌKI, 1989, p. 95, pl. 6, fig. 11.
Procerolagena clavata var. *setigera* (Millett). –JONES, 1994, p. 63, pl. 56, fig. 30.
Pygmaeoseistron oceanicum (Albani). –LOEBLICH & TAPPAN, 1994, p. 80, pl. 144, figs 4-7.

Superfamily POLYMORPHINACEA d'Orbigny, 1839
Family POLYMORPHINIDAE d'Orbigny, 1839
Subfamily POLYMORPHININAE d'Orbigny, 1839
Genus **GLOBULINA** d'Orbigny, 1839

Globulina gibba d'Orbigny, 1826

Globulina gibba D'ORBIGNY, 1826, p. 266.
Polymorphina gibba d'Orbigny. –BRADY, 1884, p. 561, pl. 71, fig. 12.
Globulina gibba (Deshayes). –JONES, 1994, p. 83, pl. 71, fig. 12 (not fig. 11).
Globulina gibba d'Orbigny. –LOEBLICH & TAPPAN, 1994, p. 82, pl. 145, figs 1-4.

Globulina inaequalis Reuss, 1850

Polymorphina amygdaloides (Reuss). –BRADY, 1884, p. 560, pl. 71, fig. 13.
Globulina inaequalis Reuss. –JONES, 1994, p. 83, pl. 71, fig. 13.

Remarks: Jones (1994) regarded *Globulina amygdaloides* Reuss, 1851 as a junior synonym of *Globulina inaequalis* Reuss, 1850.

Globulina regina (Brady, Parker & Jones, 1871)

Polymorphina regina BRADY, PARKER & JONES, 1871, p. 241, pl. 41, fig. 32. –BRADY, 1884, p. 571, pl. 73, figs 11-13.
Globulina regina (Brady, Parker & Jones). –JONES, 1994, p. 85, pl. 73, figs 11-13.
Guttulina regina (Brady, Parker & Jones). –LOEBLICH & TAPPAN, 1994, p. 82, pl. 146, figs 1-3.

Genus **GUTTULINA** d'Orbigny, 1839

Guttulina communis (d'Orbigny, 1826)

Polymorphina (Guttulina) communis D'ORBIGNY, 1826, p. 266, pl. 12, figs 1-4. –BRADY, 1884, p. 568, pl. 72, fig. 19.
Polymorphina problema d'Orbigny. –BRADY, 1884, p. 568, pl. 72, fig. 20; pl. 73, fig. 1.
Guttulina communis (d'Orbigny). –JONES, 1994, p. 84, pl. 72, figs 19-20, pl. 73, fig. 1.

Guttulina lehneri Cushman & Ozawa, 1930

Guttulina lehneri CUSHMAN & OZAWA, 1930, p. 39, pl. 8, figs 1-2.

Genus **KREBSINA** McCulloch, 1981

Krebsina subtenuis (Cushman, 1936)

Bolivina tenuis Brady. –BRADY, 1884, p. 419, pl. 52, fig. 29 (ZF 1198).
Bolivina subtenuis CUSHMAN, 1936a, p. 57, pl. 8, fig. 10.
Brizalina subtenuis (Cushman). –JONES, 1994, p. 58, pl. 52, fig. 29.
Krebsina subtenuis (Cushman). –LOEBLICH & TAPPAN, 1994, p. 82, pl. 146, figs 12-16.

Remarks: This very fragile form has usually broken last chamber together with very characteristic apertural face, what can lead to incorrect determination as *Bolivina* d'Orbigny.
According to Jones (1994) *Bolivina tenuis* Brady (1881) is regarded as junior homonym of *B. tenuis* Marsson (1878).

Genus **POLYMORPHINA** d'Orbigny, 1826

Polymorphina group

'fistulose polymorphinids'. –JONES, 1994, p. 85, pl. 73, figs 15, 17.

Remarks: Single specimens of different species from the genus *Polymorphina* occurs rarely in the SCS material, therefore all polymorphinids have been herein grouped together, including forms figured in Challenger Report and referred by Jones (1994) to 'fistulose polymorphinids'.
Tests widely vary in morphology and size of the fistulose projections.

Genus **PSEUDOPOLYMORPHINA** Cushman & Ozawa, 1928

Pseudopolymorphina ligua (Roemer, 1838)

Polymorphina ligua ROEMER, 1838, p. 385, pl. 3, fig. 25.
Pseudopolymorphina ligua (Roemer). –CUSHMAN & OZAWA, 1929, p. 89, pl. 22, figs 5-6. –LOEBLICH & TAPPAN, 1994, p. 83, pl. 146, figs 8-9.

Genus **PYRULINA** d'Orbigny, 1839

Pyrulina angusta (Egger, 1857)

Polymorphina (Globulina) angusta EGGER, 1857, p. 290, pl. 13, figs 13-15. –BRADY, 1884, p. 563, pl. 72, figs 1-2 (not fig. 3) (ZF 2126). –CUSHMAN, 1913a, p. 86, pl. 39, fig. 6.
Pyrulina angusta (Egger). –UJIIÉ, 1990, p. 21, pl. 6, figs 10-11. –JONES, 1994, p. 83, pl. 72, figs 1-2.

Genus **SIGMOIDELLA** Cushman & Ozawa, 1928

Sigmoidella elegantissima (Parker & Jones, 1865)

Polymorphina elegantissima PARKER & JONES, 1865, p. 438. –PARKER & JONES in Brady, Parker & Jones, 1871, p. 231, pl. 40, fig. 15. –BRADY, 1884, p. 566, pl. 72, figs 12-15. –CUSHMAN, 1921, p. 261, pl. 54, fig. 1.
Sigmoidella pacifica CUSHMAN & OZAWA, 1928, p. 19, pl. 2, fig. 13. –LOEBLICH & TAPPAN, 1994, p. 84, pl. 149, figs 1-9.
Sigmoidella elegantissima (Parker & Jones). –JONES, 1994, p. 84, pl. 72, figs 12-15. –LOEBLICH & TAPPAN, 1994, p. 83, pl. 148, figs 4-12.

Remarks: Jones (1994) regarded *Sigmoidella pacifica* Cushman & Ozawa (1928) as junior synonym of *Polymorphina elegantissima* Parker & Jones (1865).

Subfamily RAMULININAE Brady, 1884
Genus **RAMULINA** T.R. Jones, in Wright, 1875

Ramulina angusta Loeblich & Tappan, 1994

Ramulina angusta LOEBLICH & TAPPAN, 1994, p. 84, pl. 149, fig. 16.

Remarks: This species has more fragile and spinose test than *Ramulina globulifera* Brady, consisting of branching, elongated, tubular arms; it lacks central, globular chamber.

Ramulina globulifera Brady, 1879

pl. 15, fig. 15

Ramulina globulifera BRADY, 1879b, p. 272, pl. 8, figs 32-33. –BRADY, 1884, p. 587, pl. 76, figs 22-28 (ZF 2253-55). –CUSHMAN, 1913a, p. 110, pl. 39, fig. 1. –LEROY, 1964, p. 27, pl. 14, fig. 2. –TU & ZHENG, 1991, p. 175, pl. 4, fig. 23. –HATTA & UJIIÉ, 1992b, p. 167, pl. 22, fig. 6. –JONES, 1994, p. 88, pl. 76, figs 22-28. –LOEBLICH & TAPPAN, 1994, p. 84, pl. 149, fig. 17.

Family ELLIPSOLAGENIDAE A. Silvestri, 1923
Subfamily OOLININAE Loeblich & Tappan, 1961
Genus **ANTURINA** R.W. Jones, 1984

Anturina haynesi Jones, 1984

Lagena globosa (Montagu). –BRADY, 1884 (non *Vermiculum globosum* Montagu, 1803), p. 441, text-fig. 11f-g, j; p. 452.
Anturina haynesi JONES, 1984, p. 99 . –JONES, 1994, text-fig. 11 f-g, j.

Remarks: This form resembles *Reussoolina stellula* Loeblich & Tappan (1994).

Genus **CUSHMANINA** R.W. Jones, 1984

Cushmanina desmophora (R. Jones, 1872)

Lagena vulgaris var. *desmophora* R. JONES, 1872, p. 54, pl. 19, figs 23-24.
Lagena desmophora R. Jones. –BRADY, 1884, p. 468, pl. 58, figs 42-43.
Cushmanina desmophora (R. Jones). –JONES, 1984, p. 105, pl. 2, figs 10-12. –JONES, 1994, p. 67, pl. 58, figs 42-43.

Genus **OOLINA** d'Orbigny, 1839

Oolina apiopleura (Loeblich & Tappan, 1953)

Lagena acuticosta (Reuss). –BRADY, 1884 (not Reuss, 1861), p. 464, pl. 57, fig. 32; pl. 58, fig. 21 (ZF 1787).
Lagena apiopleura LOEBLICH & TAPPAN, 1953, p. 59, pl. 10, figs 14-15.
Oolina apiopleura (Loeblich & Tappan). –JONES, 1984, p. 101, pl. 1, figs 7-8. –JONES, 1994, p. 65, pl. 57, fig. 32; p. 66, pl. 58, fig. 21.

Oolina globosa (Montagu, 1803)

Vermiculum globosum MONTAGU, 1803, p. 523.
Lagena globosa (Montagu). –BRADY, 1884, p. 441, text-fig. 11a-b, h, k-l; p. 452.
Oolina globosa (Montagu) var. A. –UJIIÉ, 1990, p. 22, pl. 7, fig. 7.
Oolina globosa (Montagu). –JONES, 1994, text-fig. 11a-b, h, k-l.

Oolina hexagona (Williamson, 1848)

Entosolenia squamosa (Montagu) var. *hexagona* WILLIAMSON, 1848, p. 20, pl. 2, fig. 23.
Lagena hexagona (Williamson). –BRADY, 1884, p. 472, pl. 58, fig. 33 (not fig. 32). –CUSHMAN, 1913a, p. 17, pl. 6, fig. 3.
Oolina hexagona (Williamson). –LOEBLICH & TAPPAN, 1953, p. 69, pl. 14, figs 1-2. –JONES, 1984, p. 102, pl. 1, figs 17-18. –UJIIÉ, 1990, p. 22, pl. 7, fig. 4.

–JONES, 1994, p. 66, pl. 58, fig. 33. –HAYWARD *et al.*, 1999, p. 122, pl. 8, fig. 2.
Favulina hexagona (Williamson). –PATTERSON & RICHARDSON, 1988, p. 249, figs 32-33. –LOEBLICH & TAPPAN, 1994, p. 86, pl. 151, figs 11-12.

Oolina squamosa (Montagu, 1803)

Vermiculum squamosum MONTAGU, 1803, p. 526, pl. 14, fig. 2.
Lagena squamosa (Montagu). –BRADY, 1884, p. 471, pl. 58, figs 28-31 (ZF 1685).
Lagena hexagona (Williamson). –BRADY, 1884 (non *Entosolenia squamosa* var. *hexagona* Williamson, 1848), p. 472, pl. 58, fig. 32.
Oolina squamosa (Montagu). –JONES, 1984, p. 102, pl. 1, figs 20-21. –JONES, 1994, p. 66, pl. 58, figs 28-32.

Subfamily ELLIPSOLAGENINAE A. Silvestri, 1923
Genus **FISSURINA** Reuss, 1850

Fissurina bradii Silvestri, 1902

Lagena orbignyana (Seguenza). –BRADY, 1884 (non *Fissurina orbignyana* Seguenza, 1862a), p. 484, pl. 59, fig. 24.
Fissurina bradii SILVESTRI, 1902, p. 147. –JONES, 1994, p. 68, pl. 59, fig. 24.

Fissurina bradyiformata (McCulloch, 1977)

Lagena orbignyana (Seguenza). –BRADY, 1884 (non *Fissurina orbignyana* Seguenza, 1862a), p. 484, pl. 59, fig. 26.
Lagenosolenia bradyiformata MCCULLOCH, 1977, p. 53, pl. 61, fig. 15. –LOEBLICH & TAPPAN, 1994, p. 91, pl. 160, figs 1-8.
Fissurina bradyiformata (McCulloch). –JONES, 1994, p. 68, pl. 59, fig. 26.

Remarks: Resembles form in Car Nicobar Collection (collection no. P 48552) referred by Srinivasan & Sharma (1980) to *Fissurina schwageriana* (Cushman).

Fissurina formosa (Schwager, 1866)

Lagena formosa SCHWAGER, 1866, p. 206, pl. 4, fig. 19. –BRADY, 1884, p. 480, pl. 60, fig. 18.
Fissurina formosa (Schwager). –JONES, 1994, p. 70, pl. 60, fig. 18 (not fig. 19).

Remarks: The great variety of forms referred to *Fissurina formosa* include forms with especially rich ornamentation, which the SCS specimens lack. The SCS specimens closely resemble only those figured by Schwager (1866).

Fissurina orbignyana Seguenza, 1862

Fissurina orbignyana SEGUENZA, 1862a, p. 66, pl. 2, figs 25-26. –JONES, 1994, p. 68, pl. 59, fig. 18. –HAYWARD *et al.*, 1999, p. 120, pl. 7, fig. 24.
Lagena orbignyana (Seguenza). –BRADY, 1884, p. 484, pl. 59, fig. 18. –CUSHMAN, 1913a, p. 42, pl. 19, fig. 1.

Fissurina submarginata (Boomgaart, 1949)

Lagena marginata (Walker & Boys). –BRADY, 1884 (non *Serpula (Lagena) marginata* Walker & Boys, 1784), p. 476, pl. 59, figs 21-22. –CUSHMAN, 1913a, p. 37, pl. 22, figs 1-7.
Entosolenia submarginata BOOMGAART, 1949, p. 107, pl. 9, fig. 7.
Fissurina submarginata (Boomgaart). –VAN MARLE, 1991, p. 20, pl. 2, figs 13-15. –JONES, 1994, p. 68, pl. 59, figs 21-22.

Remarks: Resembles form referred by Srinivasan & Sharma (1980) to *Fissurina capillosa* Schwager in Car Nicobar Collection (collection no. P 48549).

Subfamily PARAFISSURININAE R.W. Jones, 1984
Genus **PARAFISSURINA** Parr, 1947

Parafissurina basispinata McCulloch, 1977

Parafissurina basispinata MCCULLOCH, 1977, p. 139, pl. 72, figs 1-3. –LOEBLICH & TAPPAN, 1994, p. 94, pl. 162, figs 1-5.

Parafissurina carinata (Buchner, 1940)

Lagena lateralis Cushman var. *carinata* BUCHNER, 1940, p. 521, pl. 23, figs 497-500.
Parafissurina subcarinata PARR, 1950, p. 318, pl. 10, fig. 9.
Parafissurina carinata (Buchner). –JONES, 1984, p. 127, pl. 6, figs 4-5.

Remarks: Jones (1984) regarded *P. subcarinata* Parr as a junior synonym of *L. carinata* Buchner.

Parafissurina curvitubulosa (McCulloch, 1977)

Fissurina curvitubulosa MCCULLOCH, 1977, p. 100, pl. 65, figs 4-5.
Parafissurina curvitubulosa (McCulloch). –LOEBLICH & TAPPAN, 1994, p. 94, pl. 162, figs 6-12.

Parafissurina lata (Wiesner, 1931)

Ellipsolagena lata WIESNER, 1931, p. 126, pl. 14, figs k-l.
Parafissurina lata (Wiesner). –PARR, 1950, p. 315, pl. 9, fig. 17. –UJIIÉ, 1990, p. 27, pl. 10, figs 5-7.

Parafissurina lateralis (Cushman, 1913)

Lagena apiculata (Reuss). –BRADY, 1884 (non *Oolina apiculata* Reuss, 1850), p. 453, pl. 56, figs 17-18 (not figs 15-16) (ZF 1617; ZF 1618).
Lagena lateralis CUSHMAN, 1913a, p. 9, pl. 1, fig. 1.
Parafissurina lateralis (Cushman). –JONES, 1984, p. 128, pl. 6, figs 11-12. –UJIIÉ, 1990, p. 27, pl. 10, fig. 1. –JONES, 1994, p. 62, pl. 56, figs 17-18.

–LOEBLICH & TAPPAN, 1994, p. 94, pl. 164, figs 1-10.

Parafissurina subventricosa McCulloch, 1977

Parafissurina subventricosa MCCULLOCH, 1977, p. 158, pl. 70, fig. 20. –LOEBLICH & TAPPAN, 1994, p. 94, pl. 164, figs 11-17.

Genus **PSEUDOSOLENINA** R.W. Jones, 1984

Pseudosolenina wiesneri (Barker, 1960)

Lagena marginata (Walker & Boys). –BRADY, 1884 (non *Serpula (Lagena) marginata* Walker & Boys, 1784), p. 476, pl. 59, fig. 23 (ZF 1720).
Fissurina wiesneri BARKER, 1960, p. 124, pl. 59, fig. 23. –UJIIÉ, 1990, p. 26, pl. 9, figs 3-4.
Parafissurina marginoradiata MCCULLOCH, 1977, p. 150, pl. 69, fig. 16.
Pseudosolenina wiesneri (Barker). –JONES, 1994, p. 68, pl. 59, fig. 23.
Pseudofissurina marginoradiata (McCulloch). –LOEBLICH & TAPPAN, 1994, p. 95, pl. 165, figs 8-17.

Remarks: Loeblich & Tappan (1994) differentiate *Fissurina wiesneri* Barker from *Pseudofissurina marginoradiata* (McCulloch) at the base of its aboral indentation, whereas the keel of *P. marginoradiata* is broad and smooth. The SCS forms lack aboral indentation and are identical with those from Challenger Collection, but not with specimen figured in Challenger Report. The aboral indentation is not mentioned by Brady in detail description of this species, therefore both species are regarded as synonymous.

Subfamily SIPHOLAGENINAE Patterson & Richardson, 1987
Genus **PYTINE** Moncharmont Zei & Sgarrella, 1978

Pytine paradoxa (Sidebottom, 1912)

Lagena foveolata Reuss var. *paradoxa* SIDEBOTTOM, 1912, p. 395, pl. 16, figs 22-23.
Lagena paradoxa Sidebottom. –UJIIÉ, 1990, p. 18, pl. 5, fig. 6.
Pytine paradoxa (Sidebottom). –LOEBLICH & TAPPAN, 1994, p. 96, pl. 167, figs 1-3.

Family GLANDULINIDAE Reuss, 1860
Subfamily GLANDULININAE Reuss, 1860
Genus **GLANDULINA** d'Orbigny, 1839

Glandulina laevigata (d'Orbigny, 1826)

Nodosaria (Glandulina) laevigata D'ORBIGNY, 1826, p. 252, pl. 10, figs 1-3.
Glandulina laevigata (d'Orbigny). –CUSHMAN & OZAWA, 1930, p. 143, pl. 40, fig. 1. –LEROY, 1944, p. 23, pl. 5, fig. 15. –WHITTAKER & HODGKINSON, 1979, p. 51, text-fig. 47.
Glandulina nipponica ASANO, 1951h, p. 14, text-figs 71-72.

Remarks: According to Whittaker & Hodgkinson (1979) and Ujiié (1990) *Nodosaria (Glandulina) laevigata* d'Orbigny has biserial initial portion and never curved test.

Glandulina (?) torrida (Cushman, 1923)

Nodosaria (Glandulina) laevigata d'Orbigny. –BRADY, 1884 (not d'Orbigny, 1826), p. 490, pl. 61, figs 20-22 (ZF 1955).
Nodosaria (Glandulina) laevigata var. *torrida* CUSHMAN, 1923, p. 65, pl. 12, fig. 10.
Pandaglandulina torrida (Cushman). –UJIIÉ, 1990, p. 21, pl. 6, figs 4-6.
Glandulina ovula d'Orbigny. –JONES, 1994, p. 72, pl. 61, figs 20-22 (not figs 17-19).
Glandulina symmetrica (McCulloch). –LOEBLICH & TAPPAN, 1994, p. 97, pl. 168, figs 6-8.

Remarks: Since *Glandulina* is referred as biserial in its initial portion (Whittaker & Hodgkinson, 1979) the appropriate generic assignment of this species is questionable, because specimens of this species show uniserial chambers arrangement throughout.

Genus **GLOBULOTUBA** Collins, 1958

Globulotuba entosoleniformis Collins, 1958

Globulotuba entosoleniformis COLLINS, 1958, p. 385, pl. 4, fig. 5. –LOEBLICH & TAPPAN, 1994, p. 97, pl. 168, figs 13-14.

Subfamily ENTOLINGULININAE Saidova, 1981
Genus **BOMBULINA** Mikhalevich, 1983

Bombulina echinata (Millett, 1902)

Nodosaria (Glandulina) echinata MILLETT, 1902, p. 511, pl. 11, fig. 4.
Glandulina echinata (Millett). –TU & ZHENG, 1991, p. 176, pl. 4, fig. 9.
Bombulina echinata (Millett). –LOEBLICH & TAPPAN, 1994, p. 97, pl. 169, figs 1-8.

Subfamily SEABROOKIINAE Cushman, 1927a
Genus **SEABROOKIA** Brady, 1890

Seabrookia pellucida Brady, 1890

pl. 15, fig. 12

Seabrookia pellucida BRADY, 1890, p. 570, text-fig. 60. –HATTA & UJIIÉ, 1992b, p. 169, pl. 24, fig. 2. –LOEBLICH & TAPPAN, 1994, p. 97, pl. 170, figs 1-9.

Order **ROBERTINIDA** Mikhalevich, 1980
Superfamily CERATOBULIMINACEA Cushman, 1927
Family CERATOBULIMINIDAE Cushman, 1927
Subfamily CERATOBULIMININAE Cushman, 1927

Genus **CERATOBULIMINA** Toula, 1915

Ceratobulimina jonesiana (Brady, 1881)

pl. 16, figs 1-2

Cassidulina jonesiana BRADY, 1881, p. 59.
Bulimina contraria (Reuss). –BRADY, 1884 (non *Rotalina contraria* Reuss, 1851), p. 409, pl. 54, fig. 18 (ZF 1207).
Ceratobulimina pacifica CUSHMAN & HARRIS, 1927, p. 176, pl. 29, fig. 9. –BELFORD, 1966, p. 186, pl. 36, figs 1-7. –VAN MARLE, 1991, p. 76, pl. 4, figs 11-12. –LOEBLICH & TAPPAN, 1994, p. 98, pl. 171, figs 1-10.
Ceratobulimina jonesiana (Brady). –JONES, 1994, p. 60, pl. 54, fig. 18.

Remarks: Following Jones (1994) *Ceratobulimina pacifica* Cushman & Harris is regarded as junior synonym of *Cassidulina jonesiana* Brady.

Genus **LAMARCKINA** Berthelin, 1881

Lamarckina scabra (Brady, 1884)

Pulvinulina oblonga Williamson var. *scabra* BRADY, 1884, p. 689, pl. 106, fig. 8 (ZF 2231).
Lamarckina scabra (Brady). –CUSHMAN, 1931, p. 35, pl. 7, fig. 6.
Ceratocancris scaber (Brady). –JONES, 1994, p. 105, pl. 106, fig. 8.

Lamarckina ventricosa (Brady, 1884)

Discorbina ventricosa BRADY, 1884, p. 654, pl. 91, fig. 7 (ZF 1424).
Lamarckina ventricosa (Brady). –CUSHMAN, 1931, p. 34, pl. 7, fig. 5. –HATTA & UJIIÉ, 1992b, p. 169, pl. 24, fig. 4. –JONES, 1994, p. 96, pl. 91, fig. 7. –LOEBLICH & TAPPAN, 1994, p. 98, pl. 172, figs 1-9.

Genus **SAINTCLAIROIDES** McCulloch, 1981

Saintclairoides toreutus Loeblich & Tappan, 1994

Saintclairoides toreutus LOEBLICH & TAPPAN, 1994, p. 98, pl. 173, figs 1-14.

Family EPISTOMINIDAE Wedekind, 1937
Subfamily EPISTOMININAE Wedekind, 1937
Genus **HOEGLUNDINA** Brotzen, 1948

Hoeglundina elegans (d'Orbigny, 1826)

pl. 16, figs 3-5

Rotalia (Turbinulina) elegans D'ORBIGNY, 1826, p. 276.
Pulvinulina partschiana (d'Orbigny). –BRADY, 1884 (non *Rotalina partschiana* d'Orbigny, 1846), p. 699, pl. 105, fig. 3 (ZF 2211-2213).
Pulvinulina elegans (d'Orbigny). –BRADY, 1884, p. 699, pl. 105, figs 4-6.
Epistomina elegans (d'Orbigny). –CUSHMAN, 1927b, p. 180, pl. 32-32. –PARR, 1950, p. 368.
Hoeglundina elegans (d'Orbigny). –PHLEGER & PARKER, 1951, p. 22, pl. 12, fig. 1. –VAN MORKHOVEN *et al.*, 1986, p. 97, pl. 29, figs 1-2. –VAN MARLE, 1991, p. 77, pl. 4, figs 14-16. –HATTA & UJIIÉ, 1992b, p. 170, pl. 24, fig. 3. –JONES, 1994, p. 104, pl. 105, figs 3-6. –LOEBLICH & TAPPAN, 1994, p. 98, pl. 174, figs 1-6.

Remarks: Three ecophenotypes of *Hoeglundina elegans* have been found in Sunda Shelf material;

type 1 – Test biconvex, wall thick, milky, not porous, periphery acute.

type 2 – Large, biconvex test, wall glassy, coarsely porous on both sides, periphery rounded.

type 3 – Test planoconvex, with strongly convex ventral side; wall very thin, milky but transparent; periphery acute, surrounded by transparent keel.

Superfamily ROBERTINACEA Reuss, 1850
Family ROBERTINIDAE Reuss, 1850
Subfamily ALLIATININAE McGowran, 1966
Genus **ALLIATINA** Troelsen, 1954

Alliatina variabilis (Zheng, 1978)

pl. 15, fig. 13

Pseudononionella variabilis ZHENG *et al.*, 1978, p. 62, pl. 9, figs 7-12.
Alliatina variabilis (Zheng). –LOEBLICH & TAPPAN, 1987, p. 449, pl. 481, figs 5-8. –LOEBLICH & TAPPAN, 1994, p. 99, pl. 174, figs 7-12.

Genus **ALLIATINELLA** D.J. Carter, 1957

Alliatinella differens (McCulloch, 1977)

pl. 15, fig. 14

Subcushmanella differens MCCULLOCH, 1977, p. 380, pl. 161, fig. 13.
Alliatinella differens (McCulloch). –LOEBLICH & TAPPAN, 1987, p. 449, pl. 481, figs 15-17. –LOEBLICH & TAPPAN, 1994, p. 99, pl. 175, figs 1-12; pl. 176, figs 1-3.

Genus **GEMINOSPIRA** Makiyama & Nakagawa, 1941

Geminospira bradyi Bermúdez, 1952

Bulimina convoluta Williamson. –BRADY, 1884 (not Williamson 1858), p. 409, pl. 113, fig. 6.
Geminospira bradyi BERMÚDEZ, 1952, p. 80, pl. 13, fig. 7. –LOEBLICH & TAPPAN, 1994, p. 99, pl. 177, figs 1-14; pl. 178, figs 1-9.

Subfamily ROBERTININAE Reuss, 1850

Genus **ROBERTINA** d'Orbigny, 1846

Robertina subcylindrica (Brady, 1881)

Bulimina subcylindrica BRADY, 1881, p. 56. –BRADY, 1884, p. 404, pl. 50, fig. 16.
Robertina subcylindrica (Brady). –CUSHMAN & PARKER, 1936, p. 95, pl. 16, fig. 10. –PARR, 1950, p. 369, pl. 15, fig. 12. –JONES, 1994, p. 55, pl. 50, fig. 16.

Robertina tasmanica Parr, 1950

Bulimina subteres (Brady). –BRADY, 1884, p. 403, pl. 50, fig. 17 (not fig. 18).
Robertina tasmanica PARR, 1950, p. 369, pl. 15, figs 10-11. –JONES, 1994, p. 55, pl. 50, fig. 17.

Genus **ROBERTINOIDES** Höglund, 1947

Robertinoides bradyi (Cushman & Parker, 1936)

Bulimina subteres BRADY, 1881, p. 55. –BRADY, 1884, p. 403, pl. 50, fig. 18 (not fig. 17) (ZF 1230).
Robertina bradyi CUSHMAN & PARKER, 1936, p. 99, pl. 16, fig. 9. –CUSHMAN & PARKER, 1947, p. 75, pl. 18, fig. 16.
Robertinoides bradyi (Cushman & Parker). –JONES, 1994, p. 55, pl. 50, fig. 18.

Robertinoides wiesneri (Parr, 1950)

pl. 15, fig. 11

Robertina wiesneri PARR, 1950, p. 369, pl. 15, fig. 9.
Robertinoides cf. *wiesneri* (Parr). –MCCULLOCH, 1977, p. 382, pl. 104, fig. 3.
Robertinoides wiesneri (Parr). –LOEBLICH & TAPPAN, 1994, p. 99, pl. 178, figs 10-14.

Order **BULIMINIDA** Fursenko, 1958
Superfamily BOLIVINACEA Glaessner, 1937
Family BOLIVINIDAE Glaessner, 1937
Genus **BOLIVINA** d'Orbigny, 1839

Bolivina earlandi Parr, 1950

Bolivina punctata (d'Orbigny). –EARLAND, 1934 (non *Virgulina punctata* d'Orbigny, 1839a), p. 132, pl. 6, figs 5-7.
Bolivina earlandi PARR, 1950, p. 339, pl. 12, fig. 16.

Bolivina glutinata Egger, 1893

Bolivina glutinata EGGER, 1893, p. 297, pl. 8, figs 57-62. –LOEBLICH & TAPPAN, 1994, p. 111, pl. 213, figs 1-8.

Bolivina macella Belford, 1966

pl. 16, fig. 12

Brizalina macella BELFORD, 1966, p. 33, pl. 2, figs 7-10. –VAN MARLE, 1991, p. 168, pl. 17, fig. 13.

Bolivina pusilla Schwager, 1866

pl. 16, figs 8-9

Bolivina pusilla SCHWAGER, 1866, p. 254, pl. 7, fig. 101.
Brizalina pusilla (Schwager). –SRINIVASAN & SHARMA, 1980, p. 44, pl. 6, fig. 21 (CNSC: P 48530). –BOERSMA, 1986, p. 988, pl. 4, figs 1-2.

Remarks: Differs from *B. pusilla* Schwager illustrated in Ujiié (1990) in having hardly visible longitudinal striae.

Bolivina robusta Brady, 1881

pl. 16, figs 10-11

Bolivina robusta BRADY, 1881, p. 57. –BRADY, 1884, p. 421, pl. 53, figs 7-9 (ZF 1194). –CUSHMAN, 1921, p. 129. –HADA, 1931, p. 131, text-fig. 88. –HOFKER, 1951, p. 76, text-figs 41-42. –TU & ZHENG, 1991, p. 177, pl. 3, fig. 11. –VAN MARLE, 1991, p. 162, pl. 10, figs 8-9. –JONES, 1994, p. 58, pl. 53, figs 7-9. –LOEBLICH & TAPPAN, 1994, p. 111, pl. 215, figs 17-18.

Bolivina spathulata (Williamson, 1858)

pl. 16, figs 6-7

Textularia variabilis Williamson var. *spathulata* WILLIAMSON, 1858, p. 76, pl. 6, figs 164-165.
Bolivina dilatata Reuss. –BRADY, 1884 (not Reuss, 1850), p. 418, pl. 52, figs 20-21.
Bolivina spatuloides HOFKER, 1956, p. 66, pl. 6, fig. 20; pl. 7, figs 8-11.
Bolivina spathulata (Williamson). –BARKER, 1960, p. 106, pl. 52, figs 20-21. –VAN MARLE, 1991, p. 163, pl. 16, figs 15-16.
Brizalina spathulata (Williamson). –JONES, 1994, p. 57, pl. 52, figs 20-21.

Remarks: *B. spathulata* generally is restricted to the shallow waters and it is dwelling deep into the sediment, it exhibits tolerance for oxygen deficiency (Stigter *et al.*, 1998).

Bolivina spinata Cushman, 1936

Bolivina striatula Cushman var. *spinata* CUSHMAN, 1936a, p. 59, pl. 8, fig. 9. –PHLEGER & PARKER, 1951, p. 14, pl. 7, fig. 7.

Bolivina subaenariensis var. mexicana Cushman, 1922

pl. 16, figs 14-15

Bolivina aenariensis (Costa). –BRADY, 1884 (non *Brizalina aenariensis* Costa, 1856), p. 423, pl. 53, figs 10-11.
Bolivina subaenariensis Cushman var. *mexicana* CUSHMAN, 1922a, p. 47, pl. 8, fig. 1. –PHLEGER &

PARKER, 1951, p. 15, pl. 7, figs 8-10. –JONES, 1994, p. 58, pl. 53, figs 10-11.

Bolivina subreticulata Parr, 1932

pl. 16, fig. 13

Bolivina reticulata Hantken. –BRADY, 1884 (not Hantken, 1876), p. 426, pl. 53, figs 30-31 (ZF 1193).
Bolivina subreticulata PARR, 1932a, p. 12, pl. 1, fig. 21–VAN MARLE, 1991, p. 173, pl. 18, figs 1-3. –HATTA & UJIIÉ, 1992b, p. 171, pl. 25, fig. 5..
Brizalina subreticulata (Parr). –ZHENG, 1979, p. 160, pl. 15, fig. 16. –JONES, 1994, p. 59, pl. 53, figs 30-31.
Latibolivina subreticulata (Parr). –LOEBLICH & TAPPAN, 1994, p. 112, pl. 217, figs 1-11.

Superfamily LOXOSTOMATACEA Loeblich & Tappan, 1962
Family BOLIVINELLIDAE Hayward, 1980
Genus **RUGOBOLIVINELLA** Hayward, 1990

Rugobolivinella elegans (Parr, 1932)

Textularia folium Parker & Jones. –BRADY, 1884 (not Parker & Jones, 1865), p. 357, pl. 42, figs 3-5 (ZF 2449).
Bolivinella elegans PARR, 1932b, p. 224. –LOEBLICH & TAPPAN, 1987, pl. 553, figs 6-7. –VAN MARLE, 1991, p. 112, pl. 9, figs 1-2. –JONES, 1994, p. 46, pl. 42, fig. 4.
Rugobolivinella elegans (Parr). –HAYWARD, 1990, p. 69, pl. 8, figs 5-6; pl. 17, figs 5-21. –HATTA & UJIIÉ, 1992b, p. 173, pl. 26, fig. 4. –LOEBLICH & TAPPAN, 1994, p. 113, pl. 220, figs 1-6.
Bolivinella philippinensis (McCulloch). –JONES, 1994, p. 46, pl. 42, figs 3, 5.

Superfamily CASSIDULINACEA, d'Orbigny, 1839
Family CASSIDULINIDAE d'Orbigny, 1839
Subfamily CASSIDULININAE, d'Orbigny, 1839
Genus **CASSIDULINA** d'Orbigny, 1826

Cassidulina carinata Silvestri, 1896

pl. 17, figs 1-2

Cassidulina laevigata D'ORBIGNY, 1826, p. 282, pl. 15, figs 4-5. –BRADY, 1884, p. 428, pl. 54, figs 2-3 (ZF 1263).
Cassidulina laevigata var. *carinata* SILVESTRI, 1896, p. 104, pl. 2, fig. 10. –JONES, 1994, p. 60, pl. 54, figs 2-3.
Cassidulina laevigata var. *carinata* CUSHMAN, 1922a, p. 124, pl. 25, figs 6-7. –PHLEGER & PARKER, 1951, p. 27, pl. 14, fig. 7.
Cassidulina neocarinata THALMANN, 1950, p. 44. –UJIIÉ, 1990, p. 38, pl. 18, fig. 6.
Cassidulina carinata Silvestri. –NOMURA, 1983b, p. 51, pl. 4, figs 9-11. –LOEBLICH & TAPPAN, 1994, p. 114, pl. 220, figs 7-12.

Remarks: *C. laevigata* var. *carinata* Cushman and *C. neocarinata* Thalmann are regarded herein as a junior synonyms of *Cassidulina laevigata* var. *carinata* Silvestri.

Cassidulina crassa d'Orbigny, 1839

Cassidulina crassa D'ORBIGNY, 1839c, p. 56, pl. 7, figs 18-20. –BRADY, 1884, p. 429, pl. 54, fig. 4 (not fig. 5) (ZF 1259). –SCHIEBEL, 1992, p. 39, pl. 2, fig. 13. –JONES, 1994, p. 60, pl. 54, fig. 4.

Cassidulina obusta Williamson, 1858

Cassidulina obusta WILLIAMSON, 1858, p. 69, pl. 6, figs 143-144.
Cassidulina crassa d'Orbigny. –BRADY, 1884 (not d'Orbigny, 1839c), p. 429, pl. 54, fig. 5 (not fig. 4).
Cassidulina obusta Williamson. –JONES, 1994, p. 60, pl. 54, fig. 5.

Genus **EVOLVOCASSIDULINA** Eade, 1967

Evolvocassidulina orientalis (Cushman, 1922)

Cassidulina orientalis CUSHMAN, 1922b, p. 129.
Evolvocassidulina orientalis (Cushman). –LOEBLICH & TAPPAN, 1987, p. 505, pl. 555, figs 14-18. –HAYWARD *et al.*, 1999, p. 128, pl. 8, fig. 28.

Genus **GLOBOCASSIDULINA** Voloshinova, 1960

Globocassidulina elegans (Sidebottom, 1910)

Cassidulina elegans SIDEBOTTOM, 1910, p. 106, pl. 4, fig. 1. –VAN MARLE, 1991, p. 115, pl. 9, fig. 16.
Globocassidulina elegans (Sidebottom). –AKIMOTO, 1990, p. 200, pl. 18, fig. 5. –LOEBLICH & TAPPAN, 1994, p. 115, pl. 223, figs 1-6.
Islandiella elegans (Sidebottom). –UJIIÉ, 1990, p. 37, pl. 19, figs 9-10.

Globocassidulina gemma (Todd, 1954)

Cassidulina gemma TODD in Cushman *et al.*, 1954, p. 366, pl. 90, figs 26-27. –NOMURA, 1983b, p. 22, pl. 2, figs 10-11; pl. 12, figs 9-10; pl. 13, figs 7-12; text-figs 17-18.
Globocassidulina gemma (Todd). –BELFORD, 1966, p. 147, pl. 24, figs 22-25. –AKIMOTO, 1990, p. 200, pl. 18, figs 8, 11-12. –LOEBLICH & TAPPAN, 1994, p. 115, pl. 223, figs 9-10.

Globocassidulina minima (Saidova, 1975)

Smyrnela crassa (d'Orbigny) var. *minima* SAIDOVA, 1975, p. 333, pl. 88, fig. 7.
Globocassidulina minima (Saidova). –LOEBLICH & TAPPAN, 1994, p. 115, pl. 224, figs 10-15.

Globocassidulina subglobosa (Brady, 1881)

pl. 16, figs 16-17

Cassidulina subglobosa BRADY, 1881, p. 60. –BRADY, 1884, p. 430, pl. 54, fig. 17 (ZF 1267-68).
Globocassidulina subglobosa (Brady). –LOEBLICH & TAPPAN, 1987, p. 505, pl. 557, figs 18-23. –UJIIÉ, 1990, p. 39, pl. 21, figs 4-7; pl. 22, fig. 1. –VAN MARLE, 1991, p. 120, pl. 10, figs 10-11. –JONES, 1994, p. 60, pl. 54, fig. 17.

Genus **ISLANDIELLA** Nørvang, 1959

Islandiella japonica (Asano & Nakamura, 1937)

pl. 17, figs 3-5

Cassidulina japonica ASANO & NAKAMURA, 1937, p. 144, pl. 13, figs 1-2. –ASANO, 1951c, p. 1, figs 3-4.
Islandiella japonica (Asano & Nakamura). –NOMURA, 1983b, p. 2, pl. 1, figs 1-2; pl. 6, fig. 1; pl. 10, figs 4-10. –LOEBLICH & TAPPAN, 1994, p. 116, pl. 225, figs 6-8.

Genus **LERNELLA** Saidova, 1975

Lernella inflata (LeRoy, 1944)

pl. 16, figs 18-20

Cassidulina inflata LEROY, 1944, p. 37, pl. 4, figs 30-31.
Lernella inflata (LeRoy). –NOMURA, 1983a, p. 86, pl. 2, fig. 9; pl. 24, figs 4-5; text-figs 51-53. –AKIMOTO, 1990, p. 203. –LOEBLICH & TAPPAN, 1994, p. 116, pl. 226, figs 1-12.

Genus **PARACASSIDULINA** Nomura, 1983

Paracassidulina minuta (Cushman, 1933)

Cassidulina minuta CUSHMAN, 1933b, p. 92, pl. 10, fig. 3. –TODD, 1965, p. 43, pl. 17, fig. 3.
Paracassidulina minuta (Cushman). –LOEBLICH & TAPPAN, 1994, p. 116, pl. 223, figs 7-8.

Subfamily EHRENBERGININAE Cushman, 1927
Genus **EHRENBERGINA** Reuss, 1850

Ehrenbergina undulata Parker, 1953

pl. 17, fig. 6

Ehrenbergina undulata PARKER in Phleger *et al.*, 1953, p. 46, pl. 10, figs 14-16. –SCHIEBEL, 1992, p. 43, pl. 2, fig. 16.

Superfamily TURRILINACEA T.R. Cushman, 1927
Family STAINFORTHIIDAE Reiss, 1963
Genus **CASSIDELINA** Saidova, 1975

Cassidelina complanata (Egger, 1893)

Virgulina schreibersiana Cžjžek. –BRADY, 1884 (not Cžjžek, 1848), p. 414, pl. 52, figs 1-3 (ZF 2618).
Virgulina schreibersiana var. *complanata* EGGER, 1893, p. 292, pl. 8, figs 91-92.
Virgulina complanata Egger. –CUSHMAN, 1937c, p. 26, pl. 4, figs 13-17. –CUSHMAN, 1942, p. 13, pl. 4, figs 2-5.
Stainforthia complanata (Egger). –MCCULLOCH, 1977, p. 250, pl. 104, fig. 16. –WANG *et al.*, 1988, p. 152, pl. 21, figs 17-19.
Fursenkoina complanata (Egger). –VAN MARLE, 1991, p. 181. –JONES, 1994, p. 56, pl. 52, figs 1-3.
Cassidelina complanata (Egger). –LOEBLICH & TAPPAN, 1994, p. 117, pl. 230, figs 1-10.

Cassidelina regina (Zhang, 1988)

Stainforthia ? regina ZHANG in Wang *et al.*, 1988, p. 152, pl. 21, figs 20-21.

Cassidelina subcapitata (Zheng, 1979)

pl. 17, fig. 7

Brizalina subcapitata ZHENG, 1979, p. 160, pl. 15, fig. 15.
Brizalina capitata (Cushman). –HATTA & UJIIÉ, 1992b (non *Bolivina capitata* Cushman, 1933a), p. 172, pl. 25, figs 9-11.
Cassidelina subcapitata (Zheng). –LOEBLICH & TAPPAN, 1994, p. 118, pl. 229, figs 8-12.

Superfamily BULIMINACEA T.R. Jones, 1875
Family SIPHOGENERINOIDIDAE Saidova, 1981
Subfamily SIPHOGENERINOIDINAE Saidova, 1981
Genus **EULOXOSTOMUM** McCulloch, 1977

Euloxostomum alata (Seguenza, 1862)

Vulvulina alata SEGUENZA, 1862b, p. 115, pl. 2, figs 5-5a.
Bolivina beyrichi Reuss var. *alata* (Seguenza). –BRADY, 1884, p. 422, pl. 53, fig. 4 (not figs 2-3) (ZF 1174).
Bolivina alata (Seguenza). –CUSHMAN, 1937c, p. 106, pl. 13, figs 3-11. –TU & ZHENG, 1991, p. 177, pl. 3, fig. 17.
Brizalina alata (Seguenza). –VAN MARLE, 1991, p. 166, pl. 17, figs 1-2. –JONES, 1994, p. 58, pl. 53, fig. 4 (not figs 2-3).
Euloxostomum pseudobeyrichi (Cushman). –LOEBLICH & TAPPAN, 1994, p. 118, pl. 231, figs 15-16.

Key features: Test elongate, compressed; periphery keeled, spinose; chambers rapidly increasing in width and gradually in height, slightly inflated; sutures depressed, limbate; aperture elongate, narrow, with a tooth; wall finely perforated, smooth.

Remarks: Differs from *E. pseudobeyrichi* (Cushman) in being broader and having larger and better developed peripheral keel. *E. alata* is often considered as variety of *E. pseudobeyrichi,* but according to van Marle (1991) should be differentiated.

Euloxostomum bradyi (Asano, 1938)

Bolivina beyrichi Reuss. –BRADY, 1884 (not Reuss, 1851), p. 422, pl. 53, fig. 1.
Bolivina bradyi ASANO, 1938b, p. 603 pl. 16, fig. 2.
Loxostomum instabile CUSHMAN & MCCULLOCH, 1942, p. 221, pl. 27, figs 15-17; pl. 28, figs 1-7.
Loxostomum bradyi (Asano). –UCHIO, 1960, p. 64, pl. 7, fig. 9.
Brizalina pseudobeyrichi (Cushman). –VAN MARLE, 1991, p. 170, pl. 17, fig. 7.
Euloxostoma bradyi (Asano). –JONES, 1994, p. 58, pl. 53, fig. 1.

Remarks: Following van Marle's (1991) opinion *Bolivina bradyi* Asano and *B. bramletti* Kleinpell are considered to be 'ecological' varieties of *B. pseudobeyrichi* Cushman.

Euloxostomum pseudobeyrichi (Cushman, 1926)

pl. 17, figs 9-10

Bolivina beyrichi Reuss var. *alata* (Seguenza). –BRADY, 1884 (non *Vulvulina alata* Seguenza, 1862b), p. 422, pl. 53, figs 2-3 (not fig. 4). –CUSHMAN, 1911, p. 35, text-fig. 57.
Bolivina pseudobeyrichi CUSHMAN, 1926c, p. 45. –CUSHMAN, 1937c, p. 139, pl. 19, figs 4-5.
Brizalina pseudobeyrichi (Cushman). –VAN MARLE, 1991, p. 170, pl. 17, figs 6 (not fig. 7).
Brizalina alata (Seguenza). –JONES, 1994, p. 58, pl. 53, figs 2-3 (not fig. 4).
Euloxostomum pseudobeyrichi (Cushman). –LOEBLICH & TAPPAN, 1994, p. 118, pl. 231, figs 9-12 & 17-23.

Key features: Test elongate, compressed, gradually increasing in width and height of chambers; periphery keeled; chambers slightly inflated; sutures depressed, oblique; wall coarsely perforated; aperture oval, with a small lip.

Genus **HOPKINSINELLA** Bermúdez & Fuenmayor, 1966

Hopkinsinella glabra (Millett, 1903)

Uvigerina auberiana d'Orbigny var. *glabra* MILLETT, 1903, p. 268, pl. 5, figs 8-9.
Hopkinsinella glabra (Millett). –LOEBLICH & TAPPAN, 1994, p. 118, pl. 232, figs 1-11.

Genus **LOXOSTOMINA** Sellier de Civrieux, 1969

Loxostomina costulata (Cushman, 1922)

Loxostoma limbatum (Brady) var. *costulatum* CUSHMAN, 1922b, p. 26, pl. 3, fig. 8.
Loxostomina costulata (Cushman). –LOEBLICH & TAPPAN, 1994, p. 119, pl. 232, figs 12-16.

Loxostomina mayori (Cushman, 1922)

Bolivina nobilis Hantken. –BRADY, 1884 (not Hantken, 1876), p. 424, pl. 53, figs 14-15 (ZF 1188).
Bolivina mayori CUSHMAN, 1922b, p. 27, pl. 3, figs 5-6.
Loxostoma mayori (Cushman). –CUSHMAN, 1937c, p. 195, pl. 22, figs 16-21. –CUSHMAN, 1942, p. 38, pl. 11, figs 1-2.
Euloxostomum mayori (Cushman). –MCCULLOCH, 1977, p. 262, pl. 106, figs 4-5.
Loxostomina mayori (Cushman). –LOEBLICH & TAPPAN, 1987, p. 516, pl. 567, figs 6-10. –JONES, 1994, p. 58, pl. 53, figs 14-15.

Genus **SAIDOVINA** Haman, 1984

Saidovina amygdalaeformis (Brady, 1881)

pl. 17, figs 11-13

Bolivina amygdalaeformis BRADY, 1881, p. 59. –BRADY, 1884, p. 426, pl. 53, figs 28-29 (ZF 1169).
Loxostomum amygdalaeformis (Brady). –BARKER, 1960, p. 110, pl. 53, figs 28-29.
Saidovina amygdalaeformis (Brady). –JONES, 1994, p. 59, pl. 53, figs 28-29.
Loxostomina mayori (Cushman). –LOEBLICH & TAPPAN, 1994 (non *Bolivina mayori* Cushman, 1922), p. 119, pl. 233, figs 9-14.

Saidovina carinata (Millett, 1900)

Bolivina karreriana Brady var. *carinata* MILLETT, 1900, p. 546, pl. 4, fig. 8.
Saidovina carinata (Millett). –LOEBLICH & TAPPAN, 1994, p. 121, pl. 237, figs 1-8.

Saidovina subangularis (Brady, 1881)

Bolivina subangularis BRADY, 1881, p. 59. –BRADY, 1884, p. 427, pl. 53, figs 32-33 (ZF 1197). –CUSHMAN, 1937c, p. 133, pl. 17, figs 5-10.
Bolivinita subangularis (Brady). –BARKER, 1960, p. 110, pl. 53, figs 32-33. –VAN MARLE, 1991, p. 83, pl. 6, figs 7-8.
Saidovina subangularis (Brady). –JONES, 1994, p. 59, pl. 53, figs 32-33.

Subfamily TUBULOGENERININAE Saidova, 1981
Genus **ALLASSOIDA** Loeblich & Tappan 1994

Allassoida virgula (Brady, 1879)

pl. 17, fig. 14

Sagrina virgula BRADY, 1879b, p. 275, pl. 8, figs 19-21. –BRADY, 1884, p. 583, pl. 76, figs 4-7 (not figs 8-10) (ZF 3361).
Siphogenerina virgula (Brady). –CUSHMAN, 1924, p. 29, pl. 8, figs 3-4.
Rectobolivina virgula (Brady). –HOFKER, 1951, p. 93, text-fig. 52.

Siphogenerina sp. nov. –JONES, 1994, p. 87, pl. 76, figs 4-7.
Allassoida virgula (Brady). –LOEBLICH & TAPPAN, 1994, p. 121, pl. 238, figs 1-11.

Genus **SAGRINA** d'Orbigny, 1839

Sagrina jugosa (Brady, 1884)

pl. 17, fig. 15

Textularia jugosa BRADY, 1884, p. 358, pl. 42, fig. 7.
Sagrinella jugosa (Brady). –JONES, 1994, p. 47, pl. 42, fig. 7.
Sagrina jugosa (Brady). –LOEBLICH & TAPPAN, 1994, p. 122, pl. 237, figs 12-17.

Sagrina zanzibarica (Cushman, 1936)

Bolivina zanzibarica CUSHMAN, 1936a, p. 58, pl. 8, fig. 12.
Sagrina zanzibarica (Cushman). –LOEBLICH & TAPPAN, 1994, p. 122, pl. 238, figs 12-17.

Genus **SIPHOGENERINA** Schlumberger, in Milne-Edwards, 1882

Siphogenerina columellaris (Brady, 1881)

Sagrina columellaris BRADY, 1881, p. 64. –BRADY, 1884, p. 581, pl. 75, figs 15-17 (ZF 2347).
Rectobolivina columellaris (Brady). –HOFKER, 1951, p. 68, text-figs 33-35. –VAN MARLE, 1991, p. 94, pl. 6, figs 12-13.
Siphogenerina columellaris (Brady). –JONES, 1994, p. 87, pl. 75, figs 15-17.

Siphogenerina raphana (Parker & Jones, 1865)

pl. 17, fig. 18

Uvigerina (Sagrina) raphanus PARKER & JONES, 1865, p. 364, pl. 18, figs 16-17.
Sagrina raphanus (Parker & Jones). –BRADY, 1884, p. 585, pl. 75, figs 21-22 (not figs 23-24) (ZF 2353).
Siphogenerina raphanus (Parker & Jones). –CUSHMAN, 1913a, p. 108, pl. 46, figs 1-5. –HADA, 1931, p. 134, text-fig. 91. –JONES, 1994, p. 87, pl. 75, figs 21-22.
Siphogenerina raphana (Parker & Jones). –CUSHMAN, 1942, p. 55, pl. 15, figs 6-9. –ASANO, 1958, p. 30, pl. 7, figs 9-10. –LOEBLICH & TAPPAN, 1994, p. 123, pl. 240, figs 1-11.
Rectobolivina raphana (Parker & Jones). –HATTA & UJIIÉ, 1992b, p. 174, pl. 26, figs 11-12.

Siphogenerina striata var. curta Cushman, 1926

Sagrina striata (Schwager). –BRADY, 1884 (non *Dimorphina striata* Schwager, 1866), p. 584, pl. 75, figs 25-26.
Siphogenerina striata Schwager var. *curta* CUSHMAN, 1926a, p. 8, pl. 2, fig. 5. –JONES, 1994, p. 87, pl. 75, figs 25-26.

Siphogenerina striatula Cushman, 1913

pl. 17, figs 16-17

Siphogenerina striatula CUSHMAN, 1913a, p. 108, pl. 47, fig. 1. –CUSHMAN, 1926a, p. 10, pl. 1, fig. 10. –LOEBLICH & TAPPAN, 1994, p. 123, pl. 241, figs 10-18.

Family BULIMINIDAE T.R. Jones, 1875
Genus **BULIMINA** d'Orbigny, 1826

Bulimina aculeata d'Orbigny, 1826

pl. 17, fig. 19

Bulimina aculeata D'ORBIGNY, 1826, p. 269. –BRADY, 1884, p. 406, pl. 51, figs 7-9 (ZF 1203). –HADA, 1931, p. 127, text-fig. 84. –PHLEGER & PARKER, 1951, p. 15, pl. 7, fig. 23. –VAN MORKHOVEN *et al.*, 1986, p. 31, pl. 7, figs 1-3. –WANG *et al.*, 1988, p. 151, pl. 21, fig. 5. –AKIMOTO, 1990, p. 193, pl. 16, fig. 5; pl. 22, fig. 9. –UJIIÉ, 1990, p. 30, pl. 12, fig. 5 (not fig. 6). –VAN MARLE, 1991, p. 84, pl. 5, figs 3-5. –JONES, 1994, p. 56, pl. 51, figs 7-9.
Bulimina acaenapeza LOEBLICH & TAPPAN, 1994, p. 123, pl. 243, figs 1-6.

Remarks: Most of the SCS specimens referred to *Bulimina aculeata* d'Orbigny have initial half of test covered with dense and strong spines of varying length.
According to Hayward *et al.* (1999) it is important to differentiate between forms revised by Loeblich & Tappan (1994) and recently named *Bulimina acaenapeza* and incorrectly referred by Brady (1884) to *B. aculeata* and true *B. aculeata* d'Orbigny, since this two occupy substrates at different water depths. Van Morkhoven *et al.* (1986) speculated whether *B. aculeata* (sensu Brady) could be a deeper-water ecophenotype of *B. marginata* d'Orbigny.

Bulimina affinis d'Orbigny, 1839

pl. 18, fig. 1

Bulimina affinis D'ORBIGNY, 1839a, p. 109, pl. 2, figs 25-26. –BRADY, 1884, p. 400, pl. 50, fig. 14 (ZF 1205). –CUSHMAN, 1911, p. 79, text-fig. 130. –PHLEGER & PARKER, 1951, p. 15, pl. 7, figs 21-22. –LOEBLICH & TAPPAN, 1994, p. 124, pl. 240, figs 12-13.
Praeglobobulimina pupoides (d'Orbigny). –JONES, 1994 (non *Bulimina pupoides* d'Orbigny, 1846), p. 55, pl. 50, fig. 14.

Bulimina elongata d'Orbigny, 1846

Bulimina elongata D'ORBIGNY, 1846, p. 187, pl. 11, figs 19-20. –BRADY, 1884, p. 401, pl. 51, figs 1-2. –JONES, 1994, p. 55, pl. 51, figs 1-2. –HAYWARD *et al.*, 1999, p. 132, pl. 9, figs 6-7.

Bulimina marginata d'Orbigny, 1826

pl. 18, figs 2-5

Bulimina marginata D'ORBIGNY, 1826, p. 269, pl. 12, figs 10-12. –BRADY, 1884, p. 405, pl. 51, figs 3-5 (ZF 1219). –CUSHMAN, 1922a, p. 91, pl. 21, figs 4-5. –VAN MORKHOVEN *et al.*, 1986, p. 18, pl. 2, fig. 1. –VAN MARLE, 1991, p. 87, pl. 5, figs 9-10. –JONES, 1994, p. 55, pl. 51, figs 3-5. –LOEBLICH & TAPPAN, 1994, p. 124, pl. 242, figs 1-4.

Bulimina marginata d'Orbigny var. *marginata* d'Orbigny. –HAYWARD *et al.*, 1999, p. 133, pl. 9, figs 13-15.

Bulimina mexicana Cushman, 1922

pl. 17, fig. 20

Bulimina inflata Seguenza. –BRADY, 1884 (not Seguenza, 1862b), p. 406, pl. 51, figs 10, 12 (not figs 11, 13) (ZF 1217). –CUSHMAN, 1921, p. 160, pl. 31, fig. 6.

Bulimina inflata Seguenza var. *mexicana* CUSHMAN, 1922a, p. 95, pl. 21, fig. 2.

Bulimina striata d'Orbigny var. *mexicana* Cushman. –PHLEGER & PARKER, 1951, p. 16, pl. 7, figs 26, 32.

Bulimina mexicana Cushman. –VAN MORKHOVEN *et al.*, 1986, p. 59, pl. 19, figs 1-4. –JONES, 1994, p. 56, pl. 51, figs 10, 12 (not figs 11, 13).

Bulimina striata var. *mexicana* Cushman & Parker. –WANG *et al.*, 1988, p. 150, pl. 21, figs 3, 8. –TU & ZHENG, 1991, p. 178, pl. 3, fig. 4.

Bulimina rostrata Brady, 1884

Bulimina rostrata BRADY, 1884, p. 408, pl. 51, figs 14-15 (ZF 1226). –WANG *et al.*, 1988, p. 150, pl. 21, figs 9-10. –AKIMOTO, 1990, p. 194, pl. 16, fig. 7. –JONES, 1994, p. 56, pl. 51, figs 14-15.

Bulimina alazanensis Cushman. –VAN MARLE, 1991, p. 85, pl. 5, figs 1-2.

Remarks: The SCS specimens resambles closely holotypes from Challenger Collection (collection no. ZF 1226), but those figured in the Challenger Report do not illustrate this species well. Forms referred by van Marle (1991) to *B. alazanensis* Cushman closely resemble *B. rostrata* Brady.

Bulimina striata d'Orbigny, 1826

pl. 18, fig. 6

Bulimina striata D'ORBIGNY, 1826, p. 269.

Bulimina inflata Seguenza. –BRADY, 1884 (not Seguenza, 1862b), p. 406, pl. 51, figs 11, 13 (not figs 10, 12).

Bulimina striata var. *notoensis* Asano. –WANG *et al.*, 1988, p. 150, pl. 21, fig. 4.

Bulimina striata d'Orbigny. –AKIMOTO, 1990, p. 194, pl. 16, fig. 8. –VAN MARLE, 1991, p. 88, pl. 5, figs 6-8. –LOEBLICH & TAPPAN, 1994, p. 125, pl. 242, figs 8-14.

Bulimina mexicana Cushman. –JONES, 1994, p. 56, pl. 51, figs 11, 13 (not figs 10, 12).

Genus **GLOBOBULIMINA** Cushman, 1927

Globobulimina pacifica Cushman, 1927

Bulimina pyrula d'Orbigny. –BRADY, 1884 (not d'Orbigny, 1846), p. 399, pl. 50, figs 7-10 (ZF 1222).

Globobulimina pacifica CUSHMAN, 1927a, p. 67, pl. 14, fig. 12. –HOFKER, 1951, p. 260, text-fig. 173. –WANG *et al.*, 1988, p. 151, pl. 21, fig. 11. –AKIMOTO, 1990, p. 199, pl. 16, fig. 9. –VAN MARLE, 1991, p. 90, pl. 5, figs 11-12. –JONES, 1994, p. 54, pl. 50, figs 7-10. –LOEBLICH & TAPPAN, 1994, p. 125, pl. 243, figs 13-16.

Genus **PRAEGLOBOBULIMINA** Hofker, 1951

Praeglobobulimina ovata (d'Orbigny, 1846)

Bulimina ovata D'ORBIGNY, 1846, p. 185, pl. 11, figs 13-14. –BRADY, 1884, p. 400, pl. 50, fig. 13 (ZF 1220).

Praeglobobulimina ovata (d'Orbigny). –JONES, 1994, p. 54, pl. 50, fig. 13. –YASSINI & JONES, 1995, p. 148, figs 573-574.

Praeglobobulimina spinescens (Brady, 1884)

pl. 18, figs 7-8

Bulimina pyrula d'Orbigny var. *spinescens* BRADY, 1884, p. 400, pl. 50, figs 11-12 (ZF 1225). –CUSHMAN & PARKER, 1947, p. 124, pl. 28, figs 30-31.

Praeglobobulimina spinescens (Brady). –HOFKER, 1951, p. 249, text-figs 165-167. –LOEBLICH & TAPPAN, 1987, p. 521, pl. 571, figs 13-16. –WANG *et al.*, 1988, p. 153, pl. 21, fig. 22. –VAN MARLE, 1991, p. 91, pl. 5, figs 15-16. –JONES, 1994, p. 54, pl. 50, figs 11-12. –LOEBLICH & TAPPAN, 1994, p. 125, pl. 240, figs 16-17.

Family ORTHOPLECTIDAE Loeblich & Tappan, 1984
Genus **FLORESINA** Revets, 1990

Floresina philippinensis (McCulloch, 1977)

Buliminella philippinensis MCCULLOCH, 1977, p. 242, pl. 103, fig. 30.

Floresina philippinensis (McCulloch). –LOEBLICH & TAPPAN, 1994, p. 126, pl. 245, figs 7-12.

Family UVIGERINIDAE Haeckel, 1894
Subfamily UVIGERININAE Haeckel, 1894
Genus **NEOUVIGERINA** Thalmann, 1952

Neouvigerina ampullacea (Brady, 1884)

Uvigerina asperula Cžjžek var. *ampullacea* BRADY, 1884, p. 579, pl. 75, figs 10-11 (ZF 2569).

Uvigerina ampullacea Brady. –CUSHMAN, 1921, p. 274, pl. 55, fig. 7. –SAIDOVA, 1975, pl. 82, figs 14-15.
Neouvigerina ampullacea (Brady). –HOFKER, 1951, p. 208, text-figs 135-138. –LOEBLICH & TAPPAN, 1987, p. 524, pl. 573, figs 14-17. –HATTA & UJIIÉ, 1992b, p. 175, pl. 27, fig. 5. –LOEBLICH & TAPPAN, 1994, p. 126, pl. 246, figs 9-19.
Siphouvigerina ampullacea (Brady). –JONES, 1994, p. 86, pl. 75, figs 10-11.

Neouvigerina interrupta (Brady, 1879)

pl. 18, fig. 9

Uvigerina interrupta BRADY, 1879b, p. 274, pl. 6, figs 17-18. –BRADY, 1884, p. 580, pl. 75, figs 12-14 (ZF 2574).
Neouvigerina interrupta (Brady). –HOFKER, 1951, p. 213, text-fig. 139. –LOEBLICH & TAPPAN, 1994, p. 126, pl. 246, figs 5-8.
Siphouvigerina interrupta (Brady). –BELFORD, 1966, p. 86, pl. 8, figs 9-11. –JONES, 1994, p. 87, pl. 75, figs 12-14.

Neouvigerina proboscidea (Schwager, 1866)

pl. 18, fig. 10

Uvigerina proboscidea SCHWAGER, 1866, p. 250, pl. 7, fig. 96. –VAN MORKHOVEN *et al.*, 1986, p. 28, pl. 6, figs 1-4. –BORSETTI *et al.*, 1986, p. 218, pl. 12, figs 1-4. –UJIIÉ, 1990, p. 32, pl. 13, figs 10-11. –VAN MARLE, 1991, p. 106, pl. 8, figs 12-14.
Neouvigerina proboscidea (Schwager). –SRINIVASAN & SHARMA, 1980, p. 52, pl. 7, fig. 21. –HAYWARD *et al.*, 1999, p. 134, pl. 9, fig. 22.

Key features: Test small, elongate; usually two and half times as long as broad; chambers in initial triserial portion closely arranged, followed by biserial and uniserial portion; chambers inflated with depressed sutures; terminal aperture on long neck with lip; test covered with fine spines.

Remarks: *N. proboscidea* differs from *U. canariensis* d'Orbigny by having more inflated and loosely arranged chambers in biserial portion and test coarsely covered with spines.

Genus **UVIGERINA** d'Orbigny, 1826

Uvigerina* ex gr. *auberiana d'Orbigny, 1839

pl. 18, figs 11-12

Uvigerina auberiana D'ORBIGNY, 1839a, p. 106, pl. 2, figs 23-24.
Uvigerina asperula Czjžek var. *auberiana* d'Orbigny. –BRADY, 1884, p. 579, pl. 75, fig. 9 (ZF 2566).
Uvigerina asperula Czjžek. –BRADY, 1884 (not Czjžek, 1848), p. 578, pl. 75, figs 6-8. –UJIIÉ, 1990, p. 31, pl. 13, figs 7-8.
Uvigerina auberiana d'Orbigny. –UCHIO, 1960, p. 65, pl. 7, fig. 11. –JONES, 1994, p. 86, pl. 75, figs 6-9.

Remarks: The SCS specimens vary in length and density of spines, but generally in the size, morphological features of the test and the depth range they resemble *Uvigerina hispida* Schwager. They differ in having well developed triserial, biserial and short uniserial part, while most of the specimens assigned to *U. hispida* have well developed triserial stage and poorly developed biserial portion.

Uvigerina* cf. *bassensis Parr, 1950

Uvigerina bassensis PARR, 1950, p. 340, pl. 12, figs 19-20. –YASSINI & JONES, 1995, p. 151, fig. 599.

Uvigerina* cf. *canariensis d'Orbigny, 1839

Uvigerina canariensis D'ORBIGNY, 1839b, p. 138, pl. 1, figs 25-27. –BRADY, 1884, p. 573, pl. 74, figs 1-3 (ZF 2573). –WANG *et al.*, 1988, p. 154, pl. 22, fig. 7; pl. 34, figs 18-20, 25. –VAN MARLE, 1991, p. 99, pl. 8, figs 9-11. –JONES, 1994, p. 85, pl. 74, figs 1-3.

Uvigerina dirupta Todd, 1948

Uvigerina peregrina Cushman var. *dirupta* TODD in Cushman & McCulloch, 1948, p. 267, pl. 43, fig. 3. –UJIIÉ, 1990, p. 31, pl. 13, figs 4-6. –VAN MARLE, 1991, p. 104, pl. 7, figs 16-17.
Uvigerina dirupta Todd. –WANG *et al.*, 1988, p. 153, pl. 22, figs 1-2. –LOEBLICH & TAPPAN, 1994, p. 128, pl. 250, figs 9-10 (not figs 7-8).

Remarks: Ujiié (1990) speculated whether *U. dirupta* could be a deeper-water ecophenotype of *U. peregrina* d'Orbigny. It is possible that taxonomic differentiation between those two is based on an artificial criteria, but can be useful for paleobathymetric studies.

Uvigerina hispida Schwager, 1866

Uvigerina hispida SCHWAGER, 1866, p. 249, pl. 2, fig. 95. –BORSETTI *et al.*, 1986, p. 216, pl. 11, figs 1-4. –VAN MORKHOVEN *et al.*, 1986, p. 62, pl. 20, figs 1-4. –VAN MARLE, 1991, p. 102, pl. 8, figs 15-16.

Key features: Test elongate; usually two times as long as broad, but some nearly as broad as long; chambers closely arranged; widest at the middle; initial triserial portion with basal spine; biserial part if present consists of one pair of chambers; sutures depressed; terminal aperture on short neck with lip; test covered with short coarse spines.

Remarks: *U. hispida* differs from *U. proboscidea* Schwager by larger size, coarse spines covering test, and short neck.

Uvigerina peregrina Cushman, 1923

pl. 18, fig. 13

Uvigerina peregrina CUSHMAN, 1923, p. 166, pl. 42, figs 7-10. –PHLEGER & PARKER, 1951, p. 18, pl. 8, figs 22, 24-26. –LUTZE, 1986, p. 32, pl. 1, figs 1-6. –UJIIÉ, 1990, p. 31, pl. 13, figs 1-3. –TU & ZHENG, 1991, p. 179, pl. 3, fig. 12. –VAN MARLE, 1991, p. 103, pl. 7, figs 14-15.
Uvigerina peregrina peregrina Cushman. –BORSETTI *et al.*, 1986, p. 224, pl. 15, figs 1-2; pl. 16, figs 1-3.

Remarks: Resembles forms referred by Jones (1994) and Loeblich & Tappan (1994) to *Uvigerina bradyana* Fornasini.

Uvigerina semiornata d'Orbigny, 1846

Uvigerina semiornata D'ORBIGNY, 1846, p. 189, pl. 11, figs 23-24.
Uvigerina semiornata semiornata d'Orbigny. –VON DANIELS, 1986, p. 96, pl. 7, figs 1-5; pl. 8, figs 1-6.

Uvigerina schwageri Brady, 1884

pl. 18, figs 14-16, 17

Uvigerina schwageri BRADY, 1884, p. 575, pl. 74, figs 8-10 (ZF 2579; ZF 2580). –CUSHMAN, 1921, p. 270, pl. 55, figs 3-5. –LEROY, 1941b, p. 82, pl. 1, figs 12, 21.
Euuvigerina schwageri (Brady). –BELFORD, 1966, p. 81, pl. 8, figs 1-5.
Uvigerina schwageri Brady. –TU & ZHENG, 1991, p. 179, pl. 3, fig. 8. –HATTA & UJIIÉ, 1992b, p. 176, pl. 2, fig. 7. –JONES, 1994, p. 85, pl. 74, figs 8-10.
Uvigerina crassicostata Schwager. –VAN MARLE, 1991 (not Schwager, 1866), p. 100, pl. 7, figs 12-13.
Euuvigerina schwageri (Brady). –LOEBLICH & TAPPAN, 1994, p. 128, pl. 249, figs 10-20.

Remarks: In the Sunda Shelf material two different morphotypes of *Uvigerina schwageri* have been observed, that represent probably microspheric and megalospheric generation of this species. More common is one with large test, broad initial coil and widely spaced, elevated longitudinal costae. The other is much smaller and slender with small, sharply pointed initial portion. It has also more narrowly spaced costae.

Uvigerina sp. 1

Key features: Test triserial, small, only 1,5 time as long as broad; chambers inflated; sutures slightly depressed; test ornamented with narrow, longitudinal costae, running the entire length of the test; aperture terminal with short neck.

Remarks: This form differs from *Uvigerina schwageri* Brady in having a delicate, thin, and almost transparent, finely perforated wall; narrower, less elevated and more numerous costae.

Subfamily ANGULOGERININAE Galloway, 1933

Genus **ANGULOGERINA** Cushman, 1927

Angulogerina bradyana Cushman, 1932

Uvigerina angulosa Williamson. –BRADY, 1884 (not Williamson, 1858), p. 576, pl. 74, figs 17-18.
Angulogerina carinata Cushman var. *bradyana* CUSHMAN, 1932b, p. 45, pl. 6, figs 9-10.
Trifarina carinata (Cushman). –JONES, 1994, p. 86, pl. 74, figs 17-18.
Angulogerina bradyana Cushman. –LOEBLICH & TAPPAN, 1994, p. 128, pl. 251, figs 1-5.

Genus **TRIFARINA** Cushman, 1923

Trifarina bradyi Cushman, 1923

Rhabdogonium tricarinatum (d'Orbigny). –BRADY, 1884 (non *Vaginulina tricarinata* d'Orbigny, 1826), p. 525, pl. 67, figs 1-3.
Trifarina bradyi CUSHMAN, 1923, p. 99, pl. 22, figs 3-9. –LOEBLICH & TAPPAN, 1987, p. 526, pl. 574, figs 10-13. –VAN MARLE, 1991, p. 110, pl. 7, figs 8-9. –JONES, 1994, p. 78, pl. 67, figs 1-3. –LOEBLICH & TAPPAN, 1994, p. 128, pl. 251, figs 6-16.

Family REUSSELLIDAE Cushman, 1933
Genus **CHRYSALIDINELLA** Schubert, 1908

Chrysalidinella dimorpha (Brady, 1881)

Chrysalidina dimorpha BRADY, 1881, p. 54. –BRADY, 1884, p. 388, pl. 46, figs 20-21.
Chrysalidinella dimorpha (Brady). –WHITTAKER & HODGKINSON, 1979, p. 57, pl. 4, fig. 14. –LOEBLICH & TAPPAN, 1987, p. 527, pl. 575, figs 3-5. –JONES, 1994, p. 51, pl. 46, figs 20-21. –LOEBLICH & TAPPAN, 1994, p. 129, pl. 252, figs 7-13.

Genus **REUSSELLA** Galloway, 1933

Reussella pulchra Cushman, 1945

Reussella pulchra CUSHMAN, 1945, p. 34, pl. 6, figs 11-12.
Reussella simplex (Cushman). –VAN MARLE, 1991 (non *Trimosina simplex* Cushman, 1929b), p. 92, pl. 6, fig. 3.
Reussella pulchra Cushman. –LOEBLICH & TAPPAN, 1994, p. 129, pl. 253, figs 5-7.

Reussella spinulosa (Reuss, 1850)

pl. 18, figs 18-19

Verneuilina spinulosa REUSS, 1850, p. 374, pl. 47, fig. 12. –BRADY, 1884, p. 384, pl. 47, figs 2-3 (not fig. 1) (ZF 2608).
Reussia spinulosa (Reuss). –HADA, 1931, p. 133, text-fig. 90.
Reussella spinulosa (Reuss). –CUSHMAN, 1942, p. 40, pl. 11, figs 5-8. –JONES, 1994, p. 51, pl. 47, figs 2-3 (not fig. 1).

Family TRIMOSINIDAE Saidova, 1981

Genus **TRIMOSINA** Cushman, 1927

Trimosina multispinata Collins, 1958

Trimosina milletti Cushman var. *multispinata* COLLINS, 1958, p. 391, pl. 4, fig. 12.
Trimosina multispinata Collins. –LOEBLICH & TAPPAN, 1994, p. 129, pl. 253, figs 1-4.

Family PAVONINIDAE Eimer & Fickert, 1899
Genus **ALECTINELLA** Revets, 1996

Alectinella elongata (Millett, 1900)

Bifarina elongata MILLETT, 1900, p. 539, pl. 4, figs 1-2. –CUSHMAN, 1937c, p. 200, pl. 22, fig. 35.
Valvobifarina elongata (Millett). –LOEBLICH & TAPPAN, 1964, p. C654.
Alectinella elongata (Millett). –REVETS, 1996, p. 15, pl. 13, figs 5-9.

Superfamily FURSENKOINACEA Loeblich & Tappan, 1961
Family FURSENKOINIDAE Loeblich & Tappan, 1961
Genus **FURSENKOINA** Loeblich & Tappan, 1961

Fursenkoina pauciloculata (Brady, 1884)

Virgulina pauciloculata BRADY, 1884, p. 414, pl. 52, figs 4-5.
Fursenkoina pauciloculata (Brady). –JONES, 1994, p. 56, pl. 52, figs 4-5. –LOEBLICH & TAPPAN, 1994, p. 131, pl. 256, figs 1-5.

Fursenkoina schreibersiana (Cžjžek, 1848)

Virgulina schreibersiana CŽJŽEK, 1848, p. 147, pl. 13, figs 18-21. –HOFKER, 1951, p. 241, text-figs 160-161. –ASANO, 1958, p. 15, text-figs 1-4.
Fursenkoina schreibersiana (CŽJŽEK). –BELFORD, 1966, p. 136, pl. 9, figs 18-21. –VAN MARLE, 1991, p. 181, pl. 18, figs 15-17. –LOEBLICH & TAPPAN, 1994, p. 131, pl. 257, figs 1-12. –REVETS, 1996, p. 12, pl. 8, figs 5-8.

Genus **NEOCASSIDULINA** McCulloch, 1977

Neocassidulina abbreviata (Heron-Allen & Earland, 1924)

pl. 17, fig. 8

Bolivina limbata Brady var. *abbreviata* HERON-ALLEN & EARLAND, 1924, p. 622, pl. 36, figs 25-27.
Bolivina abbreviata (Heron-Allen & Earland). –CUSHMAN, 1937c, p. 143, pl. 18, figs 34-35. –CUSHMAN, 1942, p. 33, pl. 9, fig. 5.
Brizalina abbreviata (Heron-Allen & Earland). –HATTA & UJIIÉ, 1992b, p. 172, pl. 25, fig. 8.
Neocassidulina abbreviata (Heron-Allen & Earland). –LOEBLICH & TAPPAN, 1994, p. 131, pl. 258, figs 1-7.

Genus **RUTHERFORDOIDES** McCulloch, 1981

Rutherfordoides mexicanus (Cushman, 1922)

Virgulina mexicana CUSHMAN, 1922a, p. 120, pl. 23, fig. 8.
Hastilina mexicana (Cushman). –NOMURA, 1983a, p. 82, pl. 2, fig. 7; pl. 3, fig. 4.
Rutherfordoides mexicanus (Cushman). –LOEBLICH & TAPPAN, 1987, p. 531, pl. 578, figs 10-12. –LOEBLICH & TAPPAN, 1994, p. 131, pl. 257, f. 13-15

Rutherfordoides virga (Nomura, 1983)

Cassidella bradyi (Cushman). –PARKER, 1964 (non *Virgulina bradyi* Cushman, 1922a), p. 624, pl. 99, figs 32-33.
Hastilina virga NOMURA, 1983a, p. 84, pl. 2, fig. 15.
Rutherfordoides virga (Nomura). –LOEBLICH & TAPPAN, 1994, p. 132, pl. 258, figs 8-14.

Order **ROTALIIDA** Lankester, 1885
Superfamily DISCORBACEA Ehrenberg, 1838
Family BAGGINIDAE Cushman, 1927
Genus **BAGGINA** Cushman, 1926b

Baggina indica (Cushman, 1921)

pl. 19, figs 6-7

Pulvinulina hauerii (d'Orbigny). –BRADY, 1884 (non *Rotalina hauerii* d'Orbigny, 1846), p. 690, pl. 106, fig. 6 (not fig. 7).
Pulvinulina indica CUSHMAN, 1921, p. 332.
Cancris indicus (Cushman). –ASANO, 1951e, p. 20, figs 146-147.
Baggina indica (Cushman). –VAN MARLE, 1991, p. 142, pl. 13, figs 9-10. –JONES, 1994, p. 105, pl. 106, fig. 6.

Remarks: Differs from *Baggina bubnanensis* McCulloch in having six chambers in the last whorl instead of eight and less elongated test.

Genus **CANCRIS** Montfort, 1808

Cancris auriculus (Fichtel & Moll, 1798)

pl. 19, figs 1-3

Nautilus auricula var. b FICHTEL & MOLL, 1798, p. 108, pl. 20, figs a-c.
Pulvinulina auricula (Fichtel & Moll). –BRADY, 1884, p. 688, pl. 106, fig. 5 (ZF 2203; ZF 2230). –CUSHMAN, 1921, p. 329, pl. 69, fig. 3.
Cancris auriculus (Fichtel & Moll). –CUSHMAN & TODD, 1942, p. 74, pl. 18, figs 1-11; pl. 23, fig. 6. –TODD, 1965, p. 22, pl. 5, fig. 5. –LOEBLICH & TAPPAN, 1987, p. 545, pl. 591, figs 1-3. –VAN MARLE, 1991, p. 143, pl. 13, figs 11-12. –TU & ZHENG, 1991, p. 181, pl. 9, fig. 8. –HATTA & UJIIÉ, 1992b, p. 179, pl. 29, fig. 4. –JONES, 1994, p. 105, pl. 106, fig. 4. –LOEBLICH & TAPPAN, 1994, p. 134, pl. 265, figs 7-10.

Remarks: Specimens of this species vary in width of the test and the shape of periphery, although grown up specimens are usually twice longer than wide.

Cancris carinatus (Millett, 1904)

pl. 19, fig. 5

Palvinulina oblonga Williamson var. *carinata* MILLETT, 1904, p. 498, pl. 10, fig. 3.
Cancris carinatus (Millett). –CUSHMAN & TODD, 1942, p. 81, pl. 20, figs 6-7. –MCCULLOCH, 1977, p. 343, pl. 136, figs 3, 5, 7. –LOEBLICH & TAPPAN, 1994, p. 134, pl. 266, figs 1-13.

Remarks: Differs from *C. auriculus* (Fichtel & Moll) in nearly circular shape of the test, thicker wall, thick periphery and great umbilical flap covering whole umbilical area.

Cancris oblongus (d'Orbigny, 1839)

pl. 19, fig. 4

Valvulina oblonga D'ORBIGNY, 1839b, p. 136, pl. 1, figs 40-42.
Pulvinulina auriculata (Fichtel & Moll). –BRADY, 1884 (non *Nautilus auricula* var. a, Fichtel & Moll, 1798), p. 688, pl. 106, fig. 5 (ZF 2204).
Cancris oblongus (d'Orbigny). –VAN MARLE, 1991, p. 145, pl. 13, figs 15-16; pl. 14, fig. 1. –JONES, 1994, p. 105, pl. 106, fig. 5. –LOEBLICH & TAPPAN, 1994, p. 134, pl. 265, figs 11-13.

Remarks: Differs from *C. auriculus* (Fichtel & Moll) in poorly developed keel around last chamber, rounded periphery and small umbilical flap partly covering depressed umbilicus.

Genus **VALVULINERIA** Cushman, 1926

Valvulineria minuta (Schubert, 1904)

pl. 19, fig. 8

Discorbina rugosa (d'Orbigny). –BRADY, 1884 (part non *Rosalina rugosa* d'Orbigny, 1839c), p. 652, pl. 91, fig. 4 (ZF 1418).
Discorbina rugosa (d'Orbigny) var. *minuta* SCHUBERT, 1904, p. 420.
Valvulineria minuta (Schubert). –PARKER, 1954, p. 527, pl. 9, figs 4-6.
Rotamorphina minuta (Schubert). –BELFORD, 1966, p. 156, pl. 37, figs 11-15. –UJIIÉ, 1990, p. 42, pl. 15, figs 2-3.
Valvulineria minuta (Schubert). –JONES, 1994, p. 96, pl. 91, fig. 4. –LOEBLICH & TAPPAN, 1994, p. 135, pl. 268, figs 1-3.

Family EPONIDIDAE Hofker, 1951
Subfamily EPONIDINAE Hofker, 1951

Genus **EPONIDES** de Montfort, 1808

Eponides cribrorepandus (Asano & Uchio, 1951)

pl. 19, fig. 12

Pulvinulina repanda (Fichtel & Moll). –BRADY, 1884 (non *Nautilus repandus* Fichtel & Moll, 1798), p. 684, pl. 104, fig. 18.
Poroeponides cribrorepandus ASANO & UCHIO in Asano, 1951e, p. 18, text-figs 134-135.
Cribroeponides cribrorepandus (Asano & Uchio). –JONES, 1994, p. 104, pl. 104, fig. 18.
Eponides cribrorepandus (Asano & Uchio). –LOEBLICH & TAPPAN, 1994, p. 135, pl. 269, figs 1-9. –HAYWARD *et al.*, 1999, p. 138, pl. 9, figs 37-38.

Eponides repandus (Fichtel & Moll, 1798)

pl. 19, figs 9-11

Nautilus repandus FICHTEL & MOLL, 1798, p. 35, pl. 3, figs a-d.
Pulvinulina repanda (Fichtel & Moll) var. *concamerata* (Montagu). –BRADY, 1884, p. 685, pl. 104, fig. 19 (ZF 2245).
Eponides repandus (Fichtel & Moll). –PHLEGER & PARKER, 1951, p. 21, pl. 11, figs 5-6. –LOEBLICH & TAPPAN, 1987, p. 549, pl. 594, figs 1-3. –HATTA & UJIIÉ, 1992b, p. 179, pl. 30, figs 1-2. –JONES, 1994, p. 104, pl. 104, fig. 19. –LOEBLICH & TAPPAN, 1994, p. 136, pl. 268, figs 10-13.

Subfamily RECTOEPONIDINAE Saidova, 1981
Genus **HELENINA** Saunders, 1961

Helenina anderseni (Warren, 1957)

pl. 19, figs 13-15

Pseudoeponides anderseni WARREN, 1957, p. 39, pl. 4, figs 12-15. –TU & ZHENG, 1991, p. 182, pl. 9, fig. 10.
Helenina anderseni (Warren). –WANG *et al.*, 1988, p. 158, pl. 24, figs 1-2. –LOEBLICH & TAPPAN, 1987, p. 553, pl. 599, figs 1-6. –HAYWARD *et al.*, 1999, p. 138, pl. 10, figs 1-3.

Family HELENINIDAE Loeblich & Tappan, 1987
Genus **PSEUDOHELENINA** Collins, 1974

Pseudohelenina cf. *collinsi* (Parr, 1932)

Discorbis collinsi PARR, 1932b, p. 230, pl. 22, fig. 33.
Valvulineria collinsi (Parr). –PARR, 1945, p. 212.
Pseudohelenina collinsi (Parr). –COLLINS, 1974, p. 37, pl. 22, fig. 26. –LOEBLICH & TAPPAN, 1987, p. 553, pl. 600, figs 4-6. –LOEBLICH & TAPPAN, 1994, p. 136, pl. 272, figs 1-4.

Family MISSISSIPPINIDAE Saidova, 1981
Subfamily STOMATORBININAE Saidova, 1981

Genus **STOMATORBINA** Dorreen, 1948

Stomatorbina concentrica (Parker & Jones, 1864)

Pulvinulina concentrica PARKER & JONES in Brady, 1864, p. 470, pl. 48, fig. 14. –BRADY, 1884, p. 686, pl. 105, fig. 1.
Stomatorbina concentrica (Parker & Jones). –HATTA & UJIIÉ, 1992b, p. 180, pl. 27, figs 1-8. –LOEBLICH & TAPPAN, 1994, p. 136, pl. 273, figs 1-7. –HAYWARD *et al.*, 1999, p. 139, pl. 10, figs 7-8.
Mississippina concentrica (Parker & Jones). –JONES, 1994, p. 104, pl. 105, fig. 1.

Subfamily MISSISSIPPININAE Saidova, 1981
Genus **MISSISSIPPINA** Howe, 1930

Mississippina chathamensis McCulloch, 1977

pl. 20, figs 1-2

Mississippina chathamensis MCCULLOCH, 1977, p. 386, pl. 149, figs 2-3. –LOEBLICH & TAPPAN, 1994, p. 136, pl. 272, figs 5-13.

Family NEOEPONIDIDAE Loeblich & Tappan, 1994
Genus **NEOEPONIDES** Reiss, 1960

Neoeponides auberii (d'Orbigny, 1839)

pl. 20, fig. 8

Rosalina auberii D'ORBIGNY, 1839a, p. 94, pl. 4, figs 5, 8.
Discorbina turbo (d'Orbigny). –BRADY, 1884 (non *Rotalia (Trochulina) turbo* d'Orbigny, 1826), p. 642, pl. 87, fig. 8 (ZF 1421).
Neoeponides auberii (d'Orbigny). –JONES, 1994, p. 94, pl. 87, fig. 8.

Neoeponides bradyi Le Calvez, 1974

pl. 20, figs 5-7

Pulvinulina berthelotiana (d'Orbigny). –BRADY, 1884 (non *Rotalina berthelotiana* d'Orbigny, 1839b), p. 701, pl. 106, fig. 1 (ZF 2205).
Neoeponides berthelotianus (d'Orbigny). –BELFORD, 1966, p. 117, pl. 17, figs 1-6. –SAIDOVA, 1975, pl. 63, fig. 3. –JONES, 1994, p. 105, pl. 106, fig. 1.
Neoeponides bradyi LE CALVEZ, 1974, p. 64. –RÖGL & HANSEN, 1984, pl. 7, figs 1-6. –HOTTINGER *et al.*, 1990, p. 337, pl. 1, figs 5-8. –LOEBLICH & TAPPAN, 1994, p. 138, pl. 279, figs 1-9.

Neoeponides procerus (Brady, 1884)

Pulvinulina procera BRADY, 1884, p. 698, pl. 105, fig. 7.
Eponides procerus (Brady). –VAN MARLE, 1991, p. 157.
Neoeponides procerus (Brady). –JONES, 1994, p. 105, pl. 105, fig. 7. –LOEBLICH & TAPPAN, 1994, p. 138, pl. 280, figs 1-4.

Neoeponides **sp. 1**

Key features: Test small, biconvex and trochospiral; 6 chambers in final coil; chambers gradually increasing in size as added, arranged in 2-2,5 whorls; spiral side highly convex with crescentic chambers and strongly oblique, elevated sutures; ventral side convex with subtriangular shape of chambers and radiate, elevated sutures; wall densely and finely perforated; periphery angular; aperture wide interiomarginal extraumbilical slit.

Genus **STREBLOIDES** Bermúdez & Seiglie, 1963

Strebloides advenus (Cushman, 1922)

Discorbina rosacea (d'Orbigny). –BRADY, 1884 (non *Rotalia rosacea* d'Orbigny, 1826), p. 644, pl. 87, fig. 1.
Discorbis advena CUSHMAN, 1922b, p. 40.
Strebloides advenus (Cushman). –LOEBLICH & TAPPAN, 1987, p. 559, pl. 608, figs 1-5. –JONES, 1994, p. 93. pl. 87, fig. 1.

Family ROSALINIDAE Reiss, 1963
Genus **GAVELINOPSIS** Hofker, 1951

Gavelinopsis lobatulus (Parr, 1950)

pl. 20, fig. 3

Discorbina isabelleana (d'Orbigny). –BRADY, 1884 (non *Rosalina isabelleana* d'Orbigny, 1839c), p. 646, pl. 88, fig. 1.
Discorbis lobatulus PARR, 1950, p. 354, pl. 13, figs 23-25.
Gavelinopsis lobatulus (Parr). –VAN MARLE, 1988, p. 143, pl. 2, figs 1-3. –VAN MARLE, 1991, p. 151, pl. 14, figs 10-12.
Gavelinopsis lobatula (Parr). –JONES, 1994, p. 94, pl. 88, fig. 1.

Gavelinopsis praegeri (Heron-Allen & Earland, 1913)

Discorbina praegeri HERON-ALLEN & EARLAND, 1913, p. 122, pl. 10, figs 8-10.
Gavelinopsis praegeri (Heron-Allen & Earland). –HOFKER, 1951, p. 486, text-figs 332-334. –ZHENG, 1980, p. 167, pl. 5, fig. 1. –LOEBLICH & TAPPAN, 1987, p. 560, pl. 608, figs 6-12. –WANG *et al.*, 1988, p. 157, pl. 23, figs 7-11. –UJIIÉ, 1990, p. 33, pl. 14, fig. 6. –LOEBLICH & TAPPAN, 1994, p. 138, pl. 281, figs 1-10. –HAYWARD *et al.*, 1999, p. 140, pl. 10, figs 15-17.

Gavelinopsis translucens (Phleger & Parker, 1951)

pl. 20, fig. 4

"*Rotalia*" *translucens* PHLEGER & PARKER, 1951, p. 24, pl. 12, figs 11-12. –PHLEGER *et al.*, 1953, p. 42, pl. 9, figs 22-23.
Gavelinopsis translucens (Phleger & Parker). –HEß, 1998, p. 81, pl. 15, figs 1-2.

Gavelinopsis sp. 1

Key features: Test biconvex, trochospiral; 7-8 chambers in final coil; chambers gradually increasing in size as added, arranged in 2,5 whorls; on the dorsal side chambers are crescentic and lobate and on the ventral side subtriangular; sutures between chambers and between following coils are deeply depressed and wall finely perforate on both sides; periphery acute; umbilical area open on the ventral side; aperture an interiomarginal slit.

Genus **NEOCONORBINA** Hofker, 1951

Neoconorbina communis Ujiié, 1992

Neoconorbina communis UJIIÉ in Hatta & Ujiié, 1992b, p. 182, pl. 32, fig. 1. –LOEBLICH & TAPPAN, 1994, p. 139, pl. 280, figs 5-9.

Key features: Test trochospiral, convex-concave; 14-16 chambers visible on dorsal side; 4-5 chambers on the ventral side; periphery acute; chambers rapidly increasing in size as added; sutures slightly depressed, strongly curved backwards; wall very delicate, finely perforated on dorsal side; umbilicus covered by umbilical flaps.

Neoconorbina marginata Hofker, 1951

Discorbina orbicularis (Terquem). –BRADY, 1884 (non *Rosalina orbicularis* Terquem, 1876), p. 647, pl. 88, fig. 4 (not figs 5-8).
Neoconorbina marginata HOFKER. –JONES, 1994, p. 94, pl. 88, fig. 4.

Neoconorbina terquemi (Rzehak, 1888)

Discorbina orbicularis (Terquem). –BRADY, 1884 (non *Rosalina orbicularis* Terquem, 1876), p. 647, pl. 88, figs 5-8 (not fig. 4).
Discorbina terquemi RZEHAK, 1888, p. 228.
Neoconorbina terquemi (Rzehak). –VAN MARLE, 1991, p. 147, pl. 14, figs 15-16. –JONES, 1994, p. 94, pl. 88, figs 5-8. –LOEBLICH & TAPPAN, 1994, p. 139, pl. 284, figs 1-12.

Neoconorbina tuberocapitata (Chapman, 1900)

pl. 20, fig. 9

Discorbina tuberocapitata CHAPMAN, 1900, p. 11, pl. 1, fig. 9.
Discorbis tuberocapitata (Chapman). –CUSHMAN, TODD & POST, 1954, p. 359, pl. 89, fig. 16.
Neoconorbina tuberocapitata (Chapman). –TODD, 1965, p. 17, pl. 1, figs 8-9. –HATTA & UJIIÉ, 1992b, p. 183, pl. 32, fig. 3.

Genus **ROSALINA** d'Orbigny, 1826

Rosalina globularis d'Orbigny, 1826

pl. 20, fig. 10

Rosalina globularis D'ORBIGNY, 1826, p. 271, pl. 13, figs 1-4.
Discorbina globularis (d'Orbigny). –BRADY, 1884, p. 643, pl. 86, fig. 13 (not fig. 8). –CUSHMAN, 1915, p. 11, pl. 9, fig. 4.
Rosalina globularis d'Orbigny. –TODD, 1965, p. 11, pl. 3, fig. 4. –LOEBLICH & TAPPAN, 1987, p. 561, pl. 610, figs 1-5; pl. 611, figs 1-3. –JONES, 1994, p. 93, pl. 86, fig. 13. –LOEBLICH & TAPPAN, 1994, p. 140, pl. 286, figs 7-15.

Remarks: *R. globularis* represents attached, immobile mode of live. It is living attached with organic 'glue' to the seaweeds or hard substrates, mainly feeds on diatoms (Kitazato, 1988).

Rosalina vilardeboana d'Orbigny, 1839

Rosalina vilardeboana D'ORBIGNY, 1839c, p. 44, pl. 6, figs 13-15.
Discorbina vilardeboana (d'Orbigny). –BRADY, 1884, p. 645, pl. 86, fig. 9 (not fig. 12) (ZF 1427).
Rosalina vilardeboana d'Orbigny. –TODD, 1965, p. 13, pl. 3, figs 2, 5. –VAN MARLE, 1991, p. 156, pl. 14, figs 13-14. –JONES, 1994, p. 93, pl. 86, fig. 9.

Genus **TRETOMPHALOIDES** Banner, Pereira & Desai, 1985

Tretomphaloides concinnus (Brady, 1884)

Discorbina concinna BRADY, 1884, p. 646, pl. 90, figs 7-8.
Tretomphalus concinnus (Brady). –CUSHMAN, 1934, p. 96, pl. 11, figs 8-9; pl. 12, figs 13-15. –LOEBLICH & TAPPAN, 1987, p. 562, pl. 613, figs 1-6. –JONES, 1994, p. 96, pl. 90, figs 7-8. –LOEBLICH & TAPPAN, 1994, p. 140, pl. 288, figs 1-10.
Rosalina concinna (Brady). –TODD, 1965, p. 10, pl. 4, fig. 3. –HEß, 1998, p. 89, pl. 15, figs 4-5.

Family SPHAEROIDINIDAE Cushman, 1927
Genus **EUSPHAEROIDINA** Ujiié, 1990

Eusphaeroidina inflata Ujiié, 1990

Eusphaeroidina inflata UJIIÉ, 1990, p. 29, pl. 11, figs 6-12. –LOEBLICH & TAPPAN, 1994, p. 141, pl. 289, figs 4-13.

Genus **SPHAEROIDINA** d'Orbigny, 1826

Sphaeroidina bulloides d'Orbigny, 1826

Sphaeroidina bulloides D'ORBIGNY, 1826, p. 267. –BRADY, 1884, p. 620, pl. 84, figs 1-5 (not figs 6-

7) (ZF 2367). –LOEBLICH & TAPPAN, 1987, p. 564, pl. 617, figs 1-6. –HATTA & UJIIÉ, 1992b, p. 184, pl. 33, fig. 4. –JONES, 1994, p. 91, pl. 84, figs 1-5, ? 6-7. –LOEBLICH & TAPPAN, 1994, p. 141, pl. 289, figs 1-3. –HEß, 1998, p. 90, pl. 9, fig. 14.

Remarks: The test morphology of *S. bulloides* varies a lot. According to van Morkhoven *et al.* (1986) it has long list of suspected synonyms including *S. austriaca* d'Orbigny, which occurs in the SCS samples. This form differs from typical *S. bulloides* in very small size of the test and the chambers arrangement, resulting in slightly triangular outline, but herein is grouped together with *S. bulloides*.

Superfamily GLABRATELLACEA Loeblich & Tappan, 1964
Family GLABRATELLIDAE Loeblich & Tappan, 1964
Genus **GLABRATELLA** Dorreen, 1948

Glabratella tabernacularis (Brady, 1881)

Discorbina tabernacularis BRADY, 1881, p. 65. –BRADY, 1884, p. 648, pl. 89, figs 5-7.
Discorbinoides tabernacularis (Brady). –SAIDOVA, 1975, p. 270.
Glabratella tabernacularis (Brady). –JONES, 1994, p. 95, pl. 89, figs 5-7.

Superfamily SIPHONINACEA Cushman, 1927
Family SIPHONINIDAE Cushman, 1927
Subfamily SIPHONININAE Cushman, 1927
Genus **SIPHONINA** Reuss, 1850

Siphonina bradyana Cushman, 1927

pl. 20, figs 12-13

Truncatulina reticulata (Cžjžek). –BRADY, 1884 (non *Rotalina reticulata* Cžjžek, 1848), p. 669, pl. 96, fig. 8 (ZF 2546).
Siphonina bradyana CUSHMAN, 1927c, p. 11, pl. 1, fig. 4. –VAN MARLE, 1991, p. 223, pl. 19, figs 13-14. –JONES, 1994, p. 100, pl. 96, fig. 8. –LOEBLICH & TAPPAN, 1994, p. 143, pl. 298, figs 1-9. –HEß, 1998, p. 90, pl. 14, figs 5-6.

Siphonina tubulosa Cushman, 1924

pl. 20, fig. 11

Truncatulina reticulata (Cžjžek). –BRADY, 1884 (non *Rotalina reticulata* Cžjžek, 1848), p. 669, pl. 96, figs 5-7 (ZF 2545).
Siphonina tubulosa CUSHMAN, 1924, p. 40, pl. 13, figs 1-2. –CUSHMAN, TODD & POST, 1954, p. 361, pl. 89, figs 29-30. –TODD, 1965, p. 22, pl. 15, fig. 4. –LOEBLICH & TAPPAN, 1987, p. 571, pl. 62, figs 13-15. –INOUE, 1989, pl. 21, fig. 4. –VAN MARLE, 1991, p. 224, pl. 19, figs 15-16. –HATTA & UJIIÉ, 1992b, p. 186, pl. 35, figs 1-2. –JONES, 1994, p. 100, pl. 96, figs 5-7. –LOEBLICH & TAPPAN, 1994, p. 144, pl. 299, figs 1-10.

Superfamily DISCORBINELLACEA Sigal, 1952 (in Piveteau)
Family PARRELLOIDIDAE Hofker, 1956
Genus **PARRELLOIDES** Hofker, 1956

Parrelloides bradyi (Trauth, 1918)

pl. 21, fig. 11

Truncatulina dutemplei (d'Orbigny). –BRADY, 1884 (non *Rotalina dutemplei* d'Orbigny, 1846), p. 665, pl. 95, fig. 5 (ZF 2523).
Truncatulina bradyi TRAUTH, 1918, p. 235.
Cibicidoides bradyi (Trauth). –PARKER, 1964, p. 624, pl. 100, figs 19, 21-23. –VAN MARLE, 1991, p. 131, pl. 12, figs 14-16.
Parrelloides bradyi (Trauth). –BELFORD, 1966, p. 100, pl. 11, figs 10-19. –VAN MARLE, 1988, p. 148, pl. 3, figs 16-17. –AKIMOTO, 1990, p. 206, pl. 20, fig. 2; pl. 23, fig. 8. –LOEBLICH & TAPPAN, 1994, p. 144, pl. 301, figs 1-9.
Gyroidina bradyi (Trauth). –JONES, 1994, p. 99, pl. 95, fig. 5.

Family Pseudoparrellidae Voloshinova, 1952
Subfamily PSEUDOPARRELLINAE Voloshinova, 1952
Genus **FACETOCOCHLEA** Loeblich & Tappan, 1994

Facetocochlea pulchra (Cushman, 1933)

pl. 20, figs 14-15

Pulvinulinella pulchra CUSHMAN, 1933b, p. 92, pl. 9, fig. 10.
Pseudoparrella pulchra (Cushman). –COLLINS, 1958, p. 410.
Epistominella pulchra (Cushman). –TODD, 1965, p. 31, pl. 10, figs 3-4. –VAN MARLE, 1991, p. 150, pl. 15, figs 7-9. –HATTA & UJIIÉ, 1992b, p. 187, pl. 36, fig. 2.
Facetocochlea pulchra (Cushman). –LOEBLICH & TAPPAN, 1994, p. 145, pl. 304, figs 1-10.

Genus **POROEPISTOMINELLA** Loeblich & Tappan, 1994

Poroepistominella decoratiformis (McCulloch, 1977)

pl. 20, figs 16-18

Svratkina (?) decoratiformis MCCULLOCH, 1977, p. 410, pl. 159, fig. 5.
Poroepistominella decoratiformis (McCulloch). –LOEBLICH & TAPPAN, 1994, p. 146, pl. 305, figs 1-10.

Genus **PSEUDOPARRELLA** Cushman & Ten Dam, 1948

Pseudoparrella exigua (Brady, 1884)

Pulvinulina exigua BRADY, 1884, p. 696, pl. 103, figs 13-14.
Pseudoparrella exigua (Brady). –PHLEGER & PARKER, 1951, p. 28, pl. 15, fig. 6. –AKIMOTO, 1990, p. 208, pl. 20, fig. 7; pl. 24, fig. 3. –LOEBLICH & TAPPAN, 1994, p. 146, pl. 307, figs 1-7.
Pulvinulinella exigua (Brady). –HOFKER, 1951, p. 322, text-figs 219-221.

Epistominella exigua (Brady). –TODD, 1965, p. 30, pl. 10, fig. 1. –UJIIÉ, 1990, p. 32, pl. 14, fig. 1. –VAN MARLE, 1991, p. 149, pl. 15, figs 4-6. –SCHIEBEL, 1992, p. 44, pl. 5, fig. 9. –HEß, 1998, p. 80, pl. 14, figs 15-16.
Alabaminoides exiguus (Brady). –JONES, 1994, p. 103, pl. 103, figs 13-14.

Family DISCORBINELLIDAE Sigal, 1952 (in Piveteau)
Subfamily DISCORBINELLINAE Sigal, 1952 (in Piveteau)
Genus **DISCORBINELLA** Cushman & Martin, 1935

Discorbinella araucana (d'Orbigny, 1839)

Rosalina araucana D'ORBIGNY, 1839c, p. 44, pl. 6, figs 16-18.
Discorbina araucana (d'Orbigny). –BRADY, 1884, p. 645, pl. 86, figs 10-11.
Discorbinella araucana (d'Orbigny). –JONES, 1994, p. 93, pl. 86, figs 10-11.

Discorbinella bertheloti (d'Orbigny, 1839)

pl. 21, figs 1-3

Rosalina bertheloti D'ORBIGNY, 1839b, p. 135, pl. 1, figs 28-30.
Discorbina bertheloti (d'Orbigny). –BRADY, 1884, p. 650, pl. 89, figs 10-12 (ZF 1384).
Discorbis bertheloti (d'Orbigny). –CUSHMAN, 1931, p. 16, pl. 3, fig. 2.
Discopulvinulina bertheloti (d'Orbigny). –HOFKER, 1951, p. 449.
Discorbinella bertheloti (d'Orbigny). –LOEBLICH & TAPPAN, 1987, p. 577, pl. 630, figs 4-6. –VAN MARLE, 1991, p. 221, pl. 19, figs 11-12. –TU & ZHENG, 1991, p. 180, pl. 10, fig. 2. –JONES, 1994, p. 95, pl. 89, figs 10-12. –LOEBLICH & TAPPAN, 1994, p. 147, pl. 309, figs 13-15. –HAYWARD *et al.*, 1999, p. 152, pl. 14, figs 1-3.

Discorbinella bodjongensis (LeRoy, 1941)

pl. 21, fig. 5

Pulvinulina scabra Brady. –CUSHMAN, 1921 (not Brady, 1884), p. 330, pl. 58, fig. 3.
Discorbis bodjongensis LEROY, 1941b, p. 82, pl. 3, figs 13-15.
Cancris bodjongensis (LeRoy). –BELFORD, 1966, p. 97, pl. 15, figs 6-9. –VAN MARLE, 1991, p. 144, pl. 13, figs 13-14.
Discorbinella bodjongensis (LeRoy). –LOEBLICH & TAPPAN, 1994, p. 148, pl. 310. figs 1-13.

Remarks: Some specimens in Challenger Collection (collection no. ZF 2232, 2233) referred to *Pulvinulina scabra* Brady resembles closely *Discorbinella bodjongensis* (LeRoy).

Discorbinella montereyensis Cushman & Martin, 1935

pl. 21, fig. 4

Discorbinella montereyensis CUSHMAN & MARTIN, 1935, p. 89, pl. 14, fig. 13. –LOEBLICH & TAPPAN, 1987, p. 577, pl. 630, figs 1-3. –LOEBLICH & TAPPAN, 1994, p. 148, pl. 311, figs 1-6.

Remarks: Differs from *Discorbinella bertheloti* (d'Orbigny) in nearly circular outline, having only 4-5 chambers in the last whorl about half of which is occupied with the last chamber.

***Discorbinella* sp. 1**

pl. 21, figs 6-8

Key features: Test small, biconvex, trochospiral; periphery acute, very slightly lobulate, with keel; eight chambers in the last whorl; chambers enlarging rapidly in height, narrow, not inflated; sutures curved, raised on dorsal side; wide and flush with the surface on ventral side; wall finely perforated on both sides; aperture an interiomarginal slit.

Remarks: This form closely resembles *D. bodjongensis* (LeRoy), but differs in smaller size and shape of last chambers, increasing in height as added, but not in width.

Genus **LATICARININA** Galloway & Wissler, 1927

Laticarinina pauperata (Parker & Jones, 1865)

pl. 21, figs 9-10

Pulvinulina repanda (Fichtel & Moll) var. *menardii* (d'Orbigny) subvar. *pauperata* PARKER & JONES, 1865, p. 395, pl. 16, figs 50-51.
Pulvinulina pauperata (Parker & Jones). –BRADY, 1884, pl. 104, figs 3-11 (ZF 2239).
Laticarinina pauperata (Parker & Jones). –UJIIÉ, 1990, p. 33, pl. 14, figs 3-4. –VAN MARLE, 1991, p. 153, pl. 15, figs 13-15. –JONES, 1994, p. 104, pl. 104, figs 3-11. –LOEBLICH & TAPPAN, 1994, p. 148, pl. 312, figs 1-5. –HEß, 1998, p. 83, pl. 9, fig. 13.

Superfamily PLANORBULINACEA Schwager, 1877
Family PLANULINIDAE Bermúdez, 1952
Genus **CIBICIDOIDES** Thalmann, 1939

Cibicidoides cicatricosus (Schwager, 1866)

Anomalina cicatricosa SCHWAGER, 1866, p. 260, pl. 7, fig. 108.
Truncatulina akneriana (d'Orbigny). –BRADY, 1884 (non *Rotalina akneriana* d'Orbigny, 1846), p. 663, pl. 94, fig. 8.
Cibicides cicatricosus (Schwager). –SRINIVASAN & SHARMA, 1980, p. 56, pl. 7, figs 27-29 (CNSC: P 48538).
Cibicidoides cicatricosus (Schwager). –VAN MORKHOVEN *et al.*, 1986, p. 53, pl. 16, fig. 1. –UJIIÉ, 1990, p. 51, pl. 29, fig. 3. –JONES, 1994, p. 98, pl. 94, fig. 8.

Cibicidoides ex gr. *pachyderma* (Rzehak, 1886)

pl. 21, figs 13-14

Truncatulina ungeriana (d'Orbigny). –BRADY, 1884 (non *Rotalina ungeriana* d'Orbigny, 1846), p. 664, pl. 94, fig. 9 (ZF 2555).
Truncatulina pachyderma RZEHAK, 1886, p. 87, pl. 1, fig. 5.
Truncatulina pseudoungeriana CUSHMAN, 1922b, p. 97, pl. 20, fig. 9.
Cibicides pseudoungeriana (Cushman). –CUSHMAN, 1931, p. 123, pl. 22, figs 3-7.
Planulina ungeriana (d'Orbigny). –BELFORD, 1966, p. 121, pl. 10, figs 7-13. –VAN MARLE, 1991, p. 206, pl. 22, figs 11-13.
Cibicidoides ungeriana (d'Orbigny). –BERGGREN & HAQ, 1976, p. 102, pl. 2, figs 1-3.
Cibicidoides pachyderma (Rzehak). –van MORKHOVEN *et al.*, 1986, p. 68, pl. 22, fig. 1. –JONES, 1994, p. 98, pl. 94, fig. 9.
Cibicidoides pseudoungerianus (Cushman). –HEß, 1998, p. 78, pl. 16, figs 1-2.

Key features: Test lenticular, biconvex; spiral side slightly convex, ventral side convex with chambers thinning towards keeled periphery; sutures curved backwards, on ventral side in the last three chambers usually depressed, slightly raised on dorsal side; coarsely perforate on dorsal side and densely but finely perforated on ventral side; aperture an interiomarginal slit with small lip.

Remarks: It is difficult to follow specific differentiation within this genus, therefore forms with test features shortly described above, although assigned by numerous authors to different species are referred herein to *Cibicidoides pachyderma* (Rzehak).
Suspected synonyms: *C. pseudoungerianus* (Cushman) and *C. ungerianus* (d'Orbigny).
There is also great confusion over the genus identity. This form was recorded as *Cibicides*, *Cibicidoides* and *Planulina*. *Cibicidoides* had been revised by van Morkhoven *et al.* (1986).

Cibicidoides robertsonianus (Brady, 1881)

Truncatulina robertsoniana BRADY, 1881, p. 65. –BRADY, 1884, p. 664, pl. 95, fig. 4 (ZF 2547).
Cibicidoides robertsonianus (Brady). –PARKER, 1964, p. 624, pl. 100, figs 26-27. –VAN MORKHOVEN *et al.*, 1986, p. 41, pl. 11, fig. 1; text-fig. 4. –VAN MARLE, 1991, p. 136. –JONES, 1994, p. 99, pl. 95, fig. 4. –HEß, 1998, p. 78, pl. 16, figs 3-4.

Remarks: Characteristic brown colour of the test, angular periphery and larger test allow to distinguish it from *Parrelloides bradyi* (Trauth).

Cibicidoides sp. 1

Key features: Test big, biconvex; 7-8 chambers in the last whorl; chambers in the last whorl inflated; periphery lobulate; sutures slightly depressed on umbilical side and almost radiate; curved backwards on the spiral side; both sides very finely perforate; aperture interiomarginal, extending onto spiral side.
Distinctive feature for this species is the large size of early chambers in final coil on umbilical side and the strongly lobulate periphery.

Genus **CORONATOPLANULINA** Ujiié, 1990

Coronatoplanulina okinawaensis Ujiié, 1990

? *Cibicidoides* sp. 1. –HERMELIN, 1989, p. 87, pl. 17, figs 6-8.
Coronatoplanulina okinawaensis UJIIÉ, 1990, p. 36, pl. 17, fig. 6; text-fig. 2. –HEß, 1998, p. 79, pl. 16, figs 9-10.

Genus **HYALINEA** Hofker, 1951

Hyalinea balthica (Schröter, 1783)

pl. 21, fig. 12

Nautilus balthicus SCHRÖTER, 1783, p. 20, pl. 1, fig. 2.
Operculina ammonoides (Gronovius). –BRADY, 1884 (non *Nautilus ammonoides* Gronovius, 1781), p. 745, pl. 112, figs 1-2 (ZF 2014).
Anomalina balthica (Schroeter). –BOOMGAART, 1949, p. 148, pl. 14, fig. 7.
Hyalinea balthica (Schroeter). –HOFKER, 1951, p. 508, text-figs 345-348. –VAN MARLE, 1991, p. 203, pl. 22, figs 4-5. –JONES, 1994, p. 110, pl. 112, figs 1-2.
Hyalinea florenceae MCCULLOCH, 1977, p. 452, pl. 181, fig. 1. –LOEBLICH & TAPPAN, 1994, p. 148, pl. 313, figs 1-10.

Genus **PLANULINA** d'Orbigny, 1826

Planulina ariminensis d'Orbigny, 1826

Planulina ariminensis D'ORBIGNY, 1826, p. 280, pl. 14, figs 1-3.
Anomalina ariminensis (d'Orbigny). –BRADY, 1884, p. 674, pl. 93, figs 10-11.
Planulina ariminensis d'Orbigny. –JONES, 1994, p. 98, pl. 93, figs 10-11.

Planulina floridana (Cushman, 1918)

Truncatulina floridana CUSHMAN, 1918b, p. 62, pl. 19, fig. 2.
Cibicides floridana (Cushman). –CUSHMAN, 1931, p. 122, pl. 23, figs 3-5.

Cibicides floridanus (Cushman). –TODD, 1965, p. 52, pl. 22, fig. 6.
Planulina floridana (Cushman). –LOEBLICH & TAPPAN, 1994, p. 149, pl. 312, figs 9-14.

Planulina retia Belford, 1966

Planulina retia BELFORD, 1966, p. 122, pl. 11, figs 1-9. –LOEBLICH & TAPPAN, 1994, p. 149, pl. 315, figs 1-11; pl. 316, figs 4-7.

***Planulina* sp. 1**

Key features: Test small; strongly compressed and keeled; 11 chambers in final whorl; chambers gradually increasing in size; last chambers slightly lobulate, but outline generally circular; sutures limbate raised on both sides; both sides evolute; initial chambers visible from both sides; aperture interiomarginal.

Remarks: This form differs from *P. arimiensis* d'Orbigny in having raised sutures on both sides and very fine, hardly visible pores.

Family CIBICIDIDAE Cushman, 1927
Subfamily CIBICIDINAE Cushman, 1927
Genus **CIBICIDES** Montford, 1808

Cibicides deprimus Phleger & Parker, 1951

?*Cibicides pseudoungeriana* (Cushman) var. *io* CUSHMAN, 1931, p. 125, pl. 23, fig. 2.
Cibicides deprimus PHLEGER & PARKER, 1951, p. 29, pl. 15, figs 16-17.

Cibicides kullenbergi Parker, 1953

Cibicides kullenbergi PARKER in Phleger *et al.*, 1953, p. 49, pl. 11, figs 7-8. –BOLTOVSKOY, 1980, p. 165, pl. 1, fig. 13. –VAN MARLE, 1991, p. 197, pl. 21, figs 9-11.
Cibicidoides kullenbergi (Parker). –CORLISS, 1979, p. 10, pl. 3, figs 4-6. –SCHMIEDL, 1995, p. 127, pl. 4, figs 5-6.
Heterolepa kullenbergi (Parker). –BOERSMA, 1984, p. 663, pl. 5, fig. 8.

Cibicides lobatulus (Walker & Jacob, 1798)

Nautilus lobatulus WALKER & JACOB in Kanmacher, 1798, p. 642, pl. 14, fig. 36.
Truncatulina lobatula d'Orbigny. –BRADY, 1884, p. 660, pl. 92, fig. 10; pl. 93, figs 1, 4-5; pl. 115, figs 4-5.
Cibicides lobatulus (Walker & Jacob). –HADA, 1931, p. 141, text-fig. 95. –ASANO, 1951d, p. 17, figs 36-38. –CUSHMAN, TODD & POST, 1954, p. 371, pl. 91, figs 27-28. –VAN MARLE, 1991, p. 198, pl. 21, figs 12-14. –JONES, 1994, p. 97, pl. 92, fig. 10; pl. 93, figs 1, 4-5; pl. 115, figs 4-5.
Lobatula lobatula (Walker & Jacob). –LOEBLICH & TAPPAN, 1987, p. 583, pl. 637, figs 10-13. –LOEBLICH & TAPPAN, 1994, p. 150, pl. 316, figs 8-11; pl. 319, figs 1-7.

Remarks: *Cibicides lobatulus* (Walker & Jacob) shows wide variety in test morphology that depends on the surface to which is attached.
C. lobatulus represents attached, immobile mode of live, is living attached with organic 'glue' to the seaweeds or hard substrates, mainly feed on diatoms (Kitazato, 1988).

Cibicides reflugens de Montfort, 1808

Cibicides reflugens DE MONTFORT, 1808, p. 123.
Truncatulina reflugens (de Monfort). –BRADY, 1884, p. 659, pl. 92, figs 7-9.
Cibicides reflugens de Montfort. –VAN MARLE, 1991, p. 200, pl. 21, figs 15-16; pl. 22, fig. 1. –JONES, 1994, p. 97, pl. 92, figs 7-9. –LOEBLICH & TAPPAN, 1994, p. 149, pl. 318, figs 7-9.

***Cibicides* sp. 1**

Key features: Test usually small, planoconvex to convex-concave; 12 chambers in the last whorl; periphery keeled; sutures on both sides depressed, slightly curved backwards; umbilical area covered by flat plug; spiral side coarsely perforate in contrary to the umbilical side, very finely perforate; aperture interiomarginal.

Genus **DISCORBIA** Sellier de Civrieux, 1977

Discorbia candeiana (d'Orbigny, 1839)

pl. 22, figs 6-7

Rosalina candeiana D'ORBIGNY, 1839a, p. 97, pl. 4, figs 2-4. –LE CALVEZ, 1977, p. 83, fig. 6.
Truncatulina candeiana (d'Orbigny). –CUSHMAN, 1922b, p. 47, pl. 6, figs 7-9.
Discorbina candeiana (d'Orbigny). –SELLIER DE CIVRIEUX, 1977a, p. 18, pl. 4, figs 1-8; pl. 5, figs 1-8; pl. 6, figs 1-9; pl. 14, figs 6-8. –LOEBLICH & TAPPAN, 1994, p. 150, pl. 320, figs 1-10.

Key features: Test small, low-trochospiral; 11-15 chambers visible on dorsal side; 6-7 on the ventral side; periphery lobate, round; chambers bigger as added, inflated in the last coil; sutures depressed, slightly curved backwards; wall very delicate, finely perforated on both sides and transparent; deep umbilicus partly covered by small flaps; aperture interiomarginal slit with tiny lip.

Genus **FONTBOTIA** Gonzales-Donoso & Linares, 1970

Fontbotia wuellerstorfi (Schwager, 1866)

pl. 22, figs 1-2

Anomalina wuellerstorfi SCHWAGER, 1866, p. 258, pl. 7, figs 105-107.

Truncatulina wuellerstorfi (Schwager). –BRADY, 1884, p. 622, pl. 93, figs 8-9 (ZF 2559).
Planulina wuellerstorfi (Schwager). –CUSHMAN, 1931, p. 110, pl. 19, figs 5-6. –VAN MORKHOVEN *et al.*, 1986, p. 48, pl. 14, figs 1-2; text-fig. 11, 13. –VAN MARLE, 1991, p. 207, pl. 22, figs 14-16.
Cibicides wuellerstorfi (Schwager). –LEROY, 1941a, p. 46, pl. 1, figs 27-29. –HOFKER, 1951, p. 350, text-fig. 237. –PARKER, 1964, p. 624, pl. 100, fig. 29. –AKIMOTO, 1990, p. 195, pl. 23, fig. 7.
Fontbotia wuellerstorfi (Schwager). –GONZALES-DONOSO & LINARES, 1970, p. 238, pl. 1, fig. 4. –LOEBLICH & TAPPAN, 1987, p. 583, pl. 634, figs 10-12; pl. 635, figs 1-3. –UJIIÉ, 1990, p. 35, pl. 17, figs 1-5. –LOEBLICH & TAPPAN, 1994, p. 150, pl. 319, figs 7-12.
Cibicidoides wuellerstorfi (Schwager). –JONES, 1994, p. 98, pl. 93, figs 8-9. –HEß, 1998, p. 78, pl. 16, figs 5-7.

Remarks: Recently this form usually is assigned to *Fontbotia* Gonzales-Donoso & Linares or *Cibicidoides* Thalmann, however Jones (1994) regarded *Fontbotia* Gonzales-Donoso & Linares (1970) as junior synonym of *Cibicidoides* Thalmann (1939).

Genus **PARACIBICIDES** Perelis & Reiss, 1975

Paracibicides endomica Perelis & Reiss, 1975

pl. 21, figs 15-16

Paracibicides endomica PERELIS & REISS, 1975, p. 94, pl. 9, figs 5-6; pl. 10, figs 1-6; text-fig. 8. –LOEBLICH & TAPPAN, 1987, p. 584, pl. 634, figs 16-18. –LOEBLICH & TAPPAN, 1994, p. 150, pl. 322, figs 1-3.

Family PLANORBULINIDAE Schwager, 1877
Subfamily CARIBEANELLINAE Saidova, 1981
Genus **CARIBEANELLA** Bermúdez, 1952

Caribeanella philippinensis McCulloch, 1977

pl. 22, figs 3-5

Caribeanella philippinensis MCCULLOCH, 1977, p. 463, pl. 191, figs 1-6. –LOEBLICH & TAPPAN, 1994, p. 151, pl. 324, figs 1-9.

Remarks: Resembles *Cibicides lobatulus* (Walker & Jacob), but differs in having two types of supplementary apertures, one at the inner margin of chambers and second at the outer margin of the chamber periphery.

Subfamily PLANORBULININAE Schwager, 1877
Genus **PLANORBULINA** d'Orbigny, 1826

Planorbulina distoma Terquem, 1876

Planorbulina distoma TERQUEM, 1876, p. 73.
Planorbulina mediterranensis d'Orbigny. –BRADY, 1884 (not d'Orbigny, 1826), p. 656, pl. 92, figs 2-3.
Planorbulina distoma Terquem. –HAYNES, 1973, p. 177, pl. 20, figs 10-12, pl. 21, figs 4, 7-8, text-fig. 36. –JONES, 1994, p. 97, pl. 92, figs 2-3.

Genus **PLANORBULINELLA** Cushman, 1927

Planorbulinella larvata (Parker & Jones, 1865)

pl. 22, fig. 8

Planorbulina vulgaris d'Orbigny var. *larvata* PARKER & JONES, 1865, p. 380, pl. 19, fig. 3.
Planorbulina larvata Parker & Jones. –BRADY, 1884, p. 658, pl. 92, figs 5-6.
Planorbulinella larvata (Parker & Jones). –JONES, 1994, p. 97, pl. 92, figs 5-6. –LOEBLICH & TAPPAN, 1994, p. 152, pl. 327, figs 1-7.

Family CYMBALOPORIDAE Cushman, 1927
Subfamily CYMBALOPORINAE Cushman, 1927
Genus **CYMBALOPORETTA** Cushman, 1928

Cymbaloporetta bradyi (Cushman, 1915)

pl. 22, figs 11-12

Cymbalopora poeyi (d'Orbigny). –BRADY, 1884, p. 637, pl. 102, fig. 14.
Cymbalopora poeyi (d'Orbigny) var. *bradyi* CUSHMAN, 1915, p. 25, pl. 10, fig. 2; pl. 14, fig. 2.
Cymbaloporetta bradyi (Cushman). –VAN MARLE, 1991, p. 201, pl. 23, figs 1-2. –HATTA & UJIIÉ, 1992b, p. 190, pl. 39, fig. 4; pl. 40, fig. 1. –JONES, 1994, p. 102, pl. 102, fig. 14. –LOEBLICH & TAPPAN, 1994, p. 152, pl. 327, figs 8-10; pl. 328, figs 1-3. –YASSINI & JONES, 1995, p. 173, figs 763, 766. –HAYWARD *et al.*, 1999, p. 155, pl. 14, figs 28-29.

Key features: Low trochospiral test, squared in outline; dorsal side slightly convex; ventral side flat with open, depressed umbilicus; chambers bigger as added; first coil regular, but asymmetrically placed, slightly darker (brownish-orange), chambers in following coils varying in shape; periphery rounded; wall finely perforate; apertures along sutures on both sides of each chamber on umbilical side.

Cymbaloporetta squammosa (d'Orbigny, 1839)

pl. 22, figs 9-10

Rosalina squammosa D'ORBIGNY, 1839a, p. 91, pl. 3, figs 12-14.
Cymbalopora poeyi (d'Orbigny). –BRADY, 1884 (non *Rosalina poeyi* d'Orbigny, 1839a), p. 636, pl. 102, fig. 13.
Cymbaloporetta squammosa (d'Orbigny). –CUSHMAN, 1928, p. 7. –SAID, 1949, p. 40, pl. 4, fig. 14. –HOFKER, 1951, p. 484, text-fig. 330. –TODD,

1965, p. 38, pl. 20, fig. 3. –CHENG & ZHENG, 1978, p. 238, pl. 23, figs 4-5. –JONES, 1994, p. 102, pl. 102, fig. 13. –LOEBLICH & TAPPAN, 1994, p. 152, pl. 328, figs 4-8. –YASSINI & JONES, 1995, p. 173, figs 758-761.

Remarks: Differs from *C. bradyi* Cushman in high trochospiral dorsal side, orange-brownish colour of the test, thinner wall and smaller chambers.

Genus **MILLETTIANA** Banner, Pereira & Desai, 1985

Millettiana millettii (Heron-Allen & Earland, 1915)

pl. 22, figs 13-14

Cymbalopora millettii HERON-ALLEN & EARLAND, 1915, p. 689, pl. 51, figs 32-35.
Cymbalopora (Tretomphalus) bulloides (d'Orbigny). –BRADY, 1884 (non *Rosalina bulloides* d'Orbigny, 1839a), p. 638, pl. 102, fig. 9.
Tretomphalus millettii (Heron-Allen & Earland). –CUSHMAN, 1924, p. 36, pl. 11, fig. 4. –TODD, 1965, p. 39, pl. 18, fig. 2.
Cymbaloporetta (Millettiana) millettii (Heron-Allen & Earland). –BANNER, PEREIRA & DESAI, 1985, p. 170, pl. 4, figs 1-10.
Millettiana millettii (Heron-Allen & Earland). –LOEBLICH & TAPPAN, 1987, p. 591, pl. 648, figs 7-11. –HATTA & UJIIÉ, 1992b, p. 191, pl. 40, figs 4, 7. –JONES, 1994, p. 102, pl. 102, fig. 9. –LOEBLICH & TAPPAN, 1994, p. 153, pl. 329, figs 1-12.

Remarks: *M. millettii* represents attached, immobile mode of live in early stage of its life cycle, while at the final stage is forming large float chamber and is known to be planktonic, what helps to extend its distribution (Kitazato, 1988).

Family VICTORIELLIDAE Chapman & Crespin, 1930
Subfamily CARPENTERIINAE Saidova, 1981
Genus **CARPENTERIA** Gray, 1858

Carpenteria balaniformis Gray, 1858

Carpenteria balaniformis GRAY, 1858, p. 269, figs 1-4. –BRADY, 1884, p. 677, pl. 98, figs, 14, 17. –JONES, 1994, p. 101, pl. 98, figs 14, 17. –LOEBLICH & TAPPAN, 1994, p. 153, pl. 330, figs 1-3.

Carpenteria proteiformis Goës, 1882

Carpenteria balaniformis var. *proteiformis* GOËS, 1882, p. 94, pl. 6, figs 208-214; pl. 7, figs 215-219.
Carpenteria proteiformis Goës. –BRADY, 1884, p. 679, pl. 97, figs 8-14. –JONES, 1994, p. 101, pl. 97, figs 8-14.
Biarritzina proteiformis (Goës). –LOEBLICH & TAPPAN, 1987, p. 595, pl. 655, figs 1-5. –HATTA & UJIIÉ, 1992b, p. 191, pl. 41, fig. 1. –LOEBLICH & TAPPAN, 1994, p. 153, 331, figs 4-8.

Subfamily RUPERTININAE Loeblich & Tappan, 1961
Genus **RUPERTINA** Loeblich & Tappan, 1961

Rupertina stabilis (Wallich, 1877)

Rupertia stabilis WALLICH, 1877, p. 501, pl. 20. –BRADY, 1884, p. 680, pl. 98, figs 1-12.
Rupertina stabilis (Wallich). –JONES, 1994, p. 101, pl. 98, figs 1-12.

Superfamily ACERVULINACEA Schultze, 1854
Family ACERVULINIDAE Schultze, 1854
Genus **ACERVULINA** Schultze, 1854

Acervulina inhaerens Schultze, 1854

Acervulina inhaerens SCHULTZE, 1854, p. 68, pl. 6, fig. 12.
Gypsina inhaerens (Schultze). –BRADY, 1884, p. 718, pl. 102, figs 1-6.
Acervulina inhaerens Schultze. –VAN MARLE, 1991, p. 80, pl. 18, fig. 18. –HATTA & UJIIÉ, 1992b, p. 192, pl. 41, fig. 5. –JONES, 1994, p. 102, pl. 102, figs 1-6. –LOEBLICH & TAPPAN, 1994, p. 154, pl. 332, figs 1-5.

Superfamily ASTERIGERINACEA d'Orbigny, 1839
Family EPISTOMARIIDAE Hofker, 1954
Subfamily Epistomariinae Hofker, 1954
Genus **PSEUDOEPONIDES** Uchio, 1950

Pseudoeponides japonicus Uchio, 1950

Pseudoeponides japonicus UCHIO in Kawai *et al.*, 1950, p. 190, fig. 16. –LOEBLICH & TAPPAN, 1987, p. 602, pl. 667, figs 10-12. –LOEBLICH & TAPPAN, 1994, p. 156, pl. 338, figs 1-12.

Subfamily NUTTALLIDINAE Saidova, 1981
Genus **NUTTALLIDES** Finlay, 1939

Nuttallides rugosus (Phleger & Parker, 1951)

pl. 22, figs 15-17

Pseudoparrella (?) rugosa PHLEGER & PARKER, 1951, p. 28, pl. 15, figs 8-9.
Alabamina ? rugosa (Phlegerr & Parker). –UJIIÉ, 1990, p. 49, pl. 29, figs 1-2.
Epistominella rugosa (Phlegerr & Parker). –SCHIEBEL, 1992, p. 45, pl. 5, fig. 10. –HEß, 1998, p. 80, pl. 14, figs 13-14.
Nuttallides rugosus (Phlegerr & Parker). –LOEBLICH & TAPPAN, 1994, p. 156, pl. 350, figs 11-13.

Family AMPHISTEGINIDAE Cushman, 1927
Genus **AMPHISTEGINA** d'Orbigny, 1826

Remarks: *Amphistegina* belongs to symbiont-bearing benthic foraminifera group (Hallock, 1999).

Amphistegina lessoni d'Orbigny, 1826

Amphistegina lessoni D'ORBIGNY, 1826, p. 304, pl. 17, figs 1-4. –BRADY, 1884, p. 740, pl. 111, figs 5-6. –LOEBLICH & TAPPAN, 1987, p. 609, pl. 677, figs 3-5. –VAN MARLE, 1991, p. 80, pl. 21, figs 7-8. –HATTA & UJIIÉ, 1992b, p. 195, pl. 42, fig. 4. –LOEBLICH & TAPPAN, 1994, p. 156, pl. 340, figs 1-9.

Amphistegina lessoni sensu Parker, Jones &Brady. –JONES, 1994, p. 109, pl. 111, figs 5-6 (not figs 2, 4, 7).

Amphistegina papillosa Said, 1949

pl. 23, figs 1-2

Amphistegina radiata (Fichtel & Moll) var. *papillosa* SAID, 1949, p. 39, pl. 4, fig. 12. –CUSHMAN, TODD & POST, 1954, p. 362, pl. 90, figs 5-6. –ZHENG, 1980, p. 170, pl. 5, fig. 9.

Amphistegina papillosa Said. –HATTA & UJIIÉ, 1992b, p. 196, pl. 42, fig. 3. –LOEBLICH & TAPPAN, 1994, p. 157, pl. 339, figs 4-7; pl. 341, figs 1-7. –HAYWARD *et al.*, 1999, p. 157, pl. 15, fig. 7.

Key features: Test low trochospiral, lenticular; chambers strongly curved back; stellate pattern on umbilical side; very thin wall.

Amphistegina radiata (Fichtel & Moll, 1798)

Nautilus radiatus FICHTEL & MOLL, 1798, p. 58, pl. 8, figs a-d.

Amphistegina lessonii d'Orbigny. –BRADY, 1884 (not d'Orbigny, 1826), p. 740, pl. 111, fig. 3. –VAN MARLE, 1991, p. 80, pl. 21, figs 7-8.

Amphistegina lessonii d'Orbigny var. *radiata* (Fichtel & Moll). –HERON-ALLEN & EARLAND, 1915, p. 736.

Amphistegina radiata (Fichtel & Moll). –CUSHMAN, 1924, p. 49, pl. 17, fig. 12. –HOFKER, 1951, p. 444, text-figs 304a-b. –ZHENG, 1980, p. 170, pl. 5, fig. 9. –HATTA & UJIIÉ, 1992b, p. 196, pl. 42, fig. 5; text-figs 1-2. –JONES, 1994, p. 110, pl. 111, fig. 3. –LOEBLICH & TAPPAN, 1994, p. 157, pl. 339, figs 8-11; pl. 341, figs 8-10.

Superfamily NONIONACEA Schultze, 1854
Family NONIONIDAE Schultze, 1854
Subfamily ASTRONONIONINAE Saidova 1981
Genus **ASTRONONION** Cushman & Edwards, 1937

Astrononion novozealandicum Cushman & Edwards, 1937

pl. 23, figs 5-6

Astrononion novozealandicum CUSHMAN & EDWARDS, 1937, p. 35, pl. 3, fig. 18. –HERMELIN, 1989, p. 77, pl. 14, figs 10-11. –UJIIÉ, 1990, p. 42, text-fig. 3. –HEß, 1998, p. 75, pl. 13, fig. 4. –HAYWARD *et. al.*, 1999, p. 157, pl. 15, figs 8-9.

Key features: Test small; 9-10 inflated chambers in the last whorl; periphery rounded; sutures slightly depressed with sutural plates extending from umbilicus and ending with small oval pits in about half way to periphery; interiomarginal aperture.

Remarks: Resembles closely *Bermudezinella profunda* Saidova which differs from *Astrononion novozealandicum* Cushman & Edwards in less compressed test, smaller size and smooth surface like in *Pullenia*. Herein both species are grouped together, because only very fresh specimens can be distinguished from each other.

Astrononion stelligerum (d'Orbigny, 1839)

pl. 23, figs 3-4

Nonionina stelligera D'ORBIGNY, 1839b, p. 128, pl. 3, figs 1-2. –BRADY, 1884, p. 728, pl. 109, figs 3-4. –CUSHMAN, 1914, p. 27, pl. 14, fig. 4; pl. 15, fig. 4; pl. 16, fig. 2.

Astrononion stelligerum (d'Orbigny). –CUSHMAN & EDWARDS, 1937, p. 31, pl. 3, fig. 7. –LOEBLICH & TAPPAN, 1987, p. 619, pl. 694, figs 1-2, 20-21. –JONES, 1994, p. 107, pl. 109, figs 3-4. –LOEBLICH & TAPPAN, 1994, p. 158, pl. 344, figs 11-14.

Genus **FIJINONION** Hornibrook, 1964

Fijinonion fijiense (Cushman & Edwards, 1937)

pl. 23, figs 7-8

Nonionina asterizans Fichtel & Moll. –BRADY, 1884 (not Fichtel & Moll, 1798), p. 728, pl. 109, figs 1-2.

Astrononion fijiense CUSHMAN & EDWARDS, 1937, p. 35, pl. 3, figs 15-16.

Astrononion (Fijinonion) fijiense (Cushman & Edwards). –HORNIBROOK, 1964, p. 338, pl. 1, figs 1-3.

Fijinonion fijiense (Cushman & Edwards). –SAIDOVA, 1975, p. 251. –JONES, 1994, p. 107, pl. 109, figs 1-2. –LOEBLICH & TAPPAN, 1994, p. 159, pl. 346, figs 1-4.

Subfamily NONIONINAE Schultze, 1854
Genus **EVOLUTONONION** N.W. Wang, 1964

Evolutononion shansiense N.W. Wang, 1964

Evolutononion shansiense N.W. WANG. –LOEBLICH & TAPPAN, 1994, p. 157, pl. 342, figs 13-14.

Genus **NONION** Montfort, 1808

Nonion fabum (Fichtel & Moll, 1798)

Nonionina boueana d'Orbigny. –BRADY, 1884 (not d'Orbigny, 1846), p. 729, pl. 109, figs 12-13.

Nonion fabum (Fichtel & Moll). –LOEBLICH & TAPPAN, 1987, p. 617, pl. 690, figs 1-7; pl. 691, figs 1-7, 14-16. –JONES, 1994, p. 108, pl. 109, figs 12-13.

Nonion japonicum Asano, 1938

pl. 23, fig. 9

Nonion subturgidum (Cushman). –CUSHMAN, 1933a (non *Nonionina subturgida* Cushman, 1924), p. 43, pl. 10, fig. 7.
Nonion japonicum ASANO, 1938a, p. 593, pl. 15, figs 1-2.
Florius japonicum SAIDOVA, 1975, p. 428, pl. 68, fig. 1.
Florius asanoi WHITTAKER & HODGKINSON, 1979, p. 104, pl. 7, fig. 17; text-figs 67-69.
Florius japonicus (Asano). –WANG *et al.*, 1988, p. 174, pl. 30, fig. 10. –ŌKI, 1989, p. 146, pl. 20, fig. 1.
Nonion cf. *japonicum* Asano. –HATTA & UJIIÉ, 1992b, p. 196, pl. 42, fig. 6.

Nonion subturgidum (Cushman, 1924)

pl. 23, figs 10-11

Nonionina subturgida CUSHMAN, 1924, p. 47, pl. 16, fig. 2.
Nonion subturgidum (Cushman). –CUSHMAN, 1933a, p. 43, pl. 10, figs 4-6 (not fig. 7). –LOEBLICH & TAPPAN, 1994, p. 158, pl. 343, figs 1-9.

Genus **NONIONOIDES** Saidova, 1975

Nonionoides grateloupi (d'Orbigny, 1826)

Nonionina grateloupi D'ORBIGNY, 1826, p. 294.
Nonion grateloupi (d'Orbigny). –CUSHMAN, 1939, p. 21, pl. 6, figs 1-7.
Nonionoides grateloupi (d'Orbigny). –SAIDOVA, 1975, p. 248, pl. 67, fig. 5. –HATTA & UJIIÉ, 1992b, p. 196, pl. 43, fig. 1. –LOEBLICH & TAPPAN, 1994, p. 158, pl. 342, figs 1-5.
Nonionella grateloupi (d'Orbigny). –HEß, 1998, p. 85, pl. 13, fig. 3.

Genus **PSEUDONONION** Asano, 1936

Pseudononion granuloumbilicatum Zheng, 1979

Pseudononion granuloumbilicatum ZHENG, 1979, p. 189, pl. 25, fig. 9. –LOEBLICH & TAPPAN, 1994, p. 158, pl. 344, figs 5-10.

Subfamily PULLENIINAE Schwager, 1877

Genus **MELONIS** Montfort, 1808

Melonis affinis (Reuss, 1851)

pl. 23, figs 12-14

Nonionina affine REUSS, 1851, p. 72, pl. 5, fig. 32.
Nonionina barleeana WILLIAMSON, 1858, p. 32, pl. 3, figs 68-69.
Nonionina umbilicatula (Montagu). –BRADY, 1884, p. 726, pl. 109, figs 8-9.
Nonion affinis (Reuss). –CUSHMAN, 1929c, p. 89, pl. 13, fig. 24.
Melonis affinis (Reuss). –BELFORD, 1966, p. 184, pl. 31, figs 1-4. –VAN MARLE, 1991, p. 186, pl. 20, figs 1-3. –JONES, 1994, p. 107, pl. 109, figs 8-9.
Melonis barleeanum (Williamson). –CORLISS, 1979, p. 10, pl. 5, figs 7-8. –HERMELIN, 1989, p. 88, pl. 17, fig. 2. –LOEBLICH & TAPPAN, 1987, p. 621, pl. 696, figs 5-6. –HEß, 1998, p. 84, pl. 13, fig. 5.
Melonis barleeanus (Williamson). –LOEBLICH & TAPPAN, 1994, p. 159, pl. 347, figs 1-5.

Remarks: *Melonis barleeanus* (Williamson) is regarded by Boltovskoy (1978), van Marle (1991) and Jones (1994) as a junior synonym of *Melonis affinis* (Reuss).

Genus **PULLENIA** Parker & Jones, in Carpenter *et al.*, 1862

Pullenia bulloides (d'Orbigny, 1826)

pl. 23, figs 15-16

Nonionina bulloides D'ORBIGNY, 1826, p. 293. –D'ORBIGNY, 1846, p. 107, pl. 5, figs 9-10.
Pullenia sphaeroides (d'Orbigny). –BRADY, 1884 (non *Nonionina sphaeroides* d'Orbigny, 1826), p. 615, pl. 84, figs 12-13 (ZF 2201-02).
Pullenia bulloides (d'Orbigny). –UJIIÉ, 1990, p. 42, pl. 23, figs 1-2. –TU & ZHENG, 1991, p. 188, pl. 6, fig. 6. –JONES, 1994, p. 92, pl. 84, figs 12-13. –HEß, 1998, p. 87, pl. 13, figs 9-10.

Pullenia quadriloba Reuss, 1867

Pullenia compressiuscula Reuss, var. *quadriloba* REUSS, 1867, p. 87, pl. 3, fig. 8.
Pullenia quadriloba Reuss. –CUSHMAN & TODD, 1943, p. 15, pl. 2, figs 20-21. –UJIIÉ, 1990, p. 43, pl. 23, figs 5-7.

Pullenia quinqueloba (Reuss, 1851)

pl. 23, figs 17-18

Nonionina quinqueloba REUSS, 1851, p. 71, pl. 5, fig. 31.
Pullenia quinqueloba (Reuss). –BRADY, 1884, p. 617, pl. 84, figs 14-15 (ZF 2199). –CUSHMAN & TODD, 1943, p. 10; pl. 2, figs 5-3, pl. 3, fig. 3. –UJIIÉ, 1990, p. 43, pl. 24, figs 1-5. –TU & ZHENG, 1991, p. 188, pl. 6, fig. 5. –JONES, 1994, p. 92, pl. 84, figs 14-15. –HEß, 1998, p. 87, pl. 13, figs 11-12.

Pullenia salisburyi R.E. & K.C. Stewart, 1930

Pullenia salisburyi STEWART R.E. & K.C. in Cushman *et al.*, 1930, p. 72, pl. 8, fig. 2. –AKIMOTO, 1990, p. 208, pl. 17, fig. 14.
Pullenia aff. *salisburyi* R.E. & K.C. Stewart. –UJIIÉ, 1990, p. 44, pl. 24, figs 8-9.

Superfamily CHILOSTOMELLACEA Brady, 1881
Family CHILOSTOMELLIDAE Brady, 1881
Subfamily CHILOSTOMELLINAE Brady, 1881

Genus **CHILOSTOMELLA** Reuss in Cžjžek, 1849

Chilostomella cushmani Chapman, 1941

Chilostomella cushmani CHAPMAN, 1941, p. 177, pl. 8, fig. 9; pl. 9, fig. 6. –CUSHMAN & TODD, 1949, p. 93, pl. 16, figs 4-5, 11-12. –UJIIÉ, 1990, p. 41, pl. 22, figs 3-4. –LOEBLICH & TAPPAN, 1994, p. 160, pl. 350, figs 4-10.

Key features: Test ovate, elongated; wall smooth, thin, randomly perforate and transparent; two chambers per whorl; last chamber embracing the previous ones covering about three-quarters of test length; aperture short, narrow interiomarginal slit with lip.

Chilostomella oolina Schwager, 1878

Chilostomella oolina SCHWAGER, 1878, p. 527, pl. 1, fig. 16.
Chilostomella ovoidea Reuss. –BRADY, 1884 (not Reuss, 1850), p. 436, pl. 55, figs 12-14, 17-18 (not figs 15-16, 19-23)
Chilostomella oolina Schwager. –CUSHMAN & TODD, 1949, p. 91, pl. 15, figs 23-24. –VAN MARLE, 1991, p. 128, pl. 10, figs 12-13. –JONES, 1994, p. 61, pl. 55, figs 12-14, 17-18. –LOEBLICH & TAPPAN, 1994, p. 160, pl. 349, figs 12-13.

Remarks: Differs from *Ch. ovoidea* Reuss in more elongated than ovoid shape of the test, shorter apertural slit placed at nearly half length of the entire test.

Chilostomella ovoidea Reuss, 1850

pl. 23, fig. 19

Chilostomella ovoidea REUSS, 1850, p. 380, pl. 48, fig. 12. –BRADY, 1884, p. 436, pl. 55, figs 15-16, 19-23 (not figs 12-14, 17-18) (ZF 1269). –CUSHMAN & TODD, 1949, p. 89, pl. 15, figs 17-19. –SCHIEBEL, 1992, p. 41, pl. 2, fig. 9. –JONES, 1994, p. 61, pl. 55, figs 15-16, 19-23. –LOEBLICH & TAPPAN, 1994, p. 160, pl. 350, figs 1-3. –HEß, 1998, p. 77, pl. 13, figs 15-16.

Key features: Test ovate; wall smooth, thin, finely perforate; two chambers per whorl; last chamber embracing the previous ones covering about four-fifths of entire test; aperture very long, narrow interiomarginal slit.

Family ORIDORSALIDAE Loeblich & Tappan, 1984
Genus **ORIDORSALIS** Andersen, 1961

Oridorsalis umbonatus (Reuss, 1851)

pl. 24, figs 1-2

Rotalina umbonata REUSS, 1851, p. 75, pl. 5, fig. 35.
Pulvinulina umbonata (Reuss). –BRADY, 1884, p. 695, pl. 105, fig. 2 (ZF 2251).
Truncatulina tenera BRADY, 1884, p. 665, pl. 95, fig. 11.
Oridolsalis tenerus (Brady). –TAPPAN & LOEBLICH, 1982, pl. 53, fig. 8.
Oridorsalis umbonatus (Reuss). –VAN MARLE, 1991, p. 138, pl. 11, figs 13-15. –HEß, 1998, p. 85, pl. 14, figs 9-10. –HAYWARD *et al.*, 1999, p. 160, pl. 15, figs 24-26.
Oridorsalis umbonata (Reuss). –JONES, 1994, p. 99, pl. 95, fig. 11; p. 104, pl. 105, fig. 2.
Oridorsalis tenera (Brady). –LOEBLICH & TAPPAN, 1994, p. 161, pl. 354, figs 1-10.

Remarks: The SCS 'juvenile' specimens of this species can vary in thickness of the test and especially the shape of periphery (from slightly to extremely lobate), but this differences are less exhibited in 'adult' specimens.
Rotalina umbonata Reuss and *Truncatulina tenera* Brady are herein regarded as ecophenotypes of one species.

Oridorsalis sp. 1

Remarks: Very like *Oridorsalis umbonatus* (Reuss), but differs in having less lobate periphery and lacking small openings at the base of sutures on dorsal side.

Family OSANGULARIIDAE Loeblich & Tappan, 1964
Genus **OSANGULARIA** Brotzen, 1940

Osangularia culter (Parker & Jones, 1865)

pl. 24, figs 3-5

Planorbulina culter PARKER & JONES, 1865, p. 382, pl. 19, fig. 1.
Truncatulina culter (Parker & Jones). –BRADY, 1884, p. 668, pl. 96, fig. 3 (ZF 2522).
Pulvinulinella culter (Parker & Jones). –CUSHMAN, 1929c, p. 100, pl. 14, fig. 13.
Parrella culter (Parker & Jones). –HOFKER, 1951, p. 336, text-figs 229-232.
Osangularia culter (Parker & Jones). –PHLEGER *et al.*, 1953, p. 42, pl. 9, figs 11-16. –BOLTOVSKOY, 1980, p. 168, pl. 3, fig. 16; pl. 4, fig. 9. –VAN MARLE, 1991, p. 140, pl. 12, figs 2-4. –HEß, 1998, p. 86, pl. 14, figs 11-12.
Osangularia bengalensis (Schwager). –JONES, 1994, p. 100, pl. 96, fig. 3.

Family HETEROLEPIDAE Gonzáles-Donoso, 1969
Genus **ANOMALINOIDES** Brotzen, 1942

Anomalinoides colligerus (Chapman & Parr, 1937)

Anomalina ammonoides (Reuss). –BRADY, 1884 (non *Rosalina ammonoides*, Reuss, 1844), p. 672, pl. 94, figs 2-3.
Anomalina colligera CHAPMAN & PARR, 1937, p. 117, pl. 9, fig. 26.
Anomalinoides colligerus (Chapman & Parr). –VAN MARLE, 1991, p. 129, pl. 13, figs 6-8. –JONES,

1994, p. 98, pl. 94, figs 2-3. –LOEBLICH & TAPPAN, 1994, p. 162, pl. 355, figs 1-3.

Anomalinoides globulosus (Chapman & Parr, 1937)

pl. 24, figs 6-7

Anomalina grosserugosa (Guembel). –BRADY, 1884 (not Gümbel, 1868), p. 673, pl. 94, figs 4-5 (ZF 1083-84).
Anomalina globulosa CHAPMAN & PARR, 1937, p. 117, pl. 9, fig. 27.
Anomalinoides globulosus (Chapman & Parr). –VAN MORKHOVEN *et al.*, 1986, p. 36, pl. 9. –INOUE, 1989, pl. 27, fig. 8. –VAN MARLE, 1991, p. 130, pl. 13, figs 3-5. –HATTA & UJIIÉ, 1992b, p. 197, pl. 43, fig. 4. –LOEBLICH & TAPPAN, 1994, p. 162, pl. 354, figs 11-13; pl. 355, figs 4-13. –HEß, 1998, p. 75, pl. 16, figs 13-14.
Cibicidoides globulosus (Chapman & Parr). –JONES, 1994, p. 98, pl. 94, figs 4-5.

Key features: Test planoconvex; wall coarsely perforate; highly convex, involute umbilical side; evolute spiral side; periphery broadly rounded; 5-7 inflated chambers in the last whorl; sutures depressed; aperture crescentic.

Anomalinoides* cf. *welleri (Plummer, 1926)

pl. 24, figs 8-10

Truncatulina welleri PLUMMER, 1926, p. 143, pl. 9, fig. 6.
Anomalinoides welleri (Plummer). –WANG *et al.*, 1988, p. 178, pl. 32, figs 12-13.

Key features: Test low trochospiral, rounded; wall finely perforate; periphery rounded; 11-12 chambers in the last whorl; sutures slightly curved and very slightly depressed; aperture a low interiomarginal arch extending from umbilicus to spiral side.

Remarks: Resembles form referred by Hayward *et al.* (1999) to *Anomalinoides sphericus* (Finlay, 1940).

Genus **HETEROLEPA** Franzenau, 1884

Heterolepa* aff. *dutemplei (d'Orbigny, 1846)

pl. 24, figs 11-14

Rotalina dutemplei D'ORBIGNY, 1846, p. 157, pl. 8, figs 19-21.
Cibicidoides dutemplei (d'Orbigny). –VAN MORKHOVEN *et al.*, 1986, p. 112, pl. 35, figs 1-2; text-fig. 19-20.

Key features: Test biconvex; coarsely perforated; ventral side very convex, at the dorsal side chambers in the last whorl flattened, while the earlier whorls convex; periphery acute; 8-10 chambers in the last whorl; chambers on the dorsal side hardly visible except the last whorl, where rectangular to trapezoidal; spiral line between coils clearly visible; on ventral side sutures distinct, slightly depressed between last chambers; slightly curved backwards on the spiral side and strongly on ventral side; aperture an elongated slit extending from the periphery towards umbilicus with small lip.

Remarks: Although abundant in residues from the Sunda Shelf area, it has not been found in Recent records. In morphological features of the test and bathymetric occurrences (neritic to upper bathyal) this form exhibits strong similarity to *Cibicidoides dutemplei* (d'Orbigny) figured by van Morkhoven *et al.* (1986).

Heterolepa margaritifera (Brady, 1881)

pl. 25, figs 4-7

Truncatulina margaritifera BRADY, 1881, p. 66. –BRADY, 1884, p. 667, pl. 96, fig. 2.
Eponides margaritiferus (Brady). –LEROY, 1941a, p. 40, pl. 3, figs 110-112. –BELFORD, 1966, p. 126, pl. 18, figs 11-16.
Cibicides margaritifera (Brady). –HOFKER, 1951, p. 352, text-figs 238-239.
Heterolepa margaritifera (Brady). –ŌKI, 1989, p. 101, pl. 15, figs 12-13. –LOEBLICH & TAPPAN, 1994, p. 162, pl. 358, figs 1-7.
Neoeponides margaritifer (Brady). –JONES, 1994, p. 100, pl. 96, fig. 2.

Remarks: Two ecophenotypes different from typical *Heterolepa margaritifera* have been found in Sunda Shelf material;
type 1 differs in having large, strongly compressed and richly ornamented lenticular test.
type 2 differs in having smaller planoconvex test, with almost plane dorsal side and strongly convex ventral side; test is generally less ornamented with bosses and tubercles then the typical form.

Heterolepa ornata (Cushman, 1921)

Truncatulina ungeriana (d'Orbigny) var. *ornata* CUSHMAN, 1921, p. 317, text-fig. 12.
Cibicides ornata (Cushman). –LEROY, 1964, p. F-45, pl. 8, figs 19-21.
Heterolepa ornata (Cushman). –LOEBLICH & TAPPAN, 1994, p. 162, pl. 314, figs 1-10.

Heterolepa praecincta (Karrer, 1868)

pl. 25, figs 1-3

Rotalina praecincta KARRER, 1868, p. 189, pl. 5, fig. 7.
Truncatulina praecincta (Karrer). –BRADY, 1884, p. 667, pl. 95, figs 1-3 (ZF 2538-40). –CUSHMAN, 1915, p. 39, pl. 26, fig. 2.
Cibicidoides (?) *praecinctus* (Karrer). –MCCULLOCH, 1977, p. 446, pl. 152, fig. 11.
Cibicides praecinctus (Karrer). –TU & ZHENG, 1991, p. 186, pl. 9, fig. 3.

Neoeponides praecinctus (Karrer). –JONES, 1994, p. 99, pl. 95, figs 1-3.
Heterolepa praecincta (Karrer). –LOEBLICH & TAPPAN, 1994, p. 163, pl. 360, figs 1-10.

Heterolepa subhaidingerii (Parr, 1950)

pl. 24, figs 15-17

Truncatulina haidingerii (d'Orbigny). –BRADY, 1884, p. 663, pl. 95, fig. 7 (ZF 2528). –CUSHMAN, 1914, p. 35, pl. 13, fig. 5; pl. 28, fig. 1. –CUSHMAN, 1921, p. 315, pl. 64, fig. 3.
Cibicides subhaidingerii PARR, 1950, p. 364, pl. 15, fig. 7. –TU & ZHENG, 1991, p. 185, pl. 9, fig. 2.
Cibicidoides subhaidingerii (Parr). –VAN MORKHOVEN *et al.*, 1986, p. 95, pl. 28. –JONES, 1994, p. 99, pl. 95, fig. 7.
Heterolepa subhaidingerii (Parr). –AKIMOTO, 1990, p. 201, pl. 23, fig. 3.
Heterolepa subhaidingeri (Parr). –LOEBLICH & TAPPAN, 1994, p. 163, pl. 359, figs 1-13.

Remarks: Differs from *Heterolepa* aff. *dutemplei* in larger size of the test, bluntly rounded periphery and less convex ventral side.

***Heterolepa* sp. 1**

Key features: Test planoconvex to biconvex; dorsally slightly and ventrally strongly convex; 8 chambers in final whorl; chambers on the dorsal side gradually increasing in size with acute sutures, sutures in early coils raised and ornamented with small bosses; on the umbilical side sutures straight and directed backwards; umbilical area covered with extremely large plug, occupying almost 1/3 of the test; aperture a slit extending from the periphery towards umbilicus; both sides of the test coarsely perforated.

Family GAVELINELLIDAE Hofker, 1951
Subfamily GYROIDINOIDINAE Saidova, 1981
Genus **ROTALIATINOPSIS** Banner & Blow, 1967

Rotaliatinopsis semiinvoluta (Germeraad, 1946)

Pulleniatina ? *semiinvoluta* GERMERAAD, 1946, p. 72, pl. 4, figs 16-18.
Rotaliatinopsis semiinvoluta (Germeraad). –BANNER & BLOW, 1967, p. 147, pl. 4, figs 6-8. –LOEBLICH & TAPPAN, 1994, p. 163, pl. 361, figs 1-3. –HEß, 1998, p. 89, pl. 15, fig. 6.

Subfamily GAVELINELLINAE Hofker, 1956
Genus **GYROIDINA** d'Orbigny, 1826

Gyroidina altiformis R.E. Stewart & K.C. Stewart, 1930

pl. 25, figs 8-10

Gyroidina soldanii d'Orbigny var. *altiformis* STEWART R.E. & STEWART K.C. in Cushman *et al.*, 1930, p. 67, pl. 9, fig. 2. –CUSHMAN, 1931, p. 41, pl. 8, fig. 10; pl. 9, fig. 1. –RENZ, 1948, p. 140, pl. 8, fig. 13.
Hansenisca altiformis (R.E. & K.C. Stewart). –FINGER, 1990, p. 124-125, figs 1-8; text-fig. 2.

Gyroidina broeckhiana (Karrer, 1878)

pl. 25, figs 11-12

Rotalia broeckhiana KARRER, 1878, p. 98, pl. 5, fig. 26. –BRADY, 1884, p. 705, pl. 107, fig. 4 (ZF 2318).
Gyroidina broeckhiana (Karrer). –JONES, 1994, p. 106, pl. 107, fig. 4. –HEß, 1998, p. 82, pl. 15, figs 10-11.

Gyroidina lamarckiana (d'Orbigny, 1839)

pl. 25, figs 13-15

Rotalia lamarckiana D'ORBIGNY, 1839b, p. 131, pl. 2, figs 13-15.
Gyroidina lamarckiana (d'Orbigny). –PHLEGER *et al.*, 1953, p. 41, pl. 8, figs 33-34. –TODD, 1965, p. 19, pl. 6, fig. 3. –LOEBLICH & TAPPAN, 1994, p. 163, pl. 361, figs 7-12. –HEß, 1998, p. 82, pl. 15, figs 7-9.

Gyroidina neosoldanii Brotzen, 1936

pl. 26, figs 1-3

Rotalia soldanii d'Orbigny. –BRADY, 1884 (not d'Orbigny, 1826), p. 706, pl. 107, figs 6-7 (ZF 2320).
Gyroidina neosoldanii BROTZEN, 1936, p. 158. –INOUE, 1989, pl. 26, fig. 4. –VAN MARLE, 1991, p. 125, pl. 11, figs 11-12. –LOEBLICH & TAPPAN, 1994, p. 163, pl. 361, figs 13-15; pl. 362, figs 1-7.
Gyroidinoides neosoldanii (Brotzen). –UJIIÉ, 1990, p. 46, pl. 25, fig. 6; pl. 26, figs 1-2.
Gyroidinoides soldanii (d'Orbigny). –JONES, 1994, p. 106, pl. 107, figs 6-7.

Gyroidina orbicularis (Parker, Jones & Brady, 1865)

pl. 26, figs 4-5

Rotalia (Gyroidina) orbicularis (d'Orbigny). –BRADY, 1884 (not d'Orbigny, 1826), p. 706, pl. 115, fig. 6.
Gyroidina orbicularis (d'Orbigny). –PHLEGER *et al.*, 1953, p. 41, pl. 8, figs 35-36. –VAN MARLE, 1991, p. 126, pl. 11, figs 8-10. –HEß, 1998, p. 82, pl. 15, figs 12-13.
Gyroidina orbicularis (sensu Parker, Jones & Brady). –JONES, 1994, p. 114, pl. 115, fig. 6.

***Gyroidina* sp. 1**

Key features : Trochospiral, biconvex test; 3,5 whorls visible on the dorsal side; 6 chambers in the last coil; sutures straight, radiate on both sides; umbilicus closed; aperture a low interiomarginal slit, extending from periphery halfway to the umbilicus; periphery rounded and slightly lobate.

Genus **GYROIDINOIDES** Brotzen, 1942

Gyroidinoides nipponicus (Ishizaki, 1944)

Gyroidina nipponica ISHIZAKI, 1944, p. 102, pl. 3, fig. 3.
Gyroidinoides nipponicus (Ishiazaki). –INOUE, 1989, pl. 22, fig. 2; pl. 31, fig. 11. –UJIIÉ, 1990, p. 47, pl. 27, fig. 1.

Gyroidinoides soldanii (d'Orbigny, 1826)

Rotalia soldanii D'ORBIGNY, 1826, p. 276, no. 5.
Gyroidinoides soldanii (d'Orbigny). –UJIIÉ, 1990, p. 45, pl. 25, figs 1-5.
Hansenisca soldanii (d'Orbigny). –LOEBLICH & TAPPAN, 1994, p. 164, pl. 362, figs 8-10.

Gyroidinoides sp. 1

Key features: Test small trochospiral, planoconvex to slightly biconvex; spiral side smooth with 3,5 whorls visible; sutures slightly directed backwards on the spiral side and radial on the umbilical side; 11 chambers in final coil; periphery rounded in early part of the last coil and acute in the few last chambers; aperture an interiomarginal slit extending along last chamber from periphery to umbilicus; umbilicus open.

Genus **HANZAWAIA** Asano, 1944

Hanzawaia boueana (d'Orbigny, 1846)

Truncatulina boueana D'ORBIGNY, 1846, p. 169, pl. 9, figs 24-26.
Cibicides boueanus (d'Orbigny). –GRAHAM & MILITANTE, 1959, p. 116, pl. 19, fig. 11.
Hanzawaia boueana (d'Orbigny). –ZHENG, 1980, p. 171, pl. 5, fig. 10. –LOEBLICH & TAPPAN, 1994, p. 164, pl. 364, figs 1-8.

Hanzawaia concentrica (Cushman, 1918)

Truncatulina concentrica CUSHMAN, 1918b, p. 64, pl. 21, fig. 3.
Cibicides concentricus (Cushman). –PHLEGER & PARKER, 1951, pl. 15, figs 14-15.
Hanzawaia concentrica (Cushman). –TODD, 1965, p. 17. –SCHIEBEL, 1992, p. 49, pl. 1, fig. 11.

Hanzawaia grossepunctata (Earland, 1934)

pl. 26, figs 6-7

Cibicides grossepunctatus EARLAND, 1934, p. 184, pl. 8, figs 39-41.
Hanzawaia grossepunctata (Earland). –LOEBLICH & TAPPAN, 1994, p. 164, pl. 364, figs 9-13; pl. 365, figs 1-13.

Hanzawaia nipponica Asano, 1944

Hanzawaia nipponica ASANO, 1944, p. 99, pl. 4, figs 1-2. –LOEBLICH & TAPPAN, 1987, p. 185, pl. 719, figs 1-4. –AKIMOTO, 1990, p. 201, pl. 20, fig. 4. –VAN MARLE, 1991, p. 137, pl. 12, figs 5-7. –LOEBLICH & TAPPAN, 1994, p. 164, pl. 363, figs 8-13.

Superfamily ROTALIACEA Ehrenberg, 1839
Family ROTALIIDAE Ehrenberg, 1839
Subfamily PARAROTALIINAE Reiss, 1963
Genus **PARAROTALIA** Le Calvez, 1949

Pararotalia calcariformata McCulloch, 1977

Pararotalia (?) *calcariformata* MCCULLOCH, 1977, p. 428, pl. 177, figs 10-11.
Pararotalia calcariformata McCulloch. –LOEBLICH & TAPPAN, 1994, p. 165, pl. 367, figs 8-13.

Pararotalia stellata (de Férussac, 1827)

pl. 26, fig. 8

Rotalia calcar (d'Orbigny). –BRADY, 1884 (non *Calcarina calcar* d'Orbigny, 1826), p. 709, pl. 108, figs 3-4.
Pararotalia stellata (de Férussac). –JONES, 1994, p. 107, pl. 108, figs 3-?4.

Pararotalia sp. 1

pl. 26, figs 9-10, 12

Key features: Test planoconvex or slightly biconvex; dorsal side highly convex; slightly convex ventral side; 7-9 chambers in the last whorl; ventral sutures radial, depressed, widening towards umbilicus; dorsal sutures curved backwards; test ornamented with small beads on spiral side; with bosses near umbilicus; periphery sharp, acute and lobulate, ornamented with short strong spines; aperture interiomarginal, and supplementary sutural apertures.

Remarks: *Pararotalia* sp. 1 occurs in the SCS material in high numbers, but has not been found in Recent records. It resembles *Pararotalia calcariformata* McCulloch, but differs in being highly convex on the ventral side, and having supplementary apertures.

Pararotalia sp. 2

pl. 26, fig. 11

Remarks: *Pararotalia* sp. 2 resembles closely *Pararotalia* sp. 1, differs in lacking spines on periphery of the chambers.

Subfamily AMMONIINAE Saidova, 1981

Genus **AMMONIA** Brünnich, 1772

Ammonia beccarii (Linné, 1758)

pl. 26, figs 13-15

Nautilus beccarii LINNÉ, 1758, p. 710, (figured by Plancus, pl. 1, fig. 1).
Rotalia beccarii (Linné). –CUSHMAN, 1921, p. 345, pl. 70, fig. 3.
Streblus beccarri (Linné). –HOFKER, 1951, p. 492, text-figs 335-339.
Ammonia beccarii (Linné). –LOEBLICH & TAPPAN, 1964, C607, figs 479.2-3. –BELFORD, 1966, p. 108, pl. 19, figs 2-8. –VAN MARLE, 1991, p. 217, pl. 23, figs 11-12. –HATTA & UJIIÉ, 1992b, p. 199, pl. 44, figs 1-2. –SCHMIEDL, 1995, p. 123, pl. 3, figs 13-14.

Key features: Biconvex, low trochospiral, with acute, slightly rounded periphery; 7-8 chambers in the last whorl; deep umbilicus, slightly curved sutures, on ventral side ornamented with some tubercles and bosses.

Remarks: *A. beccarii* (Linné) shows wide variety of the test morphology (thickness of the test and height of the spire on dorsal side); herein all this morphotypes are grouped together.

Ammonia parkinsoniana (d'Orbigny, 1839)

Rosalina parkinsoniana D'ORBIGNY, 1839a, p. 99, pl. 4, figs 25-27.
"*Rotalia*" *parkinsoniana* (d'Orbigny). –GRAHAM & MILITANTE, 1959, p. 101, pl. 15, fig. 11.
Ammonia parkinsoniana (d'Orbigny). –LOEBLICH & TAPPAN, 1994, p. 165, pl. 368, figs 7-16. –HAYWARD *et al.*, 1999, p. 162.

Key features: Test biconvex, low trochospiral; periphery broadly rounded; 7-8 chambers in the last whorl; sutures nearly straight; umbilicus deep, open.

Ammonia pauciloculata (Phleger & Parker, 1951)

"Rotalia" pauciloculata PHLEGER & PARKER, 1951, p. 23, pl. 12, figs 8-9.
Ammonia pauciloculata (Phleger & Parker). –POAG, 1981, p. 39, pl. 45, fig. 3; pl. 46, fig. 3.

Key features: Test small, biconvex, low trochospiral; periphery acutely rounded, strongly lobulate; thin wall; five chambers in the last whorl; sutures slightly curved, widening on umbilical side.

Ammonia tepida (Cushman, 1926)

Rotalia beccarii (Linné) var. *tepida* CUSHMAN, 1926b, p. 79, pl. 1.
Streblus beccarii var. *tepida* (Cushman). –TODD, 1957, p. 290, pl. 91, fig. 5.
Ammonia tepida (Cushman). –CHENG & ZHENG, 1978, p. 221, pl. 24, figs 10-11; pl. 32, fig. 7. –LOEBLICH & TAPPAN, 1994, p. 166, pl. 371, figs 1-10.
Ammonia beccarii var. *tepida* (Cushman). –WHITTAKER & HODGKINSON, 1979, p. 68, pl. 5, fig. 8.
Ammonia parkinsoniana (d'Orbigny) var. *tepida* (Cushman). –HAYWARD *et al.*, 1999, p. 162, pl. 16, figs 10-12.

Key features: Test small, biconvex, trochospiral; periphery broadly rounded, slightly lobulate; thin brownish-orange wall; 6-8 chambers in the last whorl; sutures slightly curved; umbilicus deep, open.

Genus **ASTEROROTALIA** Hofker, 1950

Asterorotalia compressiuscula (Brady, 1884)

Rotalia papillosa d'Orbigny var. *compressiuscula* BRADY, 1884, p. 708, pl. 107, fig. 1 (ZF 2325).
Rotalia beccarii (Linné). –BRADY, 1884, p. 704, pl. 107, fig. 3.
Rotalinoides compressiusculus (Brady). –JONES, 1994, p. 106, pl. 107, figs 1, 3.

Key features: Test lenticular, biconvex; ventral side convex; dorsal side slightly convex; periphery keeled, strongly lobulate; 6-10 chambers in the last whorl; dorsal sutures curved backwards; ventral nearly straight; deep, open umbilicus; test ornamented along sutures.

Remarks: Specimens of this species are often referred to *Asterorotalia gaimardii* (d'Orbigny). *A. compressiuscula* (Brady) differs in being less convex ventrally, more convex dorsally and having lobulate periphery.

Asterorotalia (?) concinna (Millett, 1904)

pl. 27, figs 1-3

Rotalia annectens Parker & Jones var. *concinna* MILLETT, 1904, p. 223, pl. 10, fig. 7.
Ammonia annectens (Parker & Jones). –WHITTAKER & HODGKINSON, 1979, p. 66, pl. 5, fig. 9.

Asterorotalia gaimardii (d'Orbigny, 1826)

pl. 27, figs 7-8

Rotalia (Turbinulina) gaimardii d'Orbigny, 1826, p. 275.
Rotalia papillosa d'Orbigny. –BRADY, 1884 (non *R. papillosa* d'Orbigny, 1826), p. 708, pl. 106, fig. 9 (ZF 2324).
Turbinulina gaimardii d'Orbigny. –FORNASINI, 1906, p. 67, pl. 4, fig. 1.
Pseudorotalia gaimardii (d'Orbigny). –BELFORD, 1966, p. 115, pl. 20, figs 5-11. –TU & ZHENG, 1991, p. 182, pl. 10, fig. 9.
Asterorotalia gaimardii (d'Orbigny). –VAN MARLE, 1991, p. 219, pl. 23, fig. 16; pl. 24, figs 1-3. –LOEBLICH & TAPPAN, 1994, p. 166, pl. 372, figs 1-7.

Rotalinoides gaimardii (Fornasini). –JONES, 1994, p. 106, pl. 106, fig. 9.

Key features: Test planoconvex or slightly biconvex; periphery keeled; umbilical side highly convex; flat to slightly convex spiral side; 7-9 chambers in the last whorl; ventral sutures radial, straight, depressed; dorsal sutures curved backwards; test rich in ornaments on spiral side and with bosses and pillars near umbilicus; interiomarginal aperture.

Asterorotalia milletti Billman, Hottinger & Oesterle, 1980

Asterorotalia milletti BILLMAN, HOTTINGER & OESTERLE, 1980, p. 97, pl. 19, figs 1-9. –LOEBLICH & TAPPAN, 1994, p. 166, pl. 372, figs 8-11.

Key features: Test planoconvex; periphery keeled, strongly lobulate; thin wall; highly convex ventral side; flat to slightly convex spiral side; 6-7 chambers in the last whorl; ventral sutures, straight and depressed, widening towards umbilicus; dorsal sutures curved backwards; test poorly ornamented on spiral side and with pillars near umbilicus; interiomarginal aperture.

Remarks: Specimens of this species are very fragile and last chambers are usually broken.

Asterorotalia pulchella (d'Orbigny, 1839)

pl. 27, figs 11-12

Calcarina pulchella D'ORBIGNY, 1839a, p. 80, pl. 5, figs 16-18.
Rotalia pulchella (d'Orbigny). –BRADY, 1884, p. 710, pl. 115, fig. 8 (ZF 2327).
Rotalia trispinosa THALMANN, 1933, p. 249, pl. 12, fig. 1.
Asterorotalia trispinosa (Thalmann). –BARKER, 1960, p. 238, pl. 115, fig. 8.
Asterorotalia pulchella (d'Orbigny). –LOEBLICH & TAPPAN, 1964, C608, fig. 482. –WHITTAKER & HODGKINSON, 1979, p. 72, pl. 5, fig. 4; text-figs 56-59. –LOEBLICH & TAPPAN, 1987, p. 665, pl. 769, figs 5-11. –JONES, 1994, p. 114, pl. 115, fig. 8.

Key features: Test, lenticular, triangular to subcircular in outline; periphery keeled with usually three long spines; 9-12 chambers in the last whorl; ventral sutures radial, slightly curved, strongly ornamented; dorsal sutures nearly straight; test ornamented with bars and bosses.

Remarks: This species is very abundant in residue of numerous stations. Tests are often broken, lacking characteristic spines and infield with sediment. Peculiar morphology of the test and epifaunal mode of life probably help this species travel great distances by accidental transport.

Genus **PSEUDOROTALIA** Reiss & Merling, 1958

Pseudorotalia indopacifica (Thalmann, 1935)

pl. 27, figs 4-6

Rotalia indopacifica THALMANN, 1935, p. 605, pl. 73, fig. 1. –ASANO, 1951e, p. 13, text-figs 99-100.
Streblus indopacificus (Thalmann). –ISHIZAKI, 1940, p. 54, pl. 3, fig. 1; pl. 4, figs 1-6.
Pseudorotalia indopacifica (Thalmann). –WHITTAKER & HODGKINSON, 1979, p. 80, pl. 6, figs 6-8; pl. 10, figs 7-9. –TU & ZHENG, 1991, p. 183, pl. 8, fig. 1.

Pseudorotalia schroeteriana (Parker & Jones, 1862)

Rotalia schroeteriana PARKER & JONES in Carpenter, 1862, p. 213, pl. 13, figs 7-9. –BRADY, 1884, p. 707, pl. 115, fig. 7.
Pseudorotalia schroeteriana (Parker & Jones). –LOEBLICH & TAPPAN, 1964, p. C614, figs 487, 1-5. –WHITTAKER & HODGKINSON, 1979, p. 78, pl. 6, figs 1-2; pl. 10, figs 12-13. –VAN MARLE, 1991, p. 220. –JONES, 1994, p. 114, pl. 115, fig. 7.

***Pseudorotalia* sp. 1**

pl. 27, figs 9-10

Key features: Test small, planoconvex; dorsal side flat, ventral conical; 6-8 chambers in final whorl; umbilical area covered with big plug ornamented with small bosses; along sutures rows of small tubercles; sutures straight, radial on ventral side, curved backwards on dorsal side; periphery acute, keeled; aperture elongated, interiomarginal slit with small lip.

Family CALCARINIDAE Schwager, 1877
Genus **CALCARINA** d'Orbigny, 1826

Calcarina hispida Brady, 1876

Calcarina hispida BRADY, 1876, p. 589. –BRADY, 1884, p. 713, pl. 108, figs 8-9. –CUSHMAN, 1921, p. 356, pl. 75, fig. 4.
Calcarina hispida Brady. –HOFKER, 1970, p. 63, pl. 43, figs 5-13; pl. 47, fig. 3. –WHITTAKER & HODGKINSON, 1979, p. 81, pl. 7, figs 1-2; pl. 10, fig. 14. –HATTA & UJIIÉ, 1992b, p. 201, pl. 47, fig. 7. –JONES, 1994, p. 107, pl. 108, figs 8-9.

Remarks: Hatta & Ujiié (1992b) suggested that specimens of *C. hispida* Brady are identical with neotypified by Hansen (1981) *C. spengleri* Gmelin. The SCS specimens conform to forms in Challenger Collection.
Poorly preserved or juvenile specimens are difficult to differentiate from *Calcarina mayori* Cushman.

Calcarina mayori Cushman, 1924

pl. 28, fig. 4

Calcarina mayori CUSHMAN, 1924, p. 44, pl. 14, figs 4-7. –HOFKER, 1927, p. 44, pl. 20, figs 1-12. –LOEBLICH & TAPPAN, 1994, p. 167, pl. 375, figs 1-2; pl. 376, figs 1-7.

Remarks: Differs from *C. hispida* Brady in less robust test and better developed spines. In *C. mayori* Cushman chambers are usually visible under the cover of spines and tubercles on their surface.

Calcarina spengleri (Gmelin, 1788)

Nautilus spengleri GMELIN, 1788, p. 3371.
Calcarina spengleri (Gmelin). –BRADY, 1884, p. 712, pl. 108, fig. 5-7. –HATTA & UJIIÉ, 1992b, p. 202, pl. 48, figs 1-5. –JONES, 1994, p. 107, pl. 108, figs 5-7.

Family ELPHIDIIDAE Galloway, 1933
Subfamily ELPHIDIINAE Galloway, 1933
Genus **CELLANTHUS** Montfort, 1808

Cellanthus craticulatus (Fichtel &Moll, 1798)

pl. 28, fig. 1

Nautilus craticulatus FICHTEL & MOLL, 1798, p. 51, pl. 5, figs h-k.
Polystomella craticulatus (Fichtel & Moll). –BRADY, 1884, p. 739, pl. 110, figs 16-17.
Cellanthus craticulatus (Fichtel & Moll). –HATTA & UJIIÉ, 1992b, p 203, pl. 49, fig. 7. –JONES, 1994, p. 109, pl. 110, figs 16-17. –LOEBLICH & TAPPAN, 1994, p. 167, pl. 380, figs 1-10.

Genus **ELPHIDIELLA** Cushman, 1936

Elphidiella arctica (Parker & Jones, 1864)

Polystomella arctica PARKER & JONES in Brady, 1864, p. 471, pl. 48, fig. 18. –BRADY, 1884, p. 735, pl. 110, figs 2-5.
Elphidiella arctica (Parker & Jones). –LOEBLICH & TAPPAN, 1987, p. 674, pl. 790, figs 1-16. –JONES, 1994, p. 109, pl. 110, figs 2-5.

Genus **ELPHIDIUM** Montfort, 1808

Remarks: *Elphidium*-species are common in shallow water depths, and exhibit tolerance for increased salinity (van der Zwaan, 1982).

Elphidium advenum (Cushman, 1922)

pl. 28, fig. 2

Polystomella subnodosa (Münster). –BRADY, 1884 (non *Robulina subnodosa* Münster, 1838), p. 734, pl. 110, fig. 1 (ZF 2181).
Polystomella advena CUSHMAN, 1922b, p. 56, pl. 9, figs 11-12.
Elphidium advenum (Cushman). –CUSHMAN, 1933a, p. 50, pl. 12, figs 1-3. –ASANO, 1960, p. 196, pl. 22, fig. 3. –VAN MARLE, 1991, p. 214, pl. 23, fig. 6. –HATTA & UJIIÉ, 1992b, p. 203, pl. 49, figs 3-4. –JONES, 1994, p. 108, pl. 110, fig. 1. –LOEBLICH & TAPPAN, 1994, p. 168, pl. 379, figs 1-4.

Elphidium crispum (Linné, 1758)

pl. 28, fig. 3

Nautilus crispus LINNÉ, 1758, p. 709.
Polystomella crispa (Linné). –BRADY, 1884, p. 736, pl. 110, figs 6-7.
Elphidium crispum (Linné). –CUSHMAN, 1933a, p. 47, pl. 41, fig. 4. –ASANO, 1960, p. 197, pl. 22, fig. 6. –CHENG & ZHENG, 1978, p. 224, pl. 28, fig. 2. –INOUE, 1989, pl. 30, fig. 5. –VAN MARLE, 1991, p. 215, pl. 23, fig. 7. –HATTA & UJIIÉ, 1992b, p. 203, pl. 49, fig. 5. –JONES, 1994, p. 109, pl. 110, figs 6-7. –LOEBLICH & TAPPAN, 1994, p. 168, pl. 378, figs 4-6. –HAYWARD *et al.*, 1999, p. 165, pl. 17, figs 9-10.

Remarks: *E. crispum* represents phytal mode of life, it is living on the seaweeds, it extends net like pseudopodia and probably is a suspension feeder (Kitazato, 1988).

Elphidium incertum (Williamson, 1858)

Polystomella umbilicata (Walker) var. *incerta* WILLIAMSON, 1858, p. 44, pl. 3, fig. 82a.
Polystomella striatopunctata BRADY, 1884, p. 739, pl. 109, fig. 23.
Elphidium incertum (Williamson). –VAN MARLE, 1991, p. 216, pl. 23, fig. 8.
Cribrononion incertum (Williamson). –JONES, 1994, p. 108, pl. 109, fig. 23.

Elphidium jenseni (Cushman, 1924)

Polystomella jenseni CUSHMAN, 1924, p. 49, pl. 16, figs 4-6.
Elphidium jenseni (Cushman). –CUSHMAN, 1933a, p. 48, pl. 11, figs 6-7. –ASANO, 1960, p. 199, pl. 22, fig. 5. –ZHENG *et al.*, 1978, p. 55, pl. 7, fig. 9. –INOUE, 1989, p. 155, pl. 30, fig. 2. –HATTA & UJIIÉ, 1992b, p. 203, pl. 49, fig. 6. –LOEBLICH & TAPPAN, 1994, p. 169, pl. 381, figs 1-5.

Elphidium macellum (Fichtel & Moll, 1798)

Nautilus macellus FICHTEL & MOLL, 1798, p. 66, pl. 10, figs h-k.
Polystomella macella (Fichtel & Moll). –BRADY, 1884, p. 737, pl. 110, figs 8, 11 (ZF 2175).
Elphidium macellum (Fichtel & Moll). –VAN MARLE, 1991, p. 216, pl. 23, figs 9-10. –JONES, 1994, p. 109, pl. 110, figs 8, 11.

Elphidium reticulosum Cushman, 1933

Elphidium reticulosum CUSHMAN, 1933a, p. 51, pl. 12, fig. 5. –CHENG & ZHENG, 1978, p. 225, pl. 28, figs 6-7. –LOEBLICH & TAPPAN, 1994, p. 169, pl. 382, figs 1-5. –HAYWARD *et al.*, 1999, p. 168, pl. 17, figs 25-26.
Cribrononion reticulosus (Cushman). –WHITTAKER & HODGKINSON, 1979, p. 86, pl. 6, fig. 12.
Cribroelphidium ? rticulosum (Cushman). –HATTA & UJIIÉ, 1992b, p. 202, pl. 49, fig. 2.

Elphidium singaporense McCulloch, 1977

Elphidium singaporense MCCULLOCH, 1977, p. 224, pl. 97, fig. 2. –LOEBLICH & TAPPAN, 1994, p. 170, pl. 382, figs 6-10.

Elphidium vitreum Collins, 1974

Elphidium vitreum COLLINS, 1974, p. 43, pl. 3, fig. 35. –LOEBLICH & TAPPAN, 1994, p. 170, pl. 384, figs 2-4.

Subfamily NOTOROTALIINAE Hornibrook, 1961
Genus **PARRELLINA** Thalmann, 1951

Parrellina hispidula (Cushman, 1936)

Elphidium hispidulum CUSHMAN, 1936b, p. 83, pl. 14, fig. 13.
Parrellina hispidula (Cushman). –LOEBLICH & TAPPAN, 1987, p. 677, pl. 793, figs 5-8. –LOEBLICH & TAPPAN, 1994, p. 170, pl. 384, figs 5-7, pl. 387, figs 1-3.

Superfamily NUMMULITACEA de Blainville, 1827
Family NUMMULITIDAE de Blainville, 1827
Genus **HETEROSTEGINA** d'Orbigny, 1826

Heterostegina depressa d'Orbigny, 1826

pl. 28, figs 5-6

Heterostegina depressa D'ORBIGNY, 1826, p. 305, pl. 17, figs 5-7. –BRADY, 1884, p. 746, pl. 112, figs 14-18 (ZF 1577). –CUSHMAN, 1933a, p. 57, pl. 16, figs 4-9. –VAN MARLE, 1988, p. 145, pl. 4, fig. 7. –HATTA & UJIIÉ, 1992b, p. 204, pl. 50, fig. 4. –JONES, 1994, p. 111, pl. 112, figs 14-16, ? 17-18. –LOEBLICH & TAPPAN, 1994, p. 171, pl. 389, figs 1-6; pl. 390, figs 1-3.

Genus **NUMMULITES** Lamarck, 1801

Nummulites venosus (Fichtel & Moll, 1798*)*

pl. 28, figs 7-9

Nautilus venosus FICHTEL & MOLL, 1798, p. 59, pl. 8, figs e-h.
Amphistegina cumingii CARPENTER, 1860, p. 32, pl. 5, figs 13-17; pl. 6, figs 5-6.
Nummulites cumingii (Carpenter). –BRADY, 1884, p. 749, pl. 112, figs 11-13; text-fig. 22.
Nummulites venosus (Fichtel & Moll). –RÖGL & HANSEN, 1984, p. 44, pl. 10, figs 6-7; pl. 11, figs 3-6; pl. 12, figs 1-2. –LOEBLICH & TAPPAN, 1994, p. 171, pl. 388, figs 5-9.
Operculinella cumingii (Carpenter). –JONES, 1994, p. 110, pl. 112, figs 11-13; text-fig. 22.

Remarks: Following Loeblich & Tappan (1994) *Amphistegina cumingii* Carpenter (1860) is regarded as junior synonym of *Nautilus venosus* Fichtel & Moll (1798).

Genus **OPERCULINA** d'Orbigny, 1826

Remarks: This species belongs to symbiont-bearing benthic foraminifera group (Hallock, 1999), what helps to extend its depth range of euphotic habitats.

Operculina ammonoides (Gronovius, 1781)

pl. 28, figs 10-14

Nautilus ammonides GRONOVIUS, 1781, p. 282, pl. 19, figs 5-6.
Operculina complanata (Defrance). –BRADY, 1884, p. 743, pl. 112, figs 3-9. –JONES, 1994, p. 110, pl. 112, figs 3-9.
Operculina ammonoides (Gronovius). –LEROY, 1941b, p. 78, pl. 6, figs 24-25. –CUSHMAN, TODD & POST, 1954, p. 346, pl. 87, fig. 1. –WHITTAKER & HODGKINSON, 1979, p. 92, pl. 9, figs 1-5; pl. 10, figs 23, 27. –AKIMOTO, 1990, p. 205, pl. 15, fig. 11. –VAN MARLE, 1991, p. 196, pl. 21, fig. 3. –HATTA & UJIIÉ, 1992b, p. 205, pl. 50, fig. 7.
Assilina ammonoides (Gronovius). –LOEBLICH & TAPPAN, 1987, p. 682, pl. 804, figs 1-7. –LOEBLICH & TAPPAN, 1994, p. 170, pl. 387, figs 7-9; pl. 388, figs 1-4.

Remarks: *Operculina ammonoides* (Gronovius) according to numerous authors (see Whittaker & Hodgkinson, 1979) has a long list of suspected synonyms including: *Operculinella venosa* (Fichtel & Moll), *Operculina elegans* Cushman, *O. discoidalis* d'Orbigny, *O. discoidalis* var. *involuta* Cushman, *O. gaimardii* d'Orbigny.

Operculina bartschi Cushman, 1921

Operculina bartschi CUSHMAN, 1921, p. 376, text-fig. 13. –CHAPMAN & PARR, 1938, p. 292, pl. 17, figs 17-18; text-fig. 6. –WHITTAKER & HODGKINSON, 1979, p. 94, pl. 9, figs 10-12; pl. 10, figs 1-4, 6, 10-11.

Key features: Test large (>6 mm), lenticular; umbilical area usually raised; chambers high and narrow, planispirally arranged; arcuate and sharply recurved at the periphery; beading generally light and scattered over surface; sutural beads arranged in single rows.

Operculina group

Remarks: *Operculina* exhibits wide variations in shape and size; specimens of this group vary from small to large (0.03-1.5 cm), not ornamented to richly ornamented with beads of varying sizes and arrangement; lenticular, thick and involute to compressed evolute. Besides the tests of microspheric and megalospheric generations of this same species can differ a lot.
In the SCS material four morphologically varying types of *Operculina* tests were distinguished, but not determined on the specific level, herein they are grouped together, although were counted separately with the purpose of distribution studies.
Operculina (or *Assilina* as referred by numerous authors) belongs to symbiont-bearing benthic foraminifera group (Hallock, 1999).

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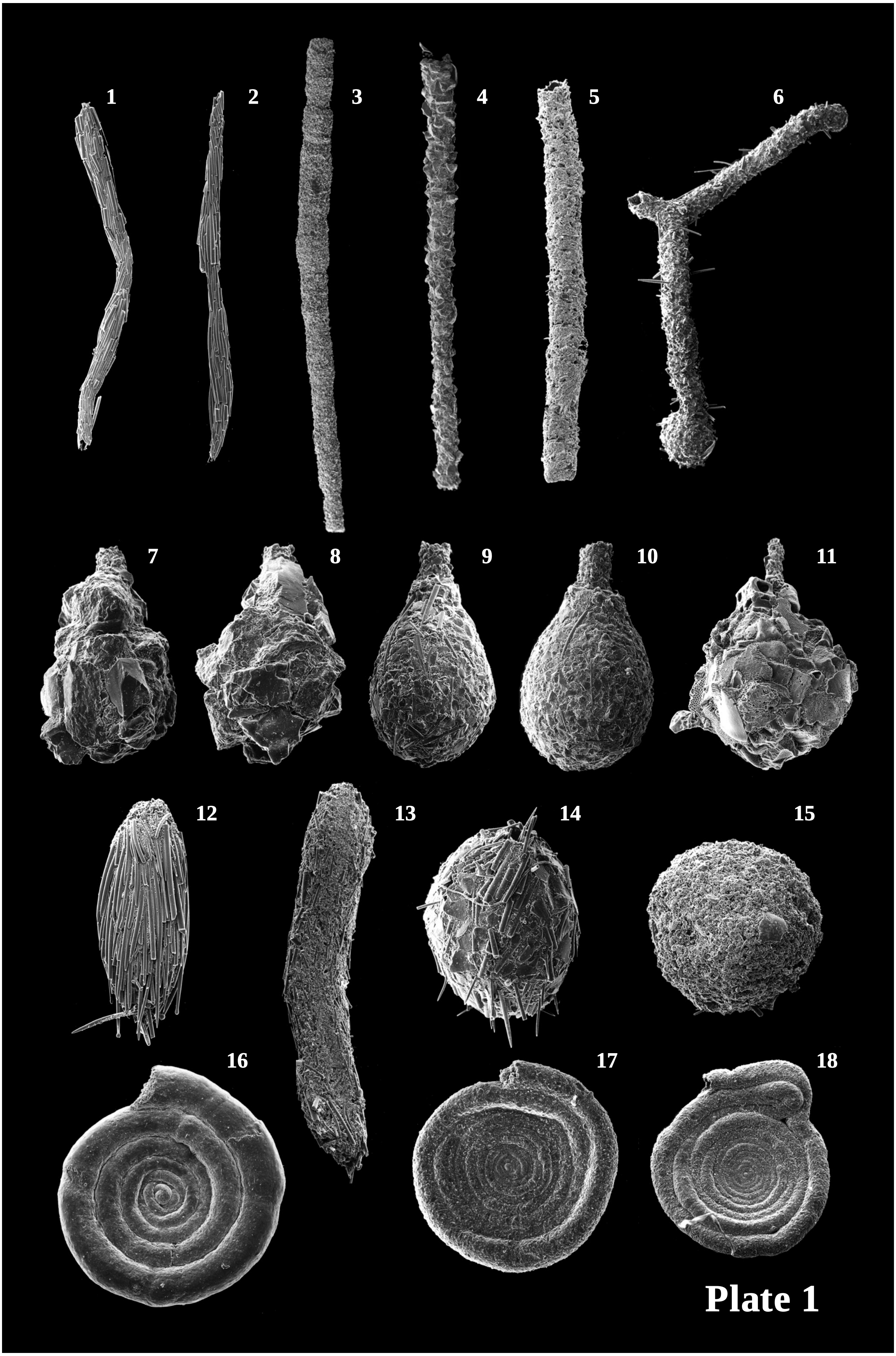

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fig. **6** *Glomospira glomerata* Höglund, 1947, top, 322 µm, station 18293

fig. **7** *Usbekistania charoides* (Jones & Parker, 1860), top, 295 µm, station 18293

fig. **8** *Glomospira gordialis* (Jones & Parker, 1860), top, 311 µm, station 18293

fig. **9** *Ammolagena clavata* (Jones & Parker, 1860), side, stained, 1750 µm, station 18281

fig. **10** *Reophax longicollaris* Zheng, 1988, side, 570 µm, station 18287

fig. **11** *Reophax micaceus* Earland, 1934, side, stained, 389 µm, station 18293

fig. **12** *Reophax subfusiformis* Earland, 1933, side, 500 µm, station 18293

fig. **13** *Reophax spiculifer* Brady, 1879, side, stained, 2300 µm, station 18291

figs **14-15** *Reophax dentaliniformis* Brady, 1881, (**14**) aperture, x 300 µm, station 18311, (**15**) side, 1180 µm, station 18311

fig. **16** *Reophax subdentaliniformis* Parr, 1950, side, stained, 1222 µm, station 18268

fig. **17** *Reophax bradyi* Brönnimann & Whittaker, 1980, side, 1338 µm, station 18281

fig. **18** *Reophax* sp., side, stained, 1067 µm, station 18311

fig. **19** *Reophax* sp., side, 1114 µm, station 18311

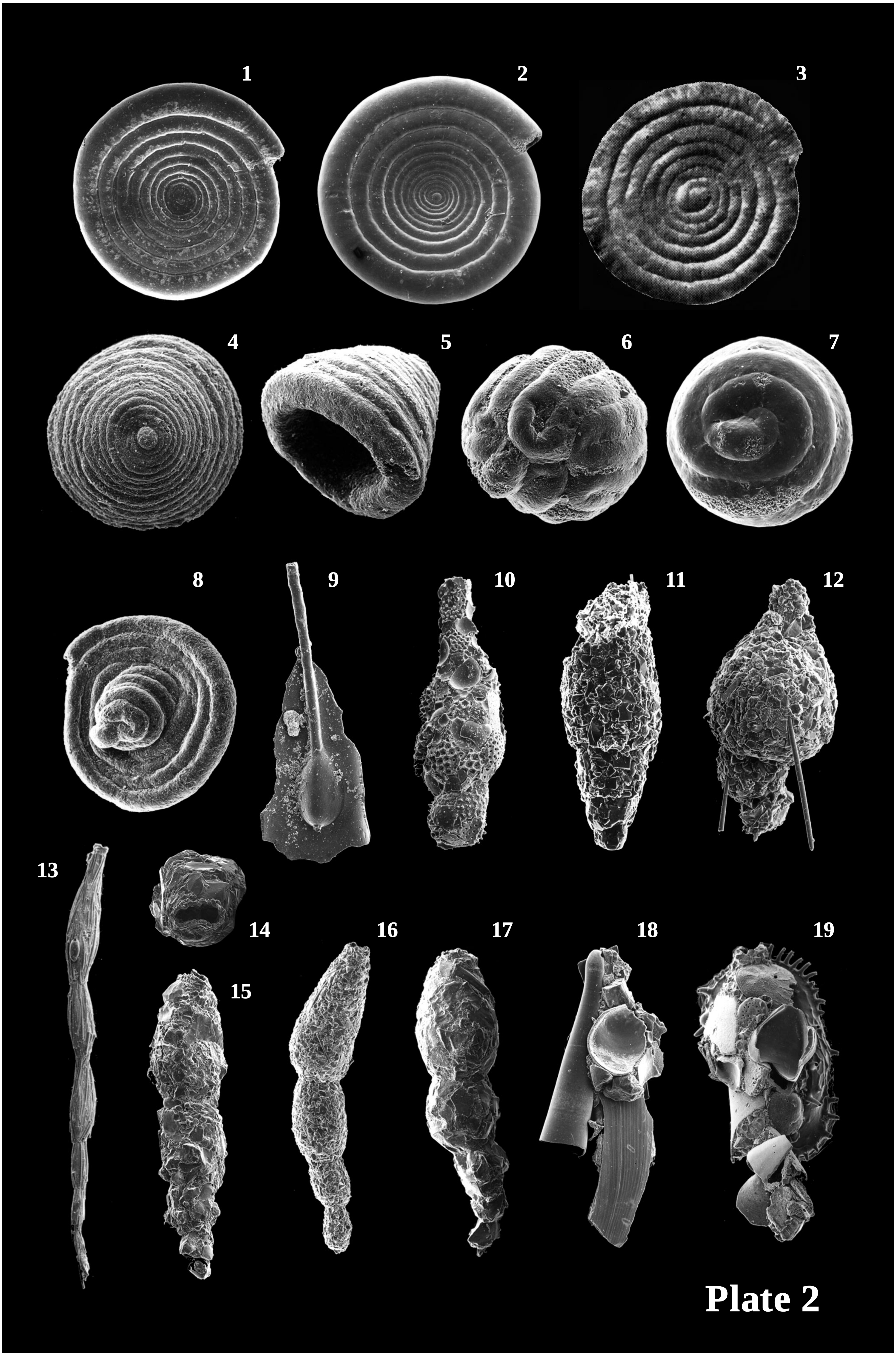

Plate 2

Plate 3

figs **1-5** *Reophax scorpiurus* de Montfort, 1808, (**1**) aperture, stained, 250 µm, station 18311,
(**2**) side, stained, 807 µm, station 18311, (**3**) side, stained, 793 µm, station 18311,
(**4**) side, 707 µm, station 18268**,** (**5**) side, 667 µm, station 18268

fig. **6** *Hormosina* sp. 2, side, 1100 µm, station 18287

fig. **7** *Pseudonodosinella* sp. 1, side, 1027 µm, station 18284

fig. **8** *Hormosinella distans* (Brady, 1881), side, 2750 µm, station 18293

fig. **9** *Hormosinella guttifera* (Brady, 1881), side, 594 µm, station 18293

fig. **10** *Subreophax aduncus* (Brady, 1882), side, 1571 µm, station 18294

fig. **11** *Reophanus oviculus* (Brady, 1879), side, 4900 µm, station 18268

figs **12-13** *Buzasina ringens* (Brady, 1879), (**12**) right-side, 700 µm, station 18268,
(**13**) left-side, 1022 µm, station 18291

figs **14-15** *Cribrostomoides nitidus* (Goës, 1896), (**14**) right-side, 750 µm, station 18268,
(**15**) periphery, 818 µm, station 18292

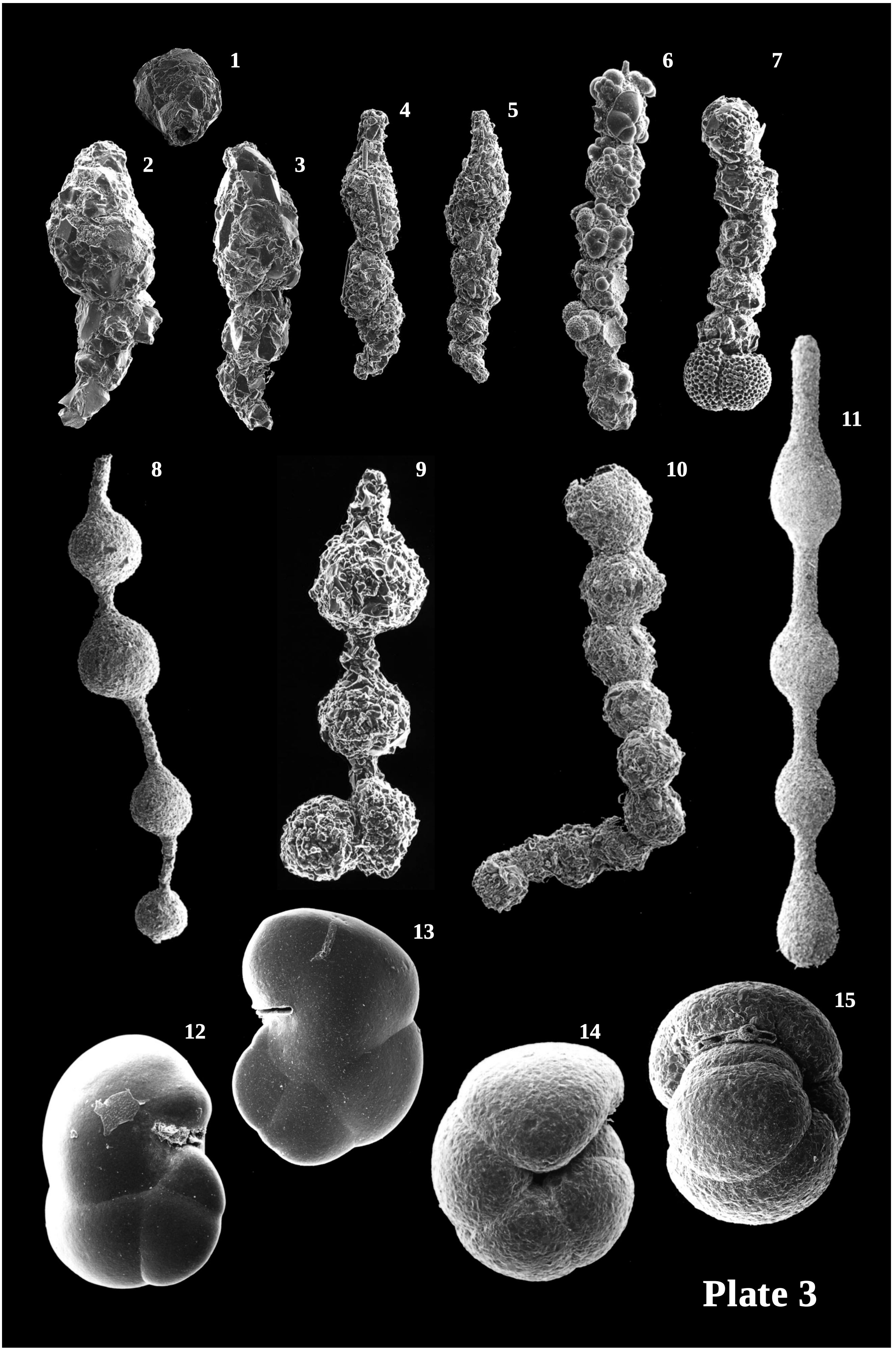

Plate 3

Plate 4

figs **1-2** *Cribrostomoides subglobosus* (M. Sars, 1869), (**1**) right-side, 615 µm, station 18290,
(**2**) periphery, 513 µm, station 18290

fig. **3** *Haplophragmoides bradyi* (Robertson, 1891), left-side, 178 µm, station 18292

fig. **4** *Haplophragmoides* sp. 1, right-side, stained, 266 µm, station 18287

figs **5-7** *Haplophragmoides sphaeriloculum* Cushman, 1910, (**5**) left-side, 500 µm, station 18287, (**6**) periphery, 500 µm, station 18287, (**7**) left-side, 731 µm, station 18287

fig. **8** *Haplophragmoides grandiformis* Cushman, 1910, right-side, stained, 1257 µm, station 18318

fig. **9** *Ammoscalaria compressa* (Cushman & McCulloch, 1939), side, 1275 µm, station 18284

figs **10-11** *Veleroninoides jeffreysii* (Williamson) (**10**) right-side, 405 µm, station 18296,
(**11**) right-side, 867 µm, station 18268

fig. **12** *Veleroninoides wiesneri* (Parr, 1950), left-side, 418 µm, station 18292

fig. **13** *Ammoscalaria tenuimargo* (Brady, 1882), side, stained, 1783 µm, station 18281

fig. **14** *Discammina compressa* (Goës, 1882), left-side, 1167 µm, station 18287

figs **15-16** *Glaphyrammina americana* (Cushman, 1910), (**15**)right-side, 715 µm, station 18304,
(**16**) left-side, 650 µm, station 18304

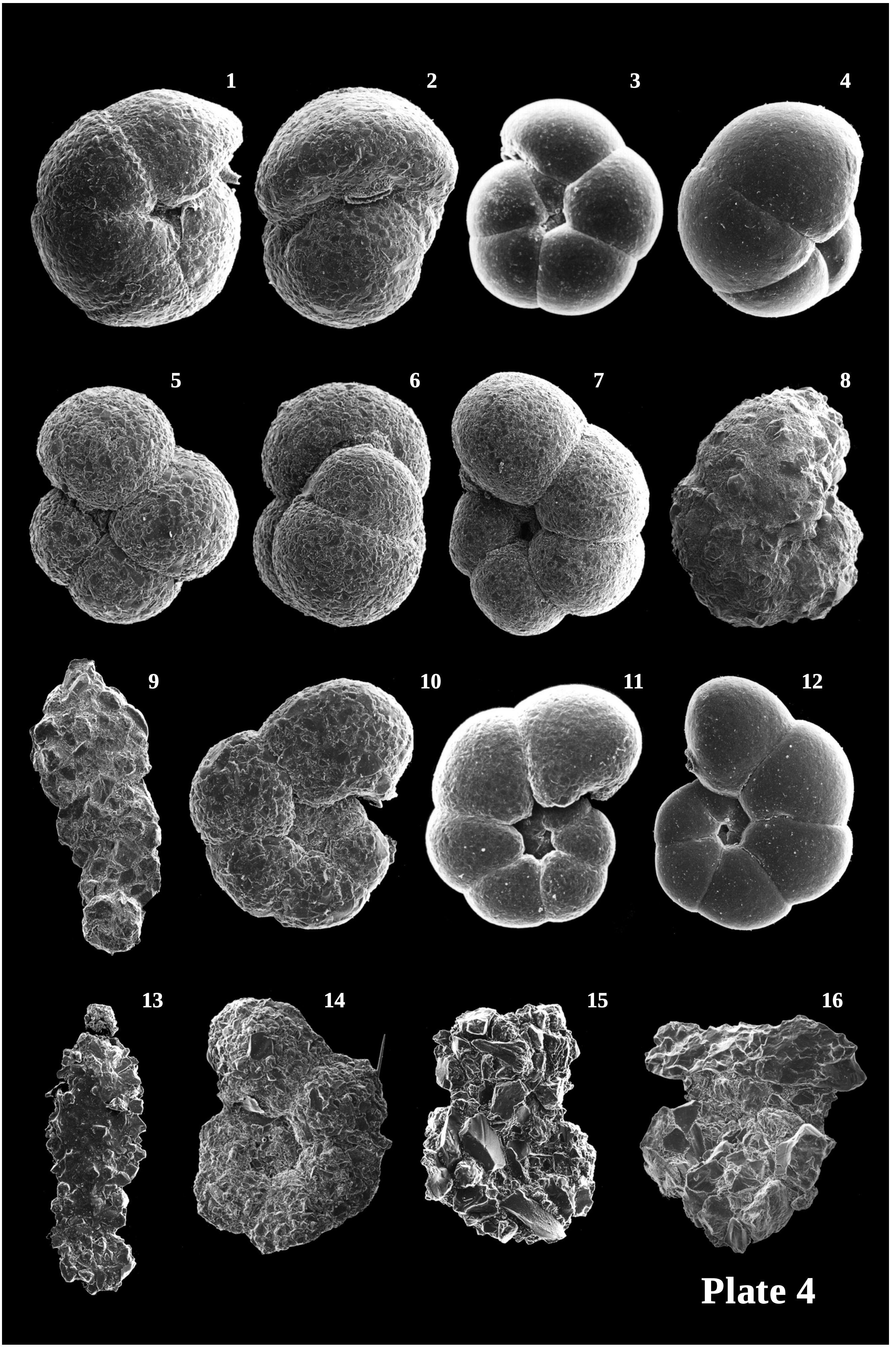
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Plate 4

Plate 5

fig. **1** *Lituotuba lituiformis* (Brady, 1879), top, 838 µm, station 18287

fig. **2** *Ammobaculites agglutinans* (d'Orbigny, 1846), left-side, stained, 750 µm, station 18269

fig. **3** *Ammobaculites baculusalsus* Schiebel & Timm, 1996, side, stained, 920 µm, station 18293

fig. **4** *Ammobaculites* sp. 1, side, 1050 µm, station 18283

fig. **5** *Ammomarginulina* aff. *rostrata* (Heron-Allen & Earland, 1929), side, 375 µm, station 18291

figs **6-7** *Eratidus recurvus* (Earland, 1934), (**6**) right-side, 408 µm, station 18292, (**7**) left-side, 256 µm, station 18292

figs **8-9** *Placopsilina bradyi* Cushman & McCulloch, 1939, (**8**) inside, stained, 754 µm, station 18273, (**9**) top, 818 µm, station 18273

figs **10-11** *Adercotryma glomeratum* (Brady, 1878), (**10**) ventral, 253 µm, station 18293, (**11**) dorsal, stained, 307 µm, station 18293

fig. **12** *Ammosphaeroidina sphaeroidiniformis* (Brady, 1884), front, 875 µm, station 18287

fig. **13** *Cyclammina trullissata* (Brady, 1879), right-side, 689 µm, station 18268

fig. **14** *Cyclammina pusilla* Brady, 1881, right-side, 1350 µm, station 18292

fig. **15** *Cyclammina subtrullissata* (Parr, 1950), left-side, stained, 453 µm, station 18311

figs **16-18** *Recurvoides contortus* Earland, 1934, (**16**) left-side, 544 µm, station 18268, (**17**) periphery, stained, 571 µm, station 18293, (**18**) left-side, 286 µm, station 18293

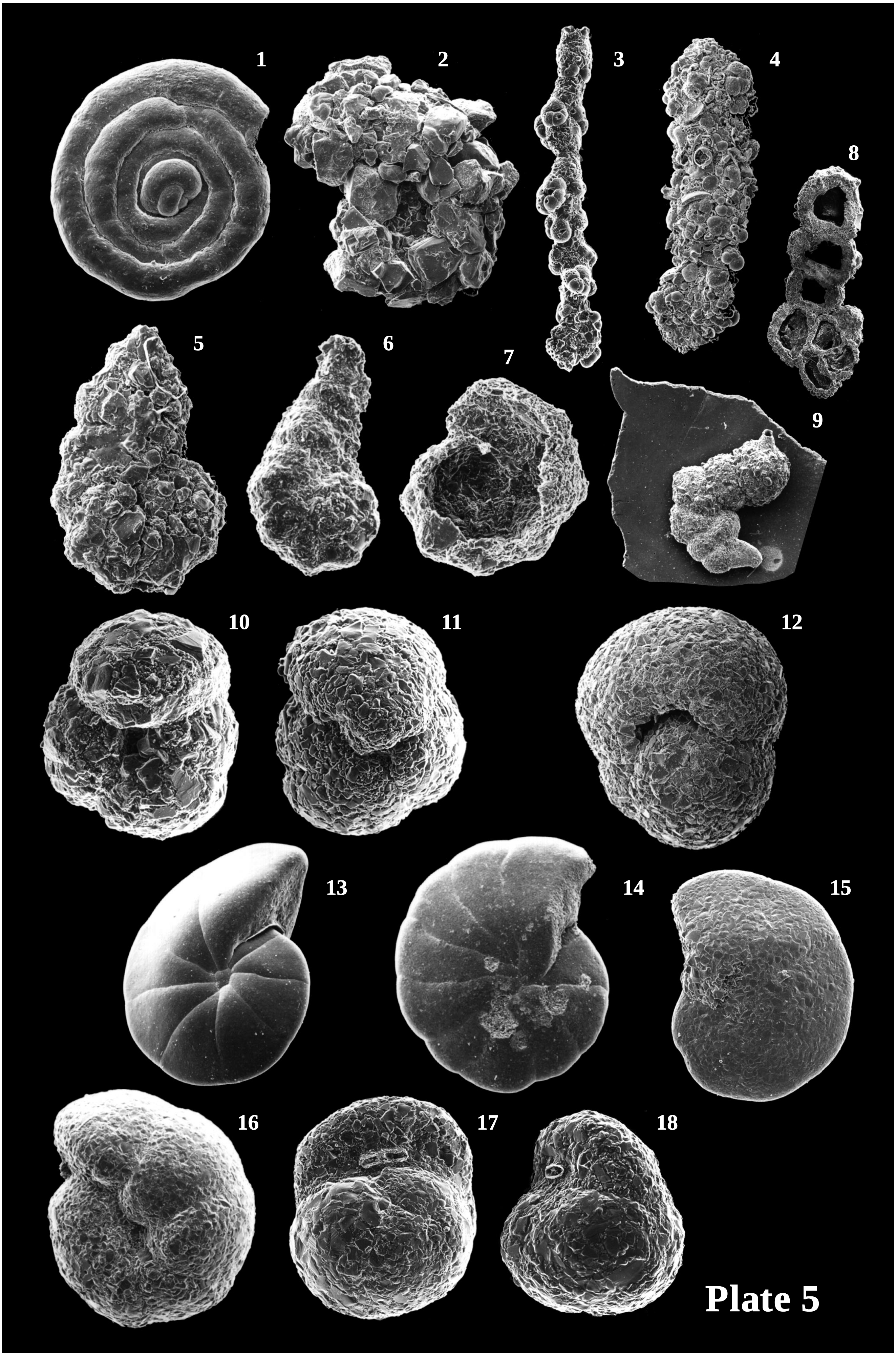

Plate 5

Plate 6

figs **1-2** *Spiroplectinella kerimbaensis* (Said, 1949), (**1**) aperture, 576 µm, station 18322, (**2**) side, 643 µm, station 18322

figs **3-6** *Spiroplectinella pseudocarinata* (Cushman, 1921), (**3**) aperture, 624 µm, station 18304, (**4**) side, 636 µm, station 18304, (**5**) aperture, 670 µm, station 18269, (**6**) side, 950 µm, station 18269

fig. **7** *Spiroplectinella higuchii* (Takayanagi, 1953), side, 523 µm, station 18284

fig. **8** *Spiroplectinella wrightii* (Silvestri, 1903), side, 438 µm, station 18284

figs **9-10** *Spirotextularia fistulosa* (Brady, 1884), (**9**) side, 500 µm, station 18271, (**10**) side, stained, 296 µm, station 18281

figs **11-13** *Spirotextularia floridana* (Cushman, 1922), (**11**) aperture, stained, 220 µm, station 18311, (**12**) side, stained, 1525 µm, station 18311, (**13**) side, 1180 µm, station 18304

fig. **14** *Parvigenerina sinensis* (Zheng, 1988), side, 433 µm, station 18284

fig. **15** *Pseudoblivina nasostoma* Zheng, 1988, side, 509 µm, station 18297

fig. **16** *Nouria harrisii* Heron-Allen & Earland, 1914, side, stained, 633 µm, station 18287

fig. **17** *Nouria polymorphinoides* Heron-Allen & Earland, 1914, side, stained, 731 µm, station 18318

fig. **18** *Gaudryina quadrangularis* Bagg, 1908, side, 767 µm, station 18298

fig. **19** *Karrerulina apicularis* (Cushman, 1911), side, 500 µm, station 18268

fig. **20** *Karrerulina erigona* (Saidova, 1975), side, 1042 µm, station 18269

fig. **21** *Verneuilinulla superba* (Earland, 1934), side, 412 µm, station 18287

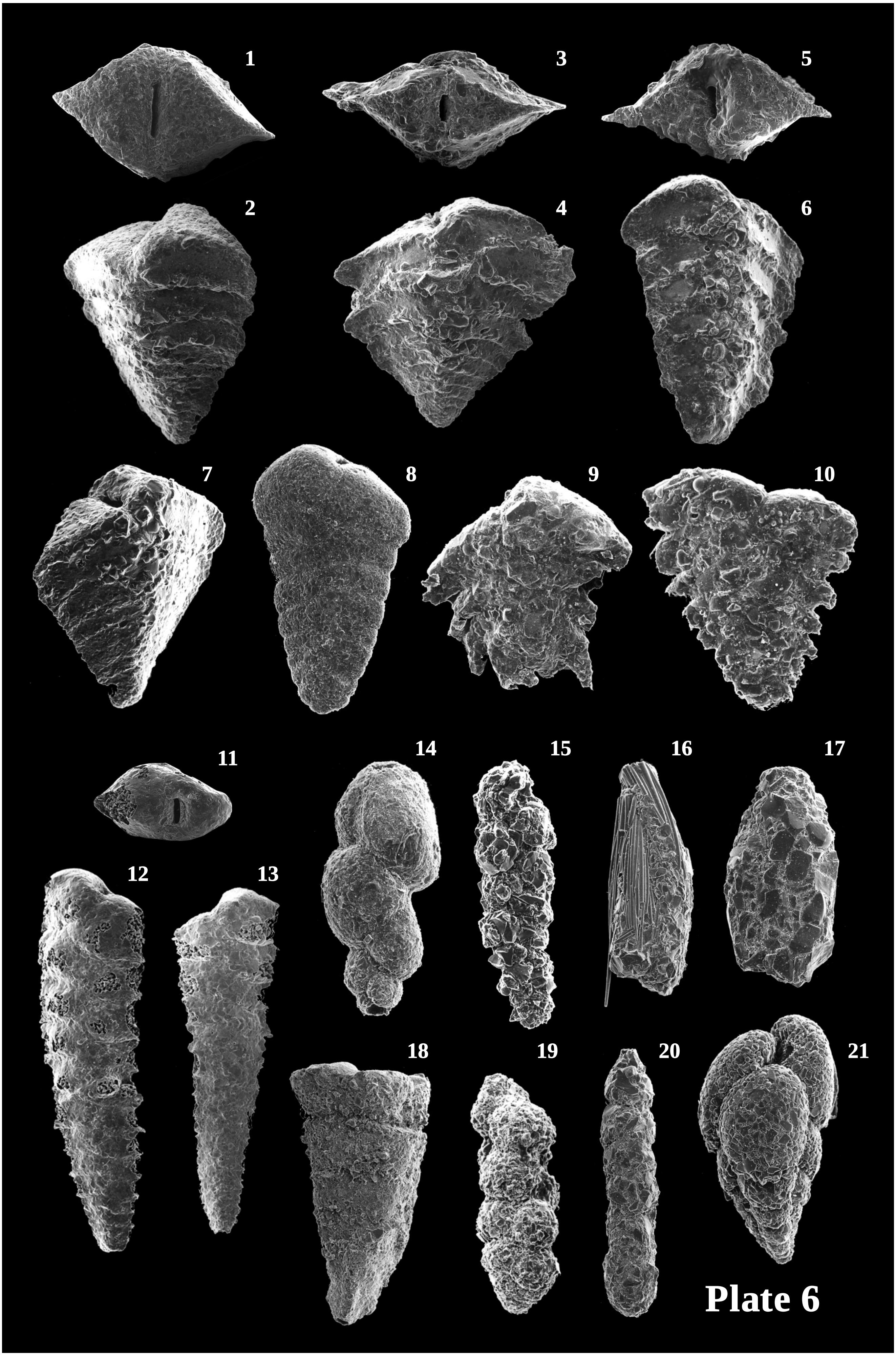
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Plate 6

Plate 7

figs **1-2** *Paratrochammina challengeri* Brönnimann & Whittaker, 1988, (**1**) dorsal, 967 µm, station 18268, (**2**) ventral, 733 µm, station 18268

fig. **3** *Tritaxis challengeri* (Hedley, Hurdle & Burdett, 1964), dorsal, 682 µm, station 18271

figs **4-5** *Tritaxis primitiva* Brönnimann & Whittaker, 1988, (**4**) dorsal, 320 µm, station 18301, (**5**) ventral, 308 µm, station 18301

fig. **6** *Trochammina inflata* (Montagu, 1808), dorsal, 328 µm, station 18292

fig. **7** *Trochamminopsis parvus* Brönnimann & Whittaker, 1988, dorsal, 656 µm, station 18268

figs **8-9** *Deuterammina grisea* (Earland, 1934), (**8**) dorsal, stained, 288 µm, station 18294, (**9**) ventral, 311 µm, station 18292

figs **10-11** *Deuterammina montagui* Brönnimann & Whittaker, 1988, (**10**) dorsal, 250 µm, station 18287, (**11**) ventral, 235 µm, station 18287

fig. **12** *Pseudotrochammina* sp. 1, ventral, 227 µm, station 18267

figs **13-14** *Earlandammina* cf. *drakensis* Brönnimann & Whittaker, 1988, (**13**) dorsal, 272 µm, station 18268, (**14**) ventral, stained, 240 µm, station 18268

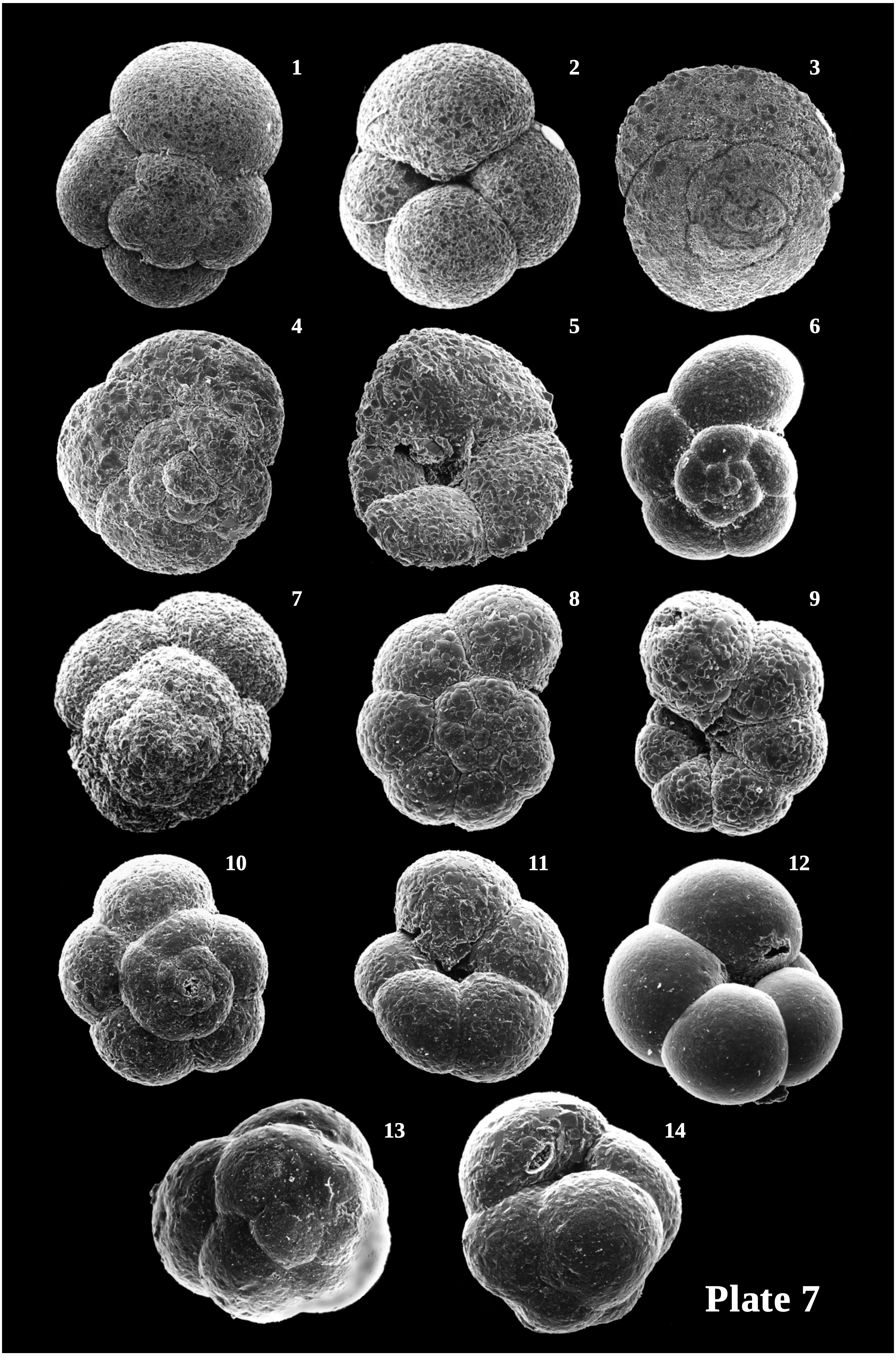
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Plate 7

Plate 8

figs **1-2**	*Dorothia scabra* (Brady, 1884), (**1**) side, 875 µm, station 18298, (**2**) side, 960 µm, station 18281
figs **3-4**	*Eggerella bradyi* (Cushman, 1911), (**3**) front, 433 µm, station 18293, (**4**) side, 425 µm, station 18292
figs **5-6**	*Karreriella* cf. *siphonella* (Reuss, 1851), (**5**) aperture, stained, 242 µm, station 18291, (**6**) side, stained, 253 µm, station 18291
fig. **7**	*Karreriella novangliae* (Cushman, 1922), side, 700 µm, station 18268
fig. **8**	*Karreriella pupiformis* Zheng, 1988, side, 866 µm, station 18292
figs **9-10**	*Martinottiella communis* (d'Orbigny, 1826), (**9**) side, 1933 µm, station 18287, (**10**) side, 858 µm, station 18268
fig. **11**	*Martinottiella milletti* (Cushman, 1936), side, 1417 µm, station 18268
figs **12-14**	*Bigenerina nodosaria* d'Orbigny, 1826, (**12**) aperture, 560 µm, station 18322, (**13**) side, 1029 µm, station 18322, (**14**) side, 1169 µm, station 18322
fig. **15**	*Bigenerina* sp. 1, side, 520 µm, station 18302
figs **16-18**	*Sahulia barkeri* (Hofker, 1978), (**16**) aperture, 506 µm, station 18269, (**17**) periphery, 487 µm, station 18269, (**18**) side, 500 µm, station 18269
figs **19-21**	*Sahulia conica* (d'Orbigny, 1839), (**19**) side, 640 µm, station 18322, (**20**) back, 347 µm, station 18311, (**21**) aperture, 567 µm, station 18322

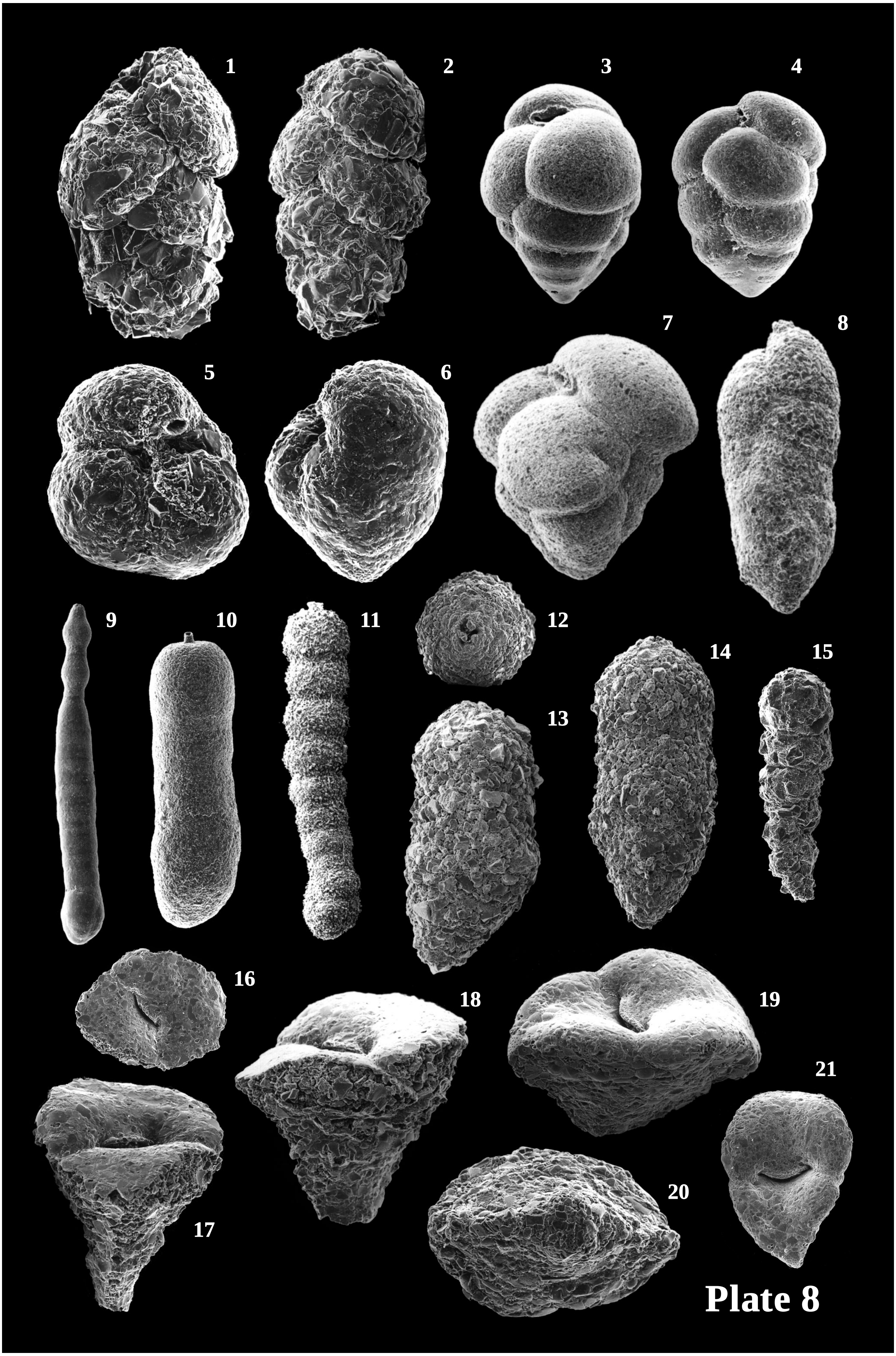

Plate 8

Plate 9

figs **1-2** *Textularia bocki* Höglund, 1947, (**1**) side, stained, 708 µm, station 18300, (**2**) side, stained, 396 µm, station 18299

figs **3-4** *Textularia* cf. *lythostrota* (Schwager, 1866), (**3**) aperture, 361 µm, station 18311, (**4**) side, 370 µm, station 18311

figs **5-6** *Textularia hauerii* d'Orbigny, 1846, (**5**) aperture, 990 µm, station 18275, (**6**) side, 1140 µm, station 18275

figs **7-8** *Textularia stricta* Cushman, 1911, (**7**) aperture, stained, 280 µm, station 18311, (**8**) side, 2420 µm, station 18308

fig. **9** *Textularia lancea* Lalicker & McCulloch, 1940, side, 680 µm, station 18311

figs **10-11** *Textularia* sp. 4, (**10**) side, 452 µm, station 18311, (**11**) periphery, 490 µm, station 18311

figs **12-14** *Textularia* sp. 5, (**12**) side, stained, 850 µm, station 18311, (**13**) periphery, stained, 676 µm, station 18311, (**14**) side, stained, 660 µm, station 18311

figs **15-16** *Siphotextularia flintii* (Cushman, 1911), (**15**) aperture, 344 µm, station 18292, (**16**) side, 300 µm, station 18292

figs **17-18** *Siphotextularia foliosa* Zheng, 1988, (**17**) side, 348 µm, station 18284, (**18**) side, stained, 329 µm, station 18284

figs **19-20** *Siphotextularia rolshauseni* (Phleger & Parker, 1951), (**19**) side, 256 µm, station 18268, (**20**) side, 249 µm, station 18268

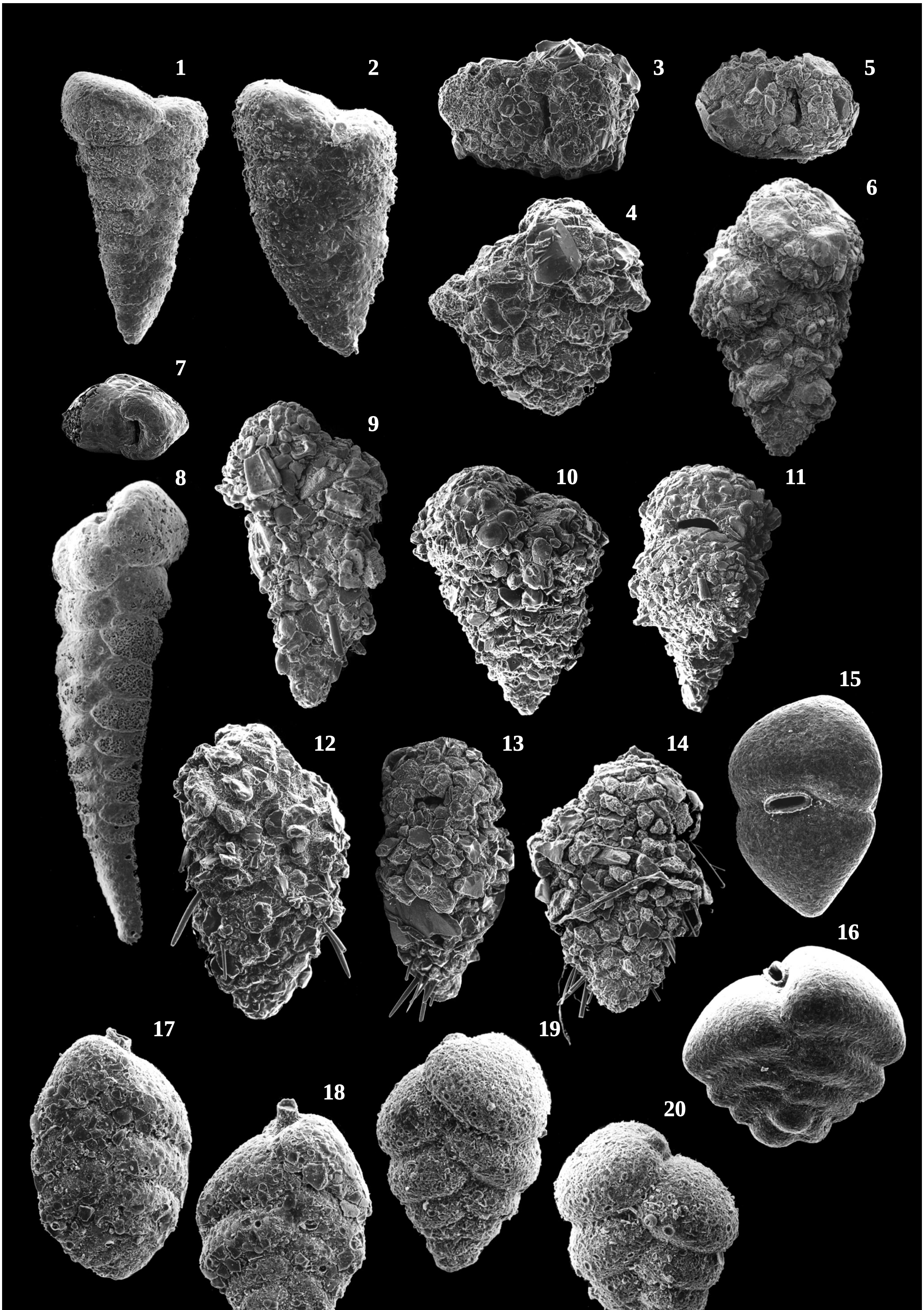

Plate 9

Plate 10

figs **1-2** *Siphotextularia mestayerae* Vella, 1957, (**1**) aperture, 276 µm, station 18304, (**2**) side, 370 µm, station 18304

figs **3-6** *Siphotextularia subplanoides* Zheng, 1988, (**3**) aperture, 390 µm, station 18311, (**4**) side, 645 µm, station 18311, (**5**) side, 500 µm, station 18306, (**6**) inside, 495 µm, station 18304

figs **7-9** *Siphotextularia* cf. *wairoana* Finlay, 1939, (**7**) aperture, 265 µm, station 18304, (**8**) side, 792 µm, station 18302, (**9**) periphery, 312 µm, station 18304

figs **10-11** *Siphotextularia* (?) sp. 1, (**10**) side, 526 µm, station 18322, (**11**) periphery, 440 µm, station 18322

fig. **12** *Cribrobigenerina* sp. 1, periphery, 590 µm, station 18311

fig. **13** *Tritaxilina atlantica* Cushman, 1922, side, 1100 µm, station 18284

figs **14-15** *Cribrobigenerina textularioidea* (Göes, 1894), (**14**) aperture, 773 µm, station 18322, (**15**) side, 1865 µm, station 18322

figs **16-17** *Pseudoclavulina serventyi* (Chapman & Parr, 1935), (**16**) aperture, 390 µm, station 18304, (**17**) side, 2500 µm, station 18271

fig. **18** *Cylindroclavulina bradyi* (Cushman, 1911), side, 1429 µm, station 18318

fig. **19** *Clavulina humilis* Brady, 1884, side, 990 µm, station 18275

fig. **20** *Tritaxilina caperata* (Brady, 1881), front, 1833 µm, station 18271

figs **21-22** *Pseudogaudryina pacifica* Cushman & McCulloch, 1939, (**21**) aperture, 288 µm, station 18304, (**22**) side, 367 µm, station 18311

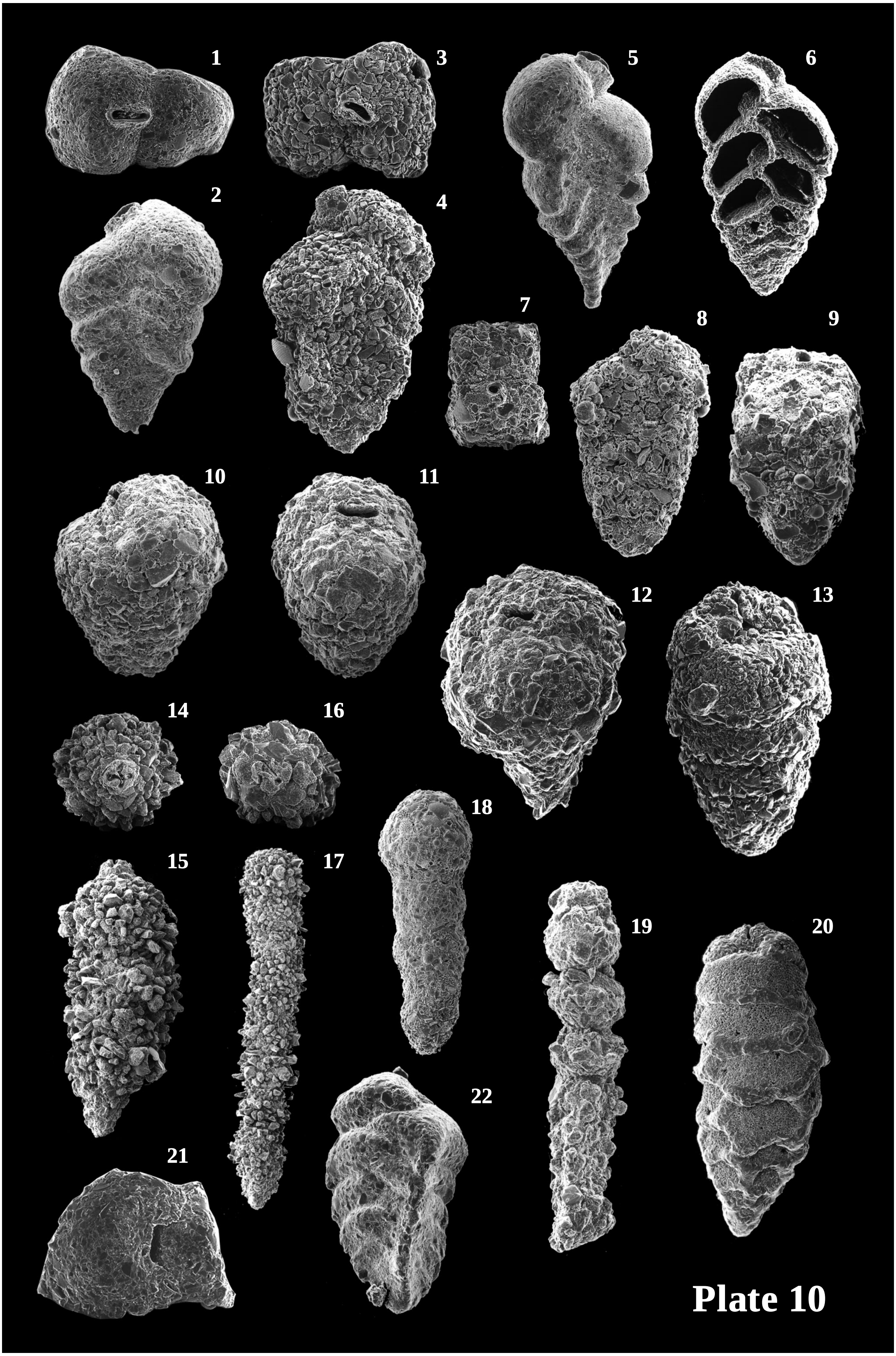

Plate 10

Plate 11

fig. **1** *Nubeculina divaricata* (Brady, 1879), side, 1136 µm, station 18311

fig. **2** *Nubeculina advena* Cushman, 1924, side, 1710 µm, station 18311

fig. **3** *Adelosina litoralis* Martinotti, 1921, right-side, 350 µm, station 18271

fig. **4** *Adelosina laevigata* d'Orbigny, 1826, right-side, 390 µm, station 18311

fig. **5** *Edentostomina cultrata* (Brady, 1881), right-side, 769 µm, station 18275

figs **6-7** *Spiroloculina communis* Cushman & Todd, 1944, (**6**) right-side, 480 µm, station 18311, (**7**) right-side, 1400 µm, station 18295

fig. **8-9** *Spirophthalmidium concava* (Wiesner, 1913), (**8**) aperture, 390 µm, station 18316, (**9**) left-side, 680 µm, station 18322

figs **10-11** *Spiroloculina manifesta* Cushman & Todd, 1944, (**10**) right-side, stained, 700 µm, station 18311, (**11**) right-side, 708 µm, station 18315

figs **12-13** *Spiroloculina eximia* Cushman, 1922, (**12**) left-side, 535 µm, station 18311, (**13**) periphery, 455 µm, station 18311

fig. **14** *Spiroloculina* cf. *robusta* Brady, 1884, right-side, 500 µm, station 18274

fig. **15** *Spiroloculina excisa* Cushman & Todd, 1944, right-side, 1417 µm, station 18307

fig. **16** *Spiroloculina scrobiculata* Cushman, 1921, left-side, 846 µm, station 18312

fig. **17** *Spiroloculina depressa* d'Orbigny, 1826, left-side, 1029 µm, station 18320

fig. **18** *Agglutinella agglutinans* (d'Orbigny, 1839), right-side, 780 µm, station 18311

fig. **19** *Agglutinella arenata* (Said, 1949), left-side, 395 µm, station 18311

figs **20-21** *Ammomassilina alveoliniformis* (Millett, 1898), (**20**) right-side, 500 µm, station 18320, (**21**) left-side, 523 µm, station 18320

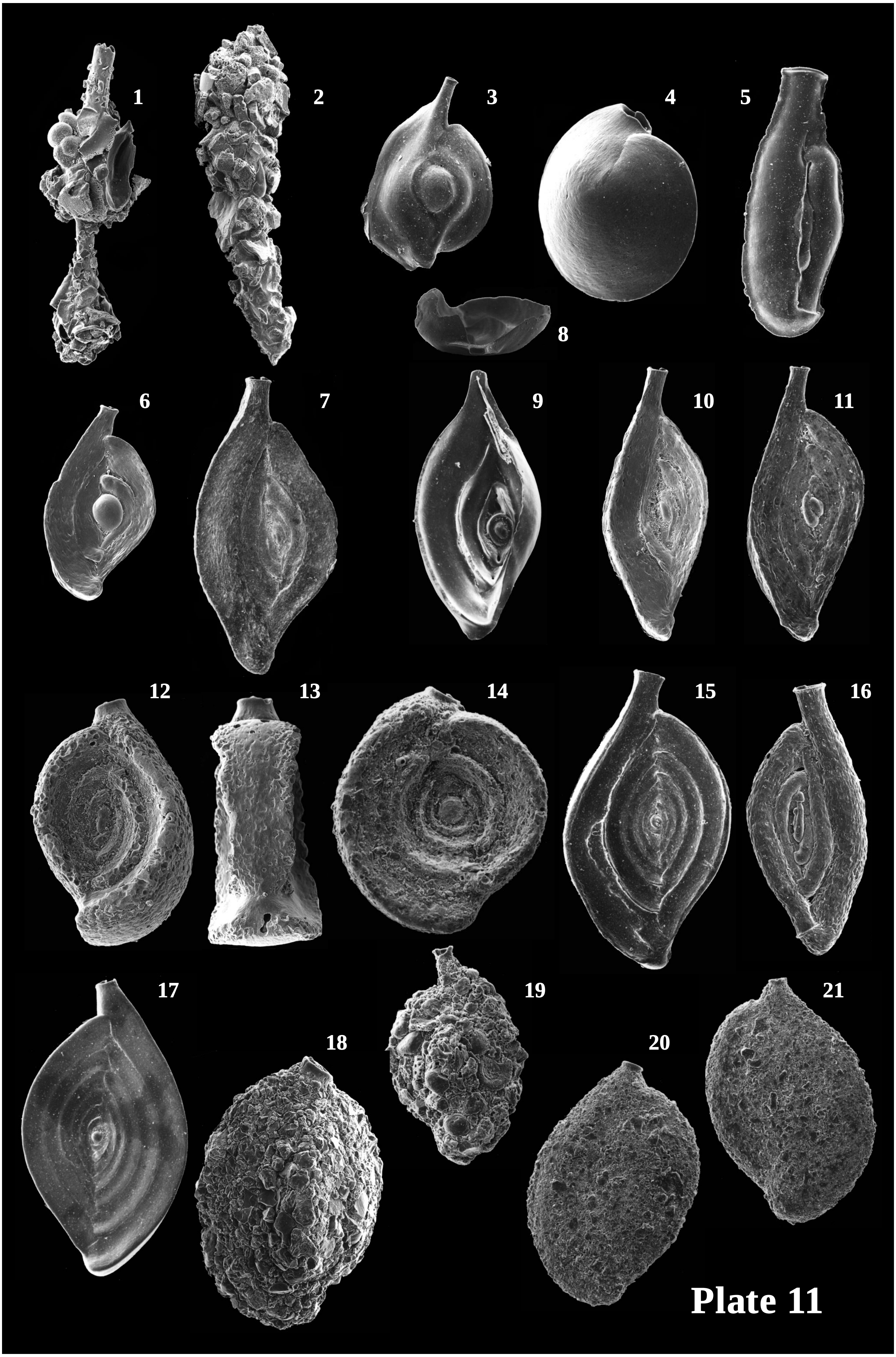

Plate 11

Plate 12

fig. **1** *Pseudoflintina laculata* Loeblich & Tappan, 1994, right-side, 864 µm, station 18275

fig. **2** *Pseudoflintina triquetra* (Brady, 1879), right-side, 1360 µm, station 18299

fig. **3** *Siphonaperta crassatina* (Brady, 1884), left-side, 817 µm, station 18311

fig. **4** *Proemassilina arenaria* (Brady, 1884), right-side, 643 µm, station 18304

fig. **5** *Pseudohauerina orientalis* (Cushman, 1946), right-side, 750 µm, station 18270

fig. **6** *Hauerina fragilissima* (Brady, 1884), left-side, 513 µm, station 18311

figs **7-8** *Pseudolachlanella slitella* Langer, 1992, (**7**) aperture, 455 µm, station 18272, (**8**) right-side, 889 µm, station 18272

figs **9-10** *Lachlanella compressiostoma* (Zheng, 1988), (**9**) aperture, 638 µm, station 18275, (**10**) left-side, stained, 700 µm, station 18275

figs **11-12** *Quinqueloculina seminulum* (Linné, 1758), (**11**) aperture, stained, 390 µm, station 18311, (**12**) right-side, stained, 533 µm, station 18311

fig. **13** *Quinqueloculina* ex gr. *auberiana* d'Orbigny, 1839, left-side, 640 µm, station 18311

fig. **14** *Quinqueloculina bicarinata* d'Orbigny, 1826, left-side, 650 µm, station 18322

figs **15-16** *Quinqueloculina subcurta* Zheng, 1988, (**15**) aperture, 404 µm, station 18311, (**16**) left-side, 474 µm, station 18311

figs **17-18** *Quinqueloculina* ex gr. *philippinensis* Cushman, 1921, (**17**) aperture, 545 µm, station 18311, (**18**) left-side, 640 µm, station 18311

figs **19-20** *Quinqueloculina collumnosa* Cushman, 1922, (**19**) aperture, 515 µm, station 18269, (**20**) left-side, 814 µm, station 18269

fig. **21** *Quinqueloculina fichteliana* (d'Orbigny, 1839), left-side, 432 µm, station 18311

fig. **22** *Quinqueloculina adiazeta* Loeblich & Tappan, 1994, right-side, 770 µm, station 18311

fig. **23** *Quinqueloculina tropicalis* Cushman, 1924, right-side, 400 µm, station 18323

fig. **24** *Quinqueloculina sagamiensis* Asano, 1936, right-side, 1600 µm, station 18316

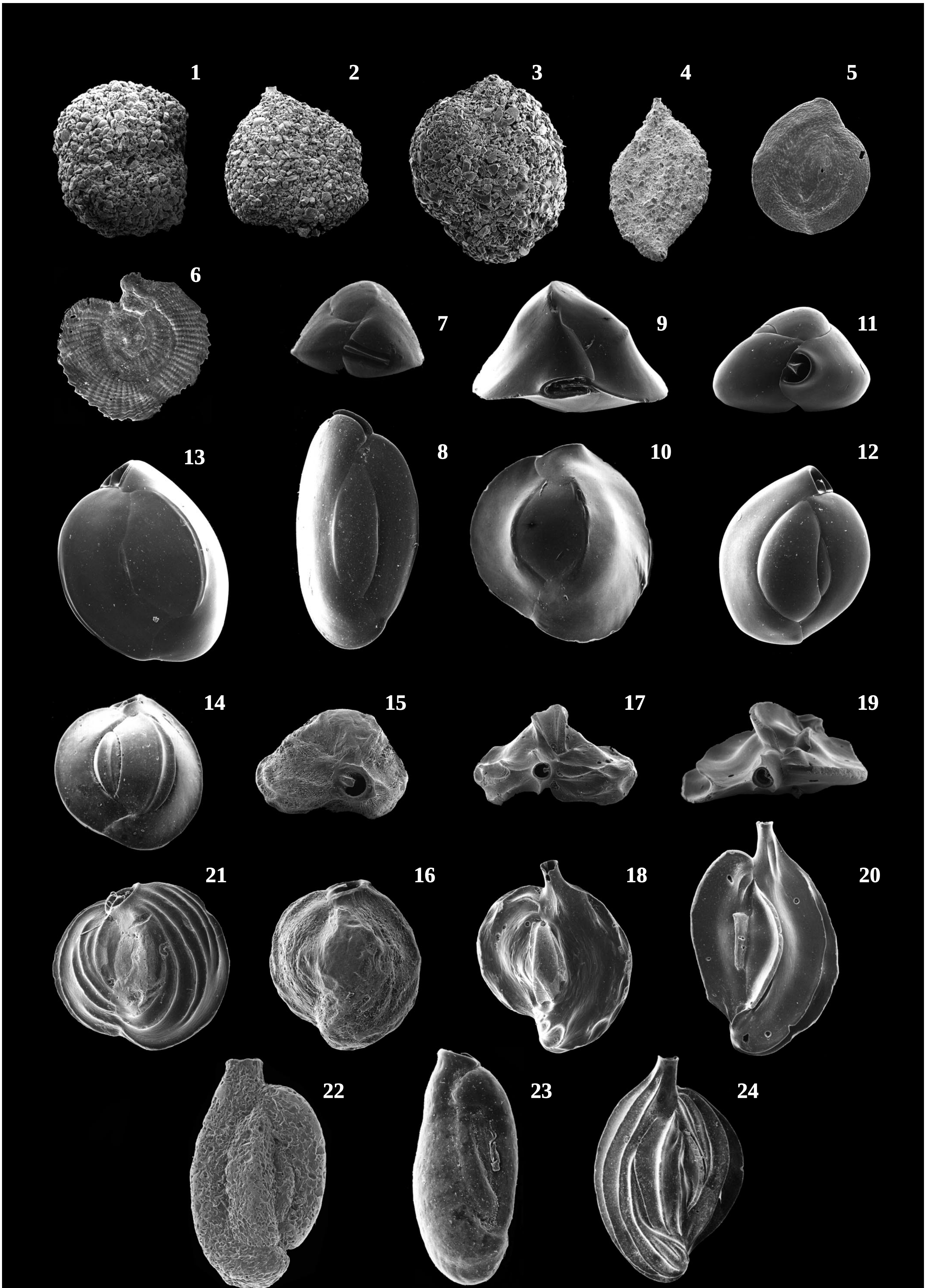

Plate 12

Plate 13

fig. **1** *Quinqueloculina* sp., front, 567 µm, station 18311

figs **2-3** *Biloculinella inflata* (Wright, 1902), (**2**) aperture, 522 µm, station 18304, (**3**) front, 555 µm, station 18304

fig. **4** *Pseudotriloculina lunata* (Zheng, 1988), front, 350 µm, station 18283

figs **5-6** *Pyrgoella tenuiaperta* (Huang, 1970), (**5**) aperture, 400 µm, station 18305, (**6**) front, 400 µm, station 18305

figs **7-8** *Pseudotriloculina lunata* (Zheng, 1988), (**7**) front, 312 µm, station 18302, (**8**) side, 317 µm, station 18302

fig. **9** *Biloculinella labiata* (Schlumberger, 1891), front, 427 µm, station 18269

fig. **10** *Pyrgo murrhina* (Schwager, 1866), front, 1033 µm, station 18292

figs **11-12** *Pyrgo sarsi* (Schlumberger, 1891), (**11**) front, 390 µm, station 18275, (**12**) periphery, 422 µm, station 18275

figs **13-15** *Triloculina tricarinata* d'Orbigny, 1826, (**13**) front, 435 µm, station 18308, (**14**) apreture, 300 µm, station 18308, (**15**) side, 308 µm, station 18308

fig. **16** *Sigmoilopsis carinata* Zheng, 1988, right-side, 477 µm, station 18284

figs **17-18** *Triloculina* cf. *pentagonalis* Wang *et al.,* 1978 (**17**) aperture, 452 µm, station 18311, (**18**) side, 467 µm, station 18311

fig. **19** *Sigmoilinita asperula* (Karrer, 1868), left-side, 390 µm, station 18302

fig. **20** *Spirosigmoilina pusilla* (Earland, 1934), right-side, 491 µm, station 18283

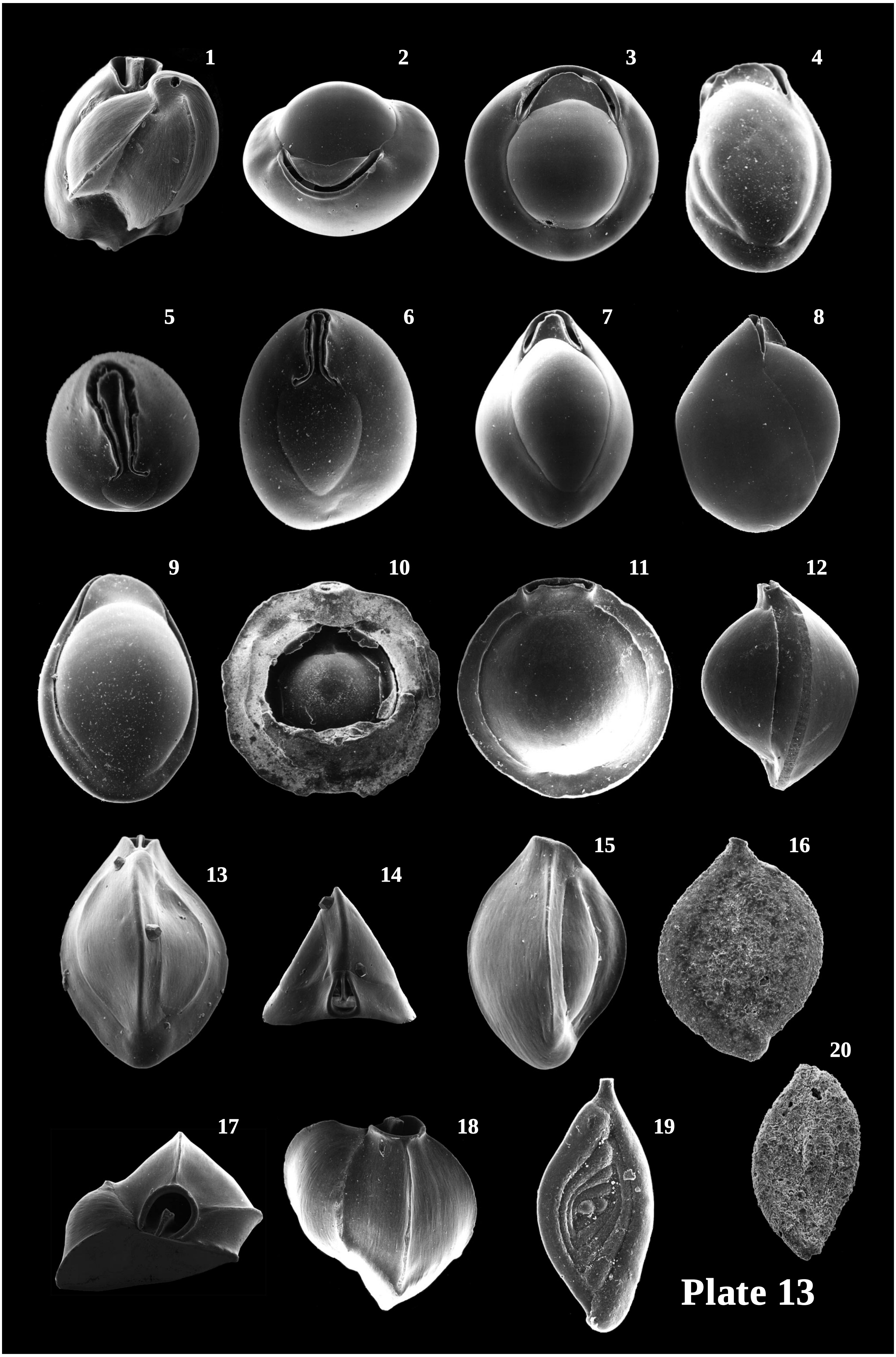
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Plate 13

Plate 14

fig. **1** *Grigelis semirugosus* (d'Orbigny, 1846), side, 7353 µm, station 18270

fig. **2** *Dentalina albatrossi* (Cushman, 1923), side, 1457 µm, station 18314

fig. **3** *Dentalina catenulata* (Brady, 1884), side, 1310 µm, station 18297

fig. **4** *Dentalina ruidarostrata* Loeblich & Tappan, 1994, side, 1072 µm, station 18297

fig. **5** *Laevidentalina inflexa* (Reuss, 1866), side, stained, 1738 µm, station 18268

fig. **6** *Laevidentalina sidebottomi* (Cushman, 1933), side, 1063 µm, station 18279

fig. **7** *Laevidentalina filiformis* (d'Orbigny, 1826), side, 1800 µm, station 18271

fig. **8** *Vaginulinopsis sublegumen* Parr, 1950, side, 1286 µm, station 18270

figs **9-10** *Marginulinopsis tenuis* (Bornemann, 1855), (**9**) aperture, 155 µm, station 18283, (**10**) side, 119 µm, station 18283

fig. **11** *Pyramidulina luzonensis* (Cushman, 1921), side, 2000 µm, station 18270

fig. **12** *Marginulinopsis* cf. *philippinensis* (Cushman, 1921), right-side, 929 µm, station 18295

fig. **13** *Planularia californica* (Galloway & Wissler, 1927), right-side, 866 µm, station 18283

fig. **14** *Planularia gemmata* (Brady, 1881), right-side, 1250 µm, station 18273

fig. **15** *Amphicoryna hirsuta* (d'Orbigny, 1826), side, 2000 µm, station 18295

fig. **16** *Amphicoryna sublineata* (Brady, 1884), side, 1430 µm, station 18311

fig. **17** *Amphicoryna separans* (Brady, 1884), side, 1089 µm, station 18284

fig. **18** *Amphicoryna scalaris* (Batsch, 1791), side, 525 µm, station 18275

figs **19-20** *Amphicoryna papillosa* (O. Silvestri, 1872), (**19**) side, 2000 µm, station 18281, (**20**) detail, 428 µm, station 18281

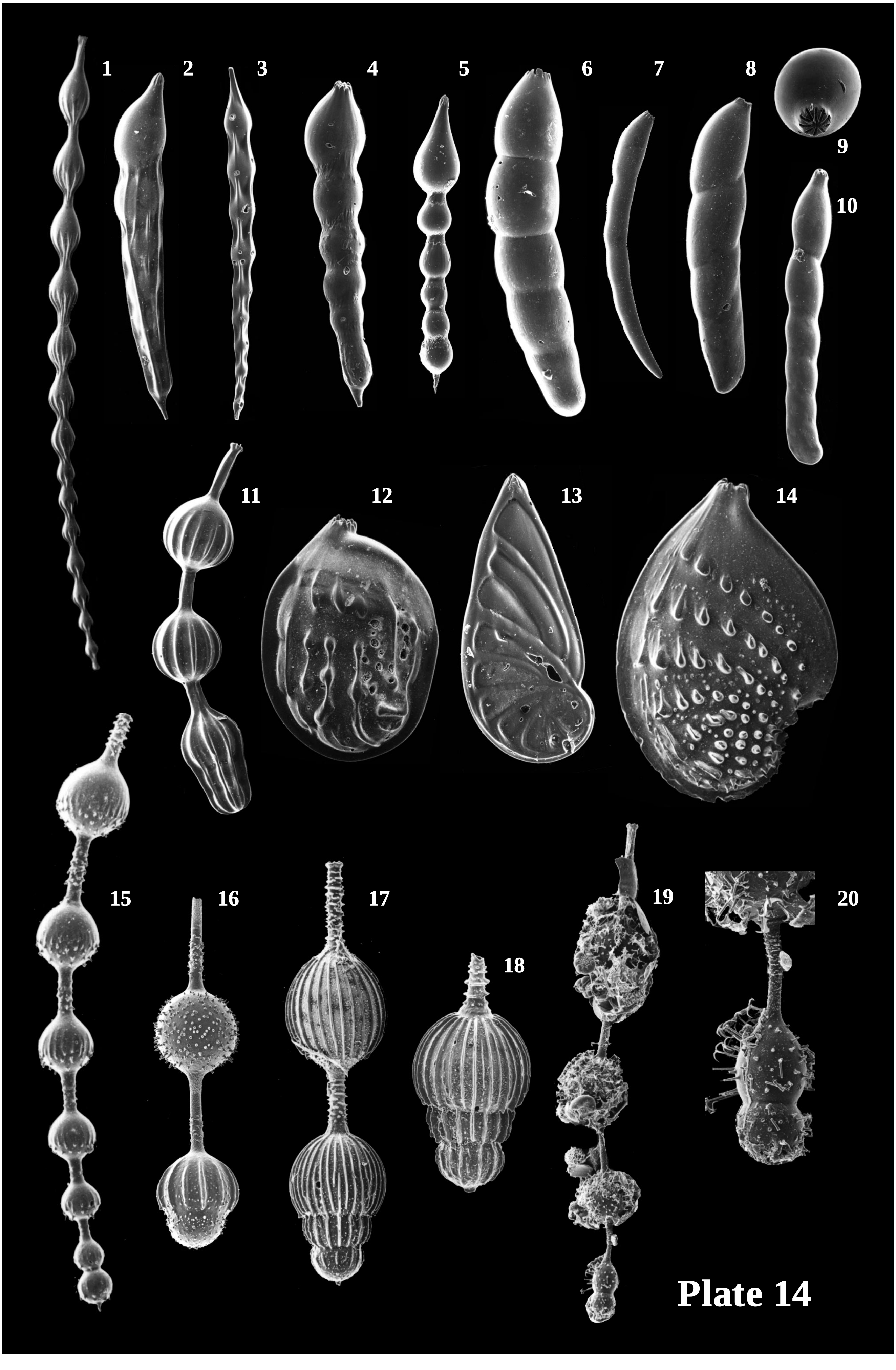
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Plate 14

Plate 15

figs **1-2** *Lenticulina gibba* (d'Orbigny, 1839), (**1**) right-side, 511 µm, station 18284, (**2**) front, 483 µm, station 18284

fig. **3** *Lenticulina echinata* (d'Orbigny, 1846), right-side, 1500 µm, station 18305

fig. **4** *Lenticulina atlantica* (Barker, 1960), right-side, 554 µm, station 18284

figs **5-6** *Lenticulina calcar* (Linné, 1758), (**5**) right-side, 370 µm, station 18322, (**6**) front, 375 µm, station 18322

fig. **7** *Lenticulina vortex* (Fichtel & Moll, 1798), right-side, 591 µm, station 18297

fig. **8** *Lenticulina submamilligera* (Cushman, 1917), right-side, 505 µm, station 18284

fig. **9** *Lenticulina anaglypta* (Loeblich & Tappan, 1987), right-side, 2000 µm, station 18313

fig. **10** *Neolenticulina peregrina* (Schwager, 1866), right-side, 670 µm, station 18284

fig. **11** *Robertinoides wiesneri* (Parr, 1950), front, 455 µm, station 18322

fig. **12** *Seabrookia pellucida* Brady, 1890, back, 308 µm, station 18271

fig. **13** *Alliatina variabilis* (Zheng, 1978), dorsal, 460 µm, station 18311

fig. **14** *Alliatinella differens* (McCulloch, 1977), ventral, 304 µm, station 18320

fig. **15** *Ramulina globulifera* Brady, 1879, side, 1333 µm, station 18273

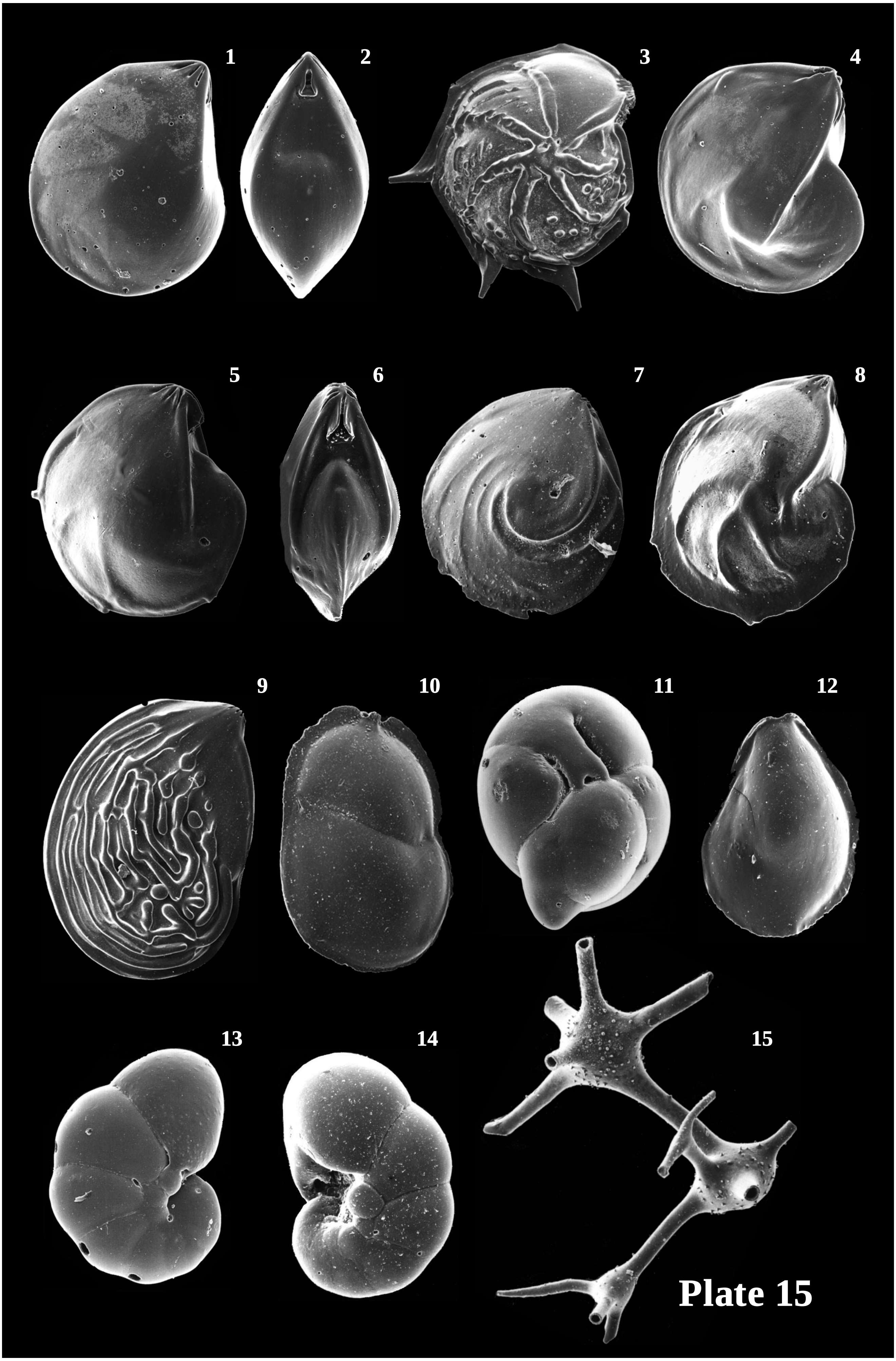
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Plate 15

Plate 16

figs **1-2** *Ceratobulimina jonesiana* (Brady, 1881), (**1**) dorsal, 656 µm, station 18292, (**2**) ventral, 460 µm, station 18292

figs **3-5** *Hoeglundina elegans* (d'Orbigny, 1826), (**3**) dorsal, 673 µm, station 18304, (**4**) periphery, 750 µm, station 18269, (**5**) ventral, 736 µm, station 18269

figs **6-7** *Bolivina spathulata* (Williamson, 1858), (**6**) aperture, 187 µm, station 18269, (**7**) right-side, 514 µm, station 18269

figs **8-9** *Bolivina pusilla* Schwager, 1866, (**8**) aperture, 232 µm, station 18304, (**9**) left-side, 535 µm, station 18304

figs **10-11** *Bolivina robusta* Brady, 1881, (**10**) aperture, 250 µm, station 18287, (**11**) right-side, 436 µm, station 18287

fig. **12** *Bolivina macella* Belford, 1966, left-side, 747 µm, station 18320

fig. **13** *Bolivina subreticulata* Parr, 1932, right-side, 433 µm, station 18284

figs **14-15** *Bolivina subaenariensis* var. *mexicana* Cushman, 1922, (**14**) right-side, 811 µm, station 18284, (**15**) left-side, 623 µm, station 18283

figs **16-17** *Globocassidulina subglobosa* (Brady, 1881), (**16**) front, 270 µm, station 18287, (**17**) front, 277 µm, station 18293

figs **18-20** *Lernella inflata* (LeRoy, 1944), (**18**) ventral, 476 µm, station 18287, (**19**) aperture, 371 µm, station 18287, (**20**) side, 500 µm, station 18287

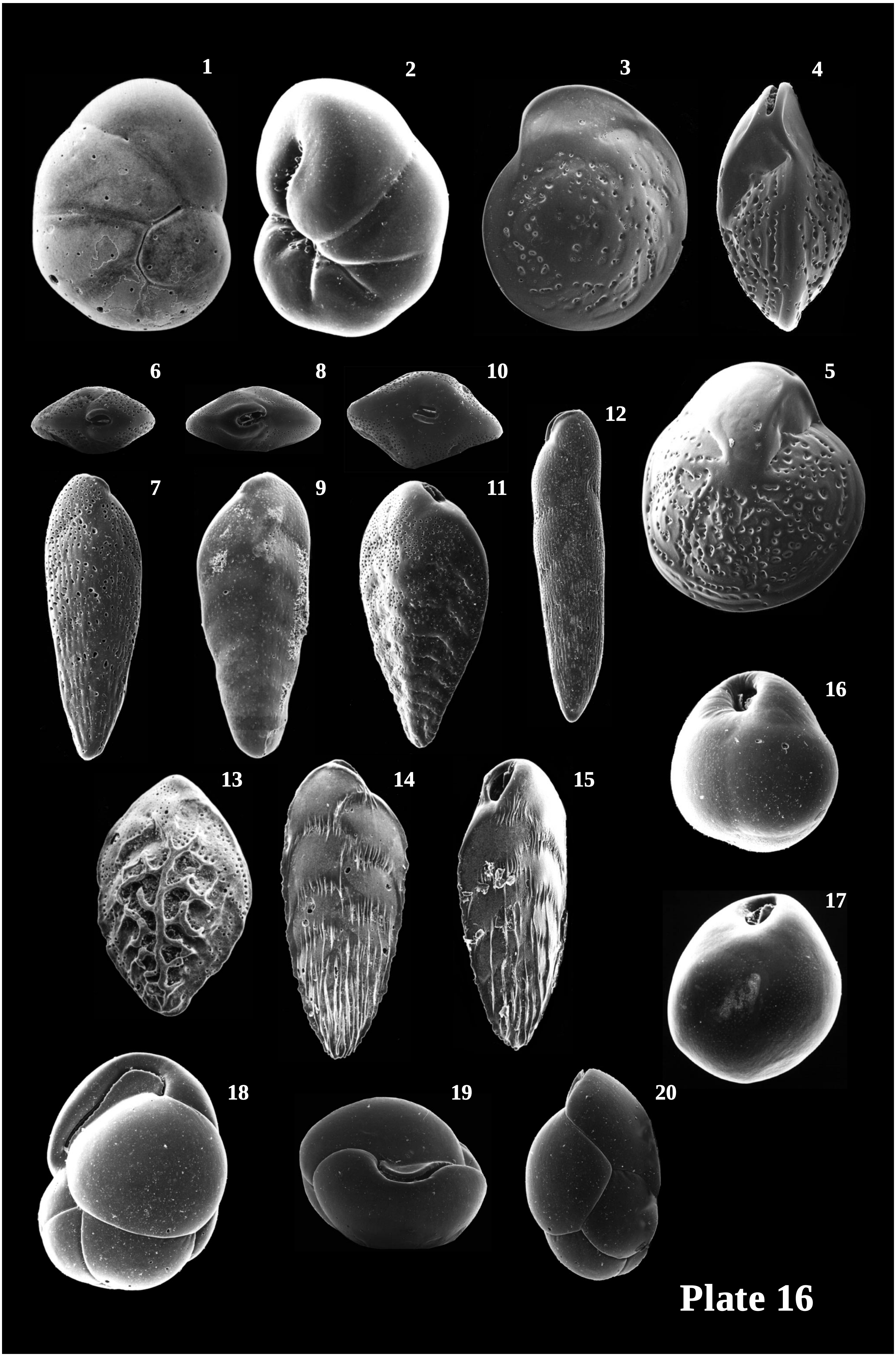

Plate 16

Plate 17

figs **1-2** *Cassidulina carinata* Silvestri, 1896, (**1**) ventral, 306 µm, station 18292, (**2**) dorsal, 300 µm, station 18292

figs **3-5** *Islandiella japonica* (Asano & Nakamura, 1937), (**3**) ventral, 300 µm, station 18302,
(**4**) periphery, 297 µm, station 18302, (**5**) dorsal, 304 µm, station 18302

fig. **6** *Ehrenbergina undulata* Parker, 1953, front, 358 µm, station 18287

fig. **7** *Cassidelina subcapitata* (Zheng, 1979), front, 611 µm, station 18318

fig. **8** *Neocassidulina abbreviata* (Heron-Allen & Earland, 1924), front, 440 µm, station 18308

figs **9-10** *Euloxostomum pseudobeyrichi* (Cushman, 1926), (**9**) aperture, 237 µm, station 18284, (**10**) right-side, 713 µm, station 18284

figs **11-13** *Saidovina amygdalaeformis* (Brady, 1881), (**11**) left-side, 850 µm, station 18312,
(**12**) aperture, 250 µm, station 18302, (**13**) right-side, 380 µm, station 18302

fig. **14** *Allassoida virgula* (Brady, 1879), side, 495 µm, station 18311

fig. **15** *Sagrina jugosa* (Brady, 1884), (**15**) left-side, 269 µm, station 18260

figs **16-17** *Siphogenerina striatula* Cushman, 1913, (**16**) aperture, 220 µm, station 18284,
(**17**) side, 693 µm, station 18284

fig. **18** *Siphogenerina raphana* (Parker & Jones, 1865), side, stained, 583 µm, station 18281

fig. **19** *Bulimina aculeata* d'Orbigny, 1826, front, 244 µm, station 18292

fig. **20** *Bulimina mexicana* Cushman, 1922, front, 250 µm, station 18292

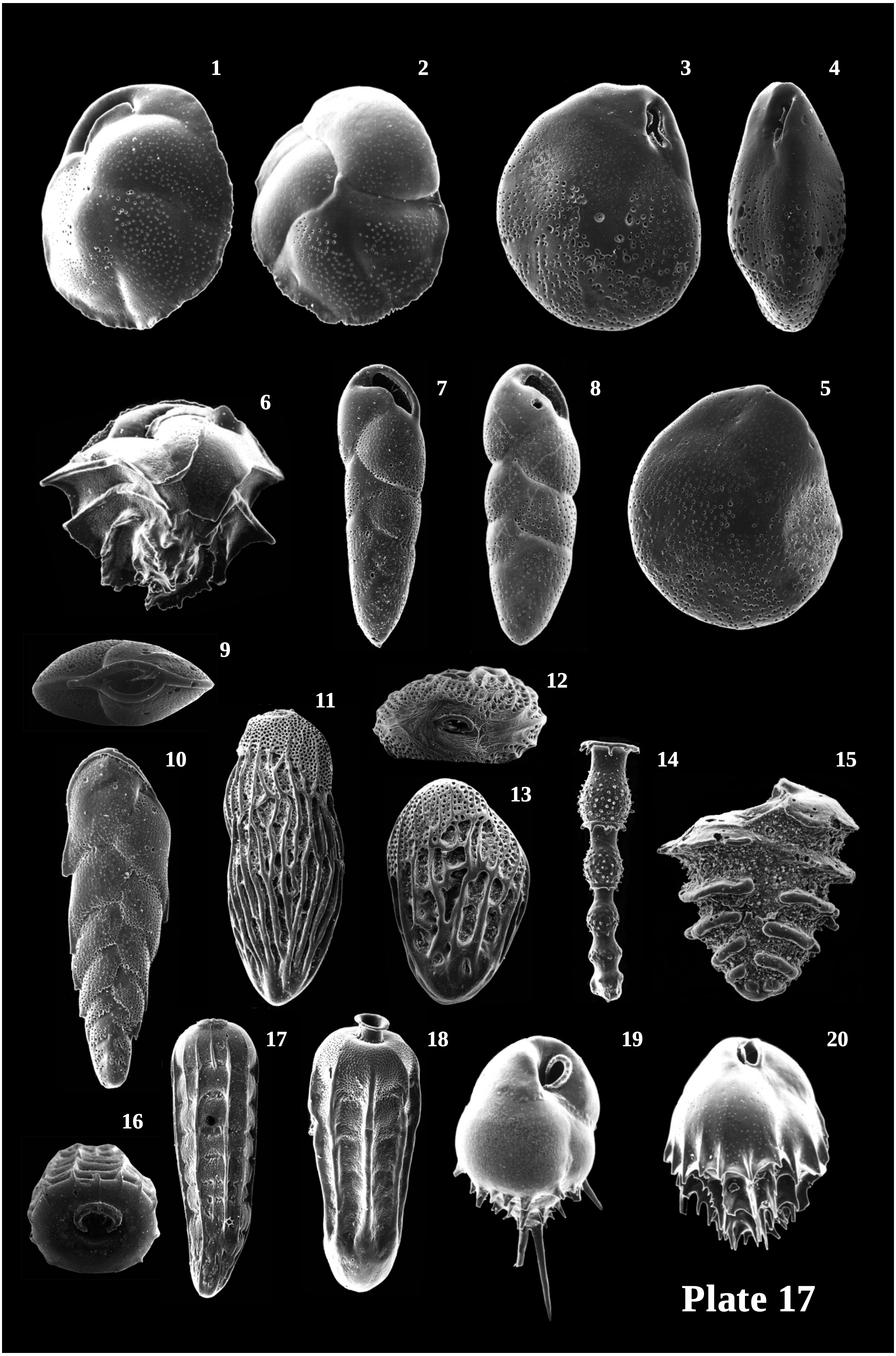

Plate 17

Plate 18

fig. **1** *Bulimina affinis* d'Orbigny, 1839, front, 733 µm, station 18292

figs **2-5** *Bulimina marginata* d'Orbigny, 1826, (**2**) aperture, 176 µm, station 18302, (**3**) front, 255 µm, station 18302, (**4**) front, 365 µm, station 18302, (**5**) front, 240 µm, station 18311

fig. **6** *Bulimina striata* d'Orbigny, 1826, front, 361 µm, station 18292

figs **7-8** *Praeglobobulimina spinescens* (Brady, 1884), (**7**) aperture, 294 µm, station 18287, (**8**) front, 581 µm, station 18287

fig. **9** *Neouvigerina interrupta* (Brady, 1879), side, 504 µm, station 18284

fig. **10** *Neouvigerina proboscidea* (Schwager, 1866), side, 500 µm, station 18278

figs **11-12** *Uvigerina* ex gr. *auberiana* d'Orbigny, 1839, (**11**) side, 492 µm, station 18292, (**12**) side, 433 µm, station 18292

fig. **13** *Uvigerina peregrina* Cushman, 1923, side, 535 µm, station 18284

figs **14-16** *Uvigerina schwageri* Brady, 1884, (**14**) aperture, 547 µm, station 18304, (**15**) side, 877 µm, station 18304, (**16**) side, 673 µm, station 18275

fig. **17** *Uvigerina schwageri* Brady, 1884, type 3, side, 486 µm, station 18269

figs **18-19** *Reussella spinulosa* (Reuss, 1850), (**18**) front, 390 µm, station 18302, (**19**) aperture, 250 µm, station 18302

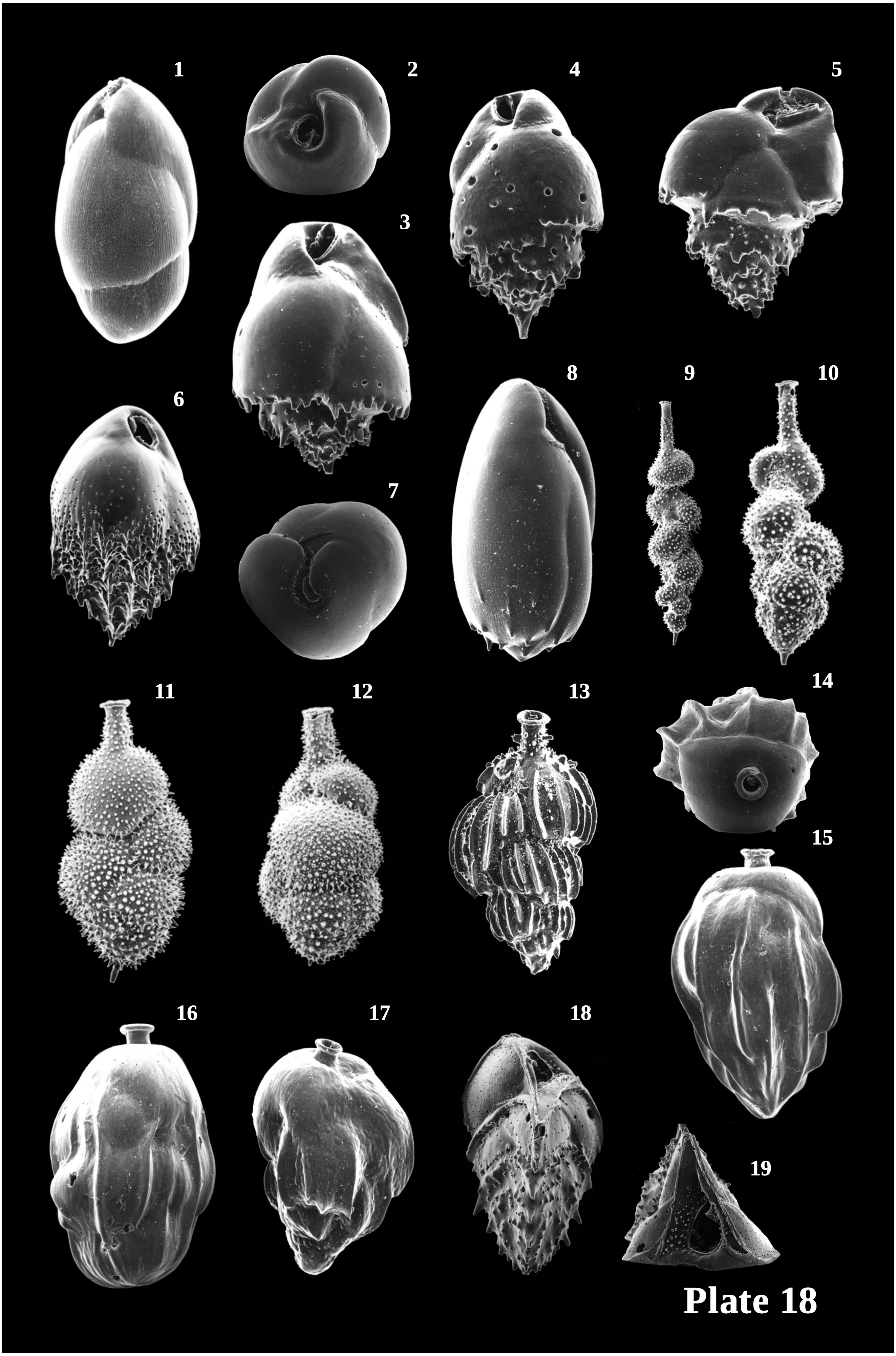
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Plate 18

Plate 19

figs **1-3** *Cancris auriculus* (Fichtel & Moll, 1798), (**1**) ventral, 520 µm, station 18304, (**2**) periphery, 365 µm, station 18311, (**3**) dorsal, 365 µm, station 18311

fig. **4** *Cancris oblongus* (d'Orbigny, 1839), ventral, 682 µm, station 18282

fig. **5** *Cancris carinatus* (Millett, 1904), ventral, 642 µm, station 18284

figs **6-7** *Baggina indica* (Cushman, 1921), (**6**) ventral, 720 µm, station 18276, (**7**) periphery, 708 µm, station 18276

fig. **8** *Valvulineria minuta* (Schubert, 1904), ventral, 307 µm, station 18284

figs **9-11** *Eponides repandus* (Fichtel & Moll, 1798), (**9**) ventral, 326 µm, station 18302, (**10**) periphery, 330 µm, station 18302, (**11**) dorsal, 538 µm, station 18317

fig. **12** *Eponides cribrorepandus* (Asano & Uchio, 1951), dorsal, 650 µm, station 18320

figs **13-15** *Helenina anderseni* (Warren, 1957), (**13**) ventral, 275 µm, station 18311, (**14**) periphery, 266 µm, station 18311, (**15**) dorsal, 390 µm, station 18322

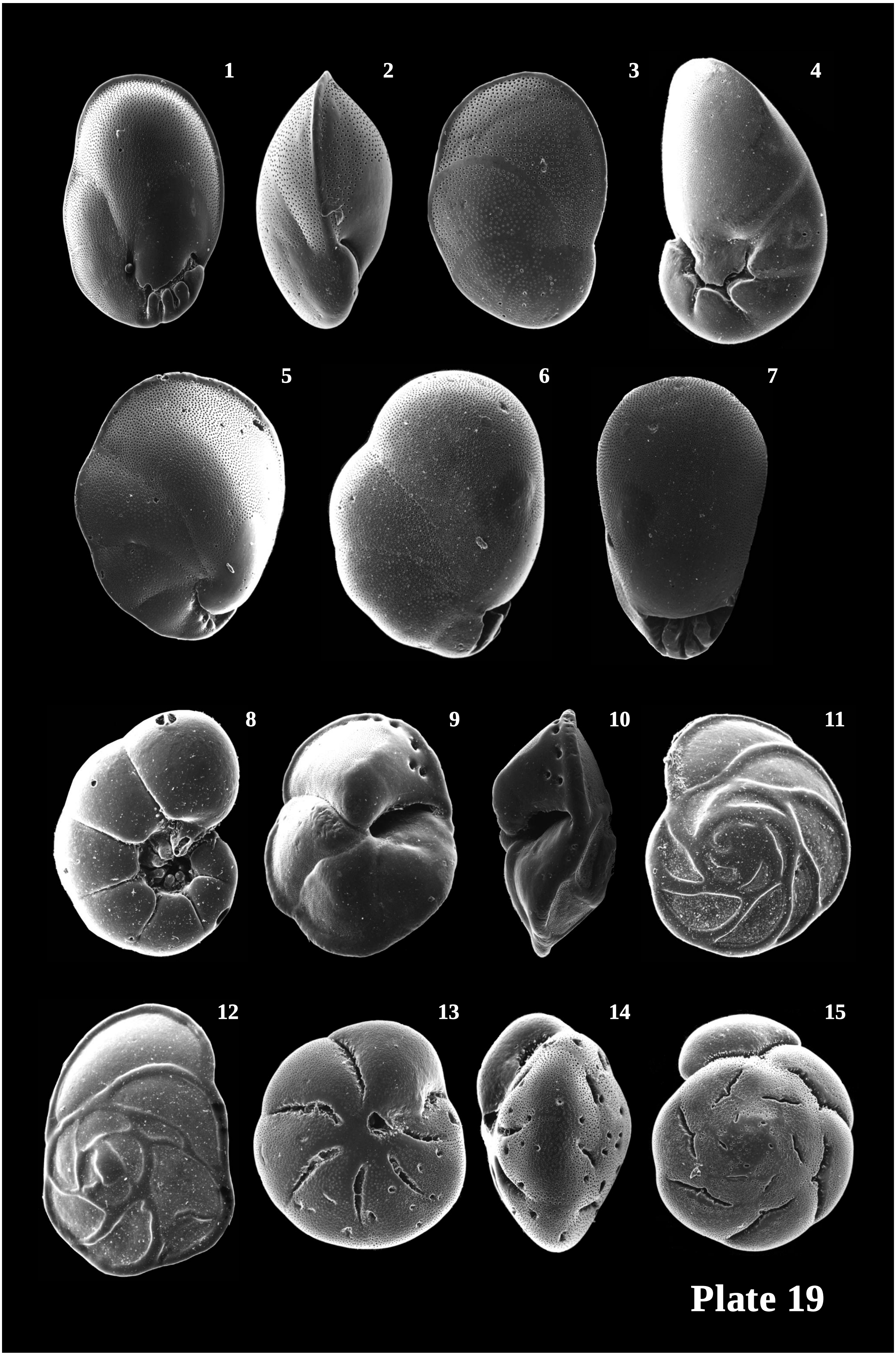

Plate 19

Plate 20

figs **1-2** *Mississippina chathamensis* McCulloch, 1977, (**1**) ventral, 395 µm, station 18270, (**2**) periphery, 417 µm, station 18270

fig. **3** *Gavelinopsis lobatulus* (Parr, 1950), dorsal, 333 µm, station 18287

fig. **4** *Gavelinopsis translucens* (Phleger & Parker, 1951), dorsal, 323 µm, station 18291

figs **5-7** *Neoeponides bradyi* Le Calvez 1974, (**5**) dorsal, 567 µm, station 18322, (**6**) ventral, stained, 623 µm, station 18311, (**7**) dorsal, 727 µm, station 18311

fig. **8** *Neoeponides auberii* (d'Orbigny, 1839), dorsal, 269 µm, station 18285

fig. **9** *Neoconorbina tuberocapitata* (Chapman, 1900), dorsal, 416 µm, station 18283

fig. **10** *Rosalina globularis* d'Orbigny, 1826, dorsal, 267 µm, station 18298

fig. **11** *Siphonina tubulosa* Cushman, 1924, ventral, 538 µm, station 18271

figs **12-13** *Siphonina bradyana* Cushman, 1927, (**12**) dorsal, 264 µm, station 18284, (**13**) ventral, 394 µm, station 18284

figs **14-15** *Facetocochlea pulchra* (Cushman, 1933), (**14**) dorsal, 313 µm, station 18269, (**15**) ventral, 315 µm, station 18302

figs **16-18** *Poroepistominella decoratiformis* (McCulloch, 1977), (**16**) dorsal, 431 µm, station 18304, (**17**) periphery, 408 µm, station 18322, (**18**) ventral, 405 µm, station 18322

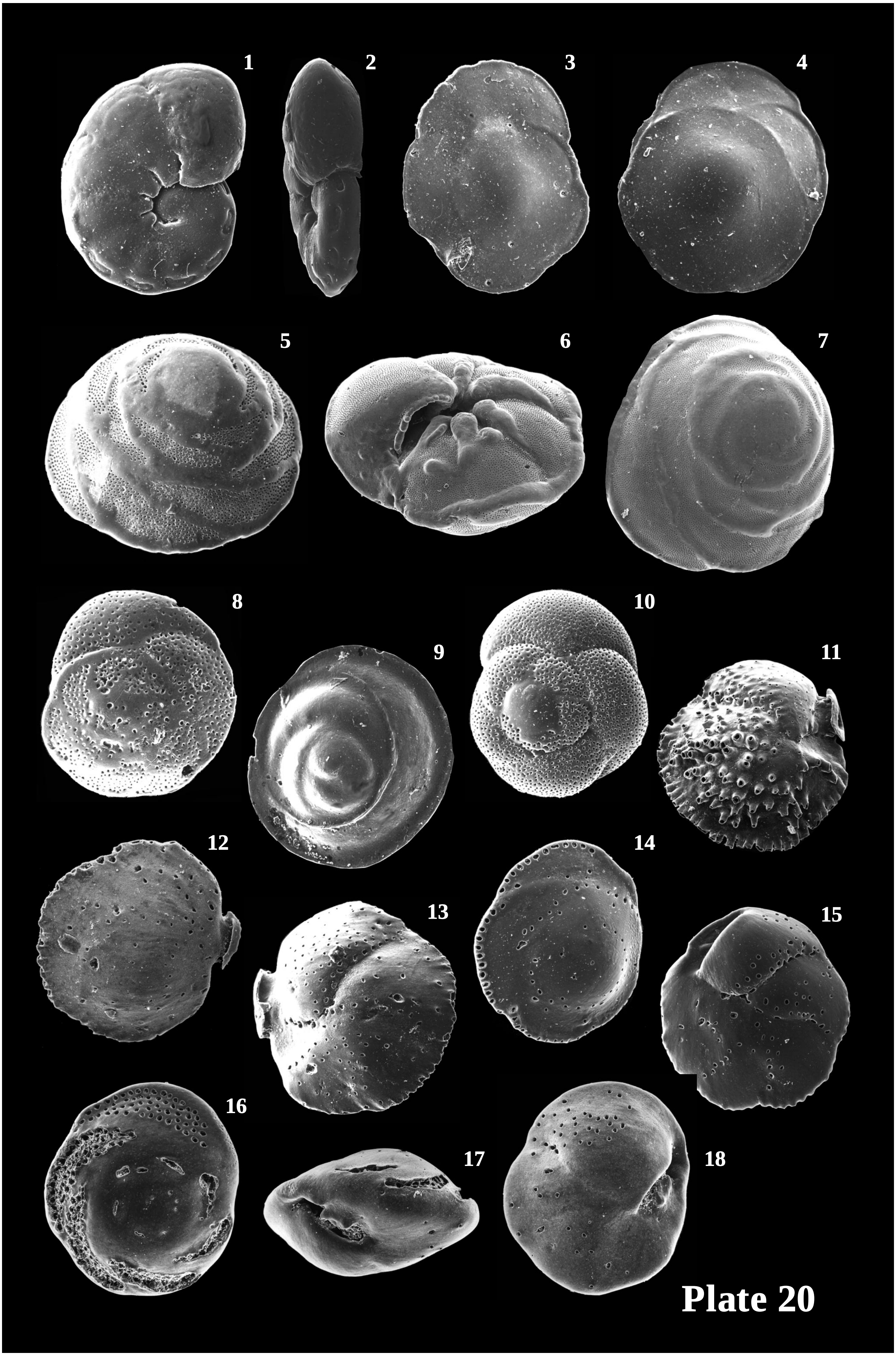

Plate 20

Plate 21

figs **1-3** *Discorbinella bertheloti* (d'Orbigny, 1839), (**1**) dorsal, 533 µm, station 18304, (**2**) ventral, 545 µm, station 18308, (**3**) dorsal, 356 µm, station 18322

fig. **4** *Discorbinella montereyensis* Cushman & Martin, 1935, ventral, 700 µm, station 18275

fig. **5** *Discorbinella bodjongensis* (LeRoy, 1941), dorsal, stained, 550 µm, station 18311

figs **6-8** *Discorbinella* sp. 1, (**6**) ventral, 460 µm, station 18311, (**7**) periphery, 367 µm, station 18311, (**8**) dorsal, 366 µm, station 18311

figs **9-10** *Laticarinina pauperata* (Parker & Jones, 1865), (**9**) left-side, 722 µm, station 18293,
(**10**) left-side, 1350 µm, station 18268

fig. **11** *Parrelloides bradyi* (Trauth, 1918), dorsal, 272 µm, station 18292

fig. **12** *Hyalinea balthica* (Schröter, 1783), right-side, 542 µm, station 18286

figs **13-14** *Cibicidoides* ex gr. *pachyderma* (Rzehak, 1886), (**13**) dorsal, 643 µm, station 18275,
(**14**) ventral, 550 µm, station 18284

figs **15-16** *Paracibicides endomica* Perelis & Reiss, 1975, (**15**) dorsal, 373 µm, station 18302, (**16**) periphery, 373 µm, station 18302

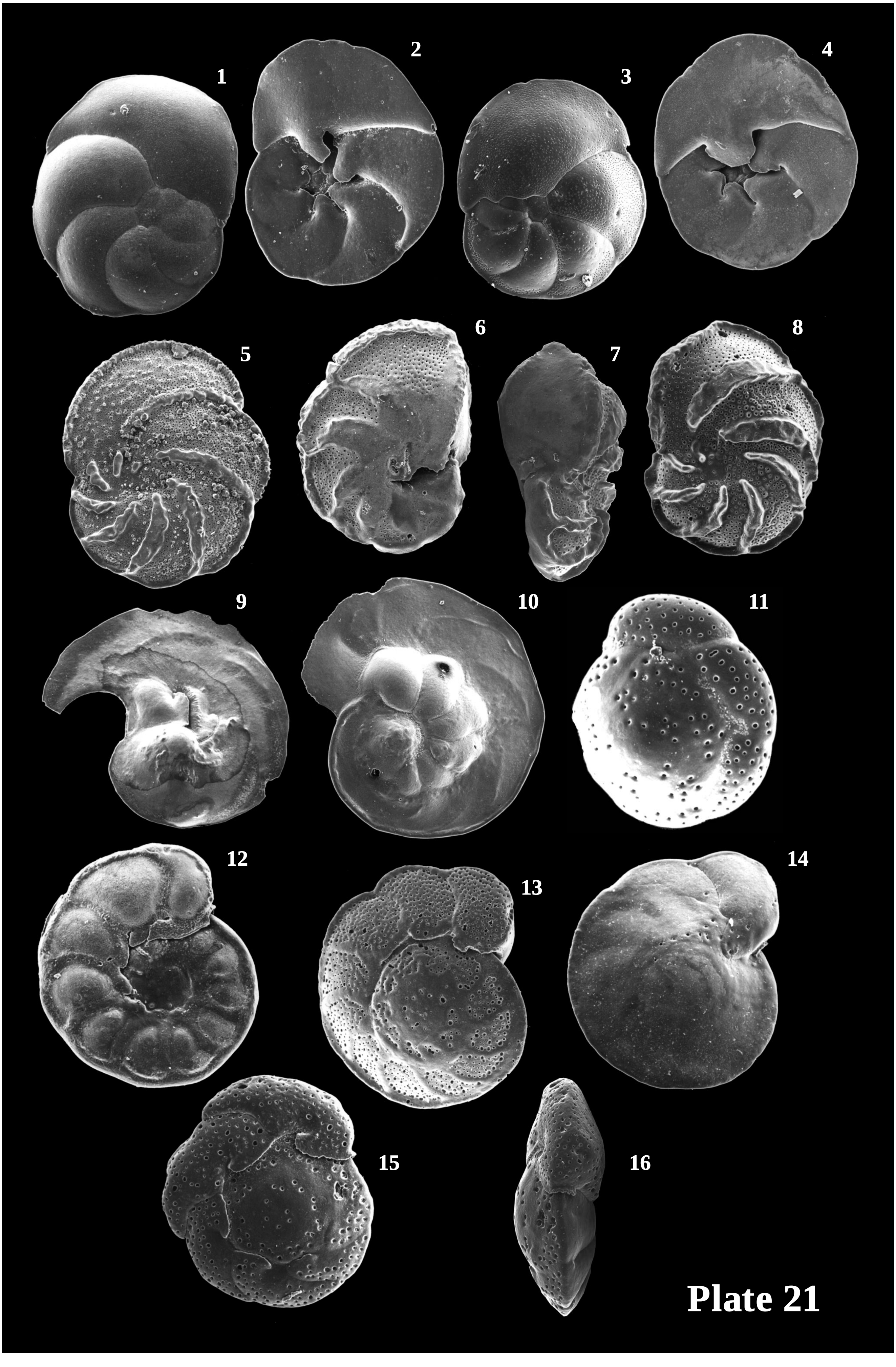

Plate 21

Plate 22

figs **1-2** *Fontbotia wuellerstorfi* (Schwager, 1866), (**1**) dorsal, 733 µm, station 18292, (**2**) ventral, 750 µm, station 18268

figs **3-5** *Caribeanella philippinensis* McCulloch, 1977, (**3**) dorsal, 710 µm, station 18308, (**4**) periphery, 787 µm, station 18299, (**5**) ventral, 660 µm, station 18299

figs **6-7** *Discorbia candeiana* (d'Orbigny, 1839), (**6**) ventral, 275 µm, station 18317, (**7**) dorsal, 480 µm, station 18317

fig. **8** *Planorbulinella larvata* (Parker & Jones, 1865), dorsal, 1675 µm, station 18270

figs **9-10** *Cymbaloporetta squammosa* (d'Orbigny, 1839), (**9**) dorsal, 360 µm, station 18311, (**10**) ventral, stained, 375 µm, station 18311

figs **11-12** *Cymbaloporetta bradyi* (Cushman, 1915), (**11**) dorsal, 340 µm, station 18311, (**12**) periphery, 337 µm, station 18311

figs **13-14** *Millettiana millettii* (Heron-Allen & Earland, 1915), (**13**) side, 250 µm, station 18311, (**14**) floating chamber, 240 µm, station 18311

figs **15-17** *Nuttallides rugosus* (Phleger & Parker, 1951), (**15**) dorsal, 285 µm, station 18293, (**16**) ventral, 260 µm, station 18287, (**17**) periphery, 273 µm, station 18287

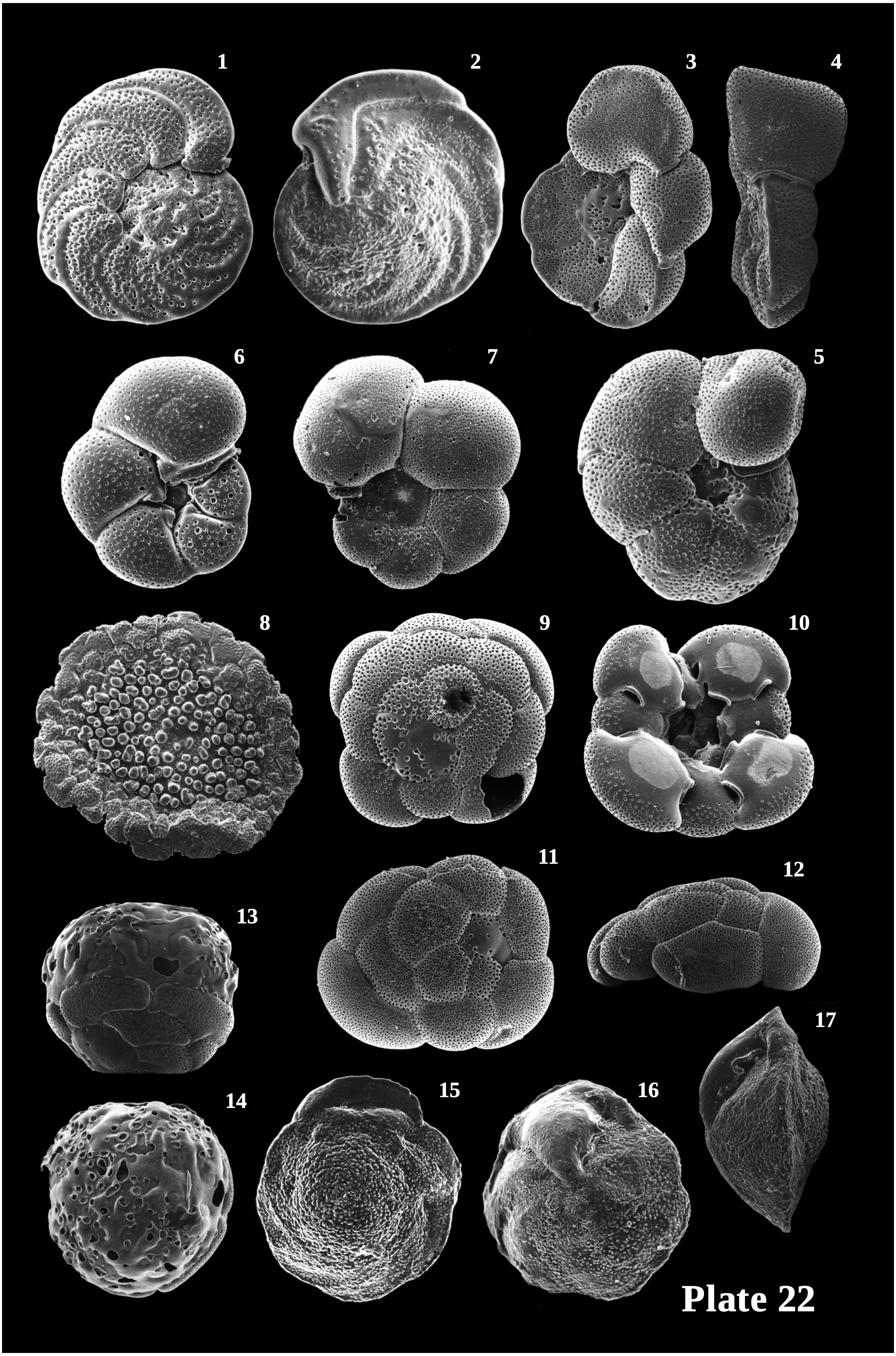

Plate 22

Plate 23

figs **1-2** *Amphistegina papillosa* Said, 1949, (**1**) right-side, 625 µm, station 18308, (**2**) left-side, 960 µm, station 18311

figs **3-4** *Astrononion stelligerum* (d'Orbigny, 1839), (**3**) right-side, 300 µm, station 18302, (**4**) periphery, 275 µm, station 18302

figs **5-6** *Astrononion novozealandicum* Cushman & Edwards, 1937, (**5**) right-side, 280 µm, station 18267, (**6**) left-side, 280 µm, station 18267

figs **7-8** *Fijinonion fijiense* (Cushman & Edwards, 1937), (**7**) right-side, 260 µm, station 18302, (**8**) periphery, 295 µm, station 18279

fig. **9** *Nonion japonicum* Asano, 1938, right-side, 404 µm, station 18284

figs **10-11** *Nonion subturgidum* (Cushman, 1924), (**10**) right-side, 370 µm, station 18284, (**11**) periphery, 436 µm, station 18284

figs **12-14** *Melonis affinis* (Reuss, 1851), (**12**) right-side, 487 µm, station 18293, (**13**) front, 468 µm, station 18293, (**14**) left-side, 531 µm, station 18293

figs **15-16** *Pullenia bulloides* (d'Orbigny, 1826), (**15**) right-side, 350 µm, station 18292, (**16**) left-side, 317 µm, station 18292

figs **17-18** *Pullenia quinqueloba* (Reuss, 1851), (**17**) left-side, 453 µm, station 18268, (**18**) front, 445 µm, station 18268

fig. **19** *Chilostomella ovoidea* Reuss, 1850, front, 1071 µm, station 18287

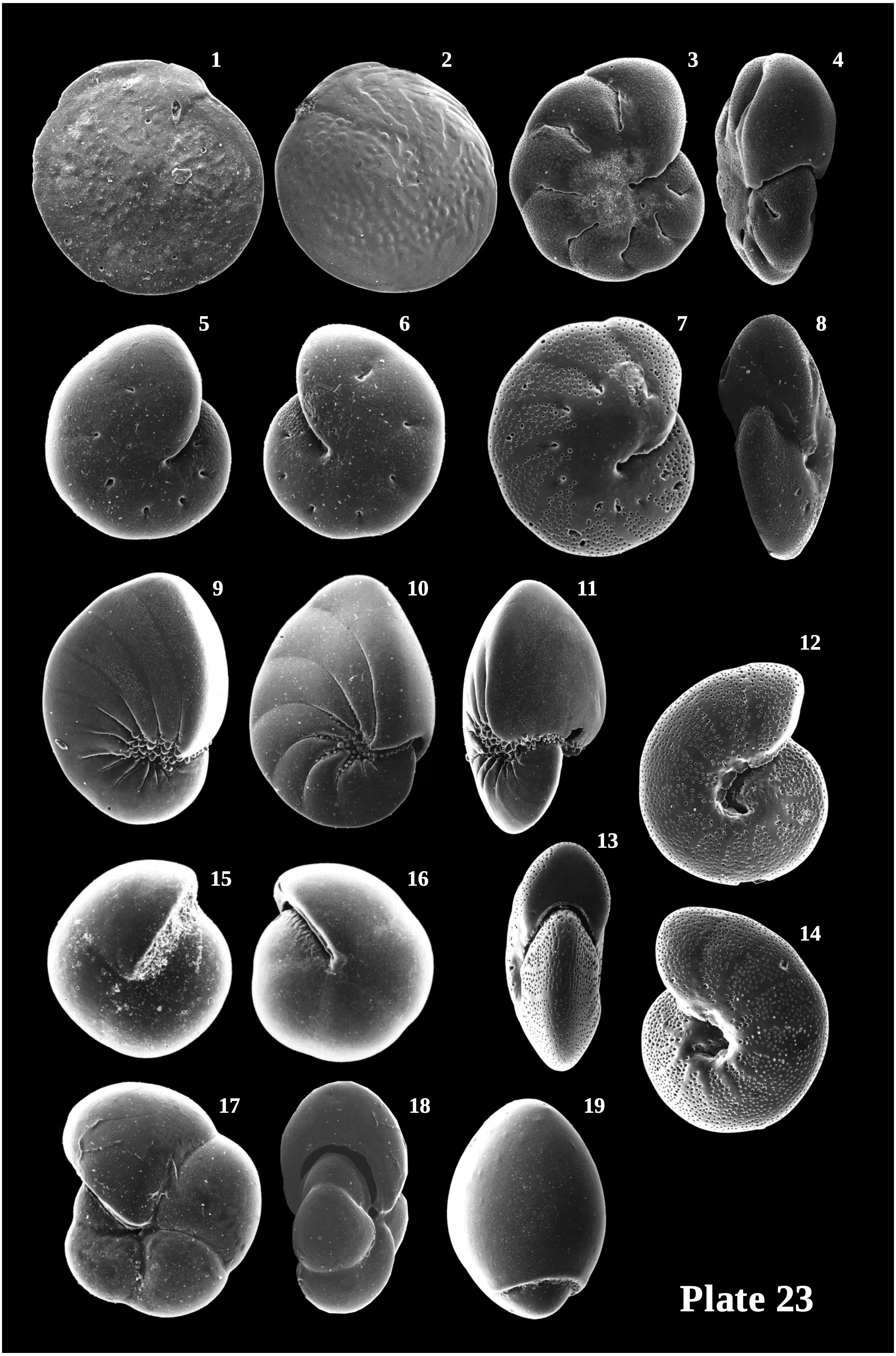
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Plate 23

Plate 24

figs **1-2** *Oridorsalis umbonatus* (Reuss, 1851), (**1**) dorsal, stained, 386 µm, station 18293, (**2**) dorsal, stained, 396 µm, station 18293

figs **3-5** *Osangularia culter* (Parker & Jones, 1865), (**3**) dorsal, 289 µm, station 18292, (**4**) periphery, 476 µm, station 18294, (**5**) ventral, 533 µm, station 18294

figs **6-7** *Anomalinoides globulosus* (Chapman & Parr, 1937), (**6**) dorsal, 600 µm, station 18319, (**7**) periphery, 600 µm, station 18319

figs **8-10** *Anomalinoides* cf. *welleri* (Plummer, 1926), (**8**) dorsal, 453 µm, station 18269, (**9**) ventral, 500 µm, station 18269, (**10**) periphery, 493 µm, station 18269

figs **11-14** *Heterolepa* aff. *dutemplei* (d'Orbigny, 1846), (**11**) dorsal, 580 µm, station 18311, (**12**) ventral, 421 µm, station 18322, (**13**) periphery, stained, 427 µm, station 18311,
(**14**) periphery, stained, 590 µm, station 18311

figs **15-17** *Heterolepa subhaidingerii* (Parr, 1950), (**15**) dorsal, 756 µm, station 18303, (**16**) ventral, 722 µm, station 18303, (**17**) periphery, 679 µm, station 18303

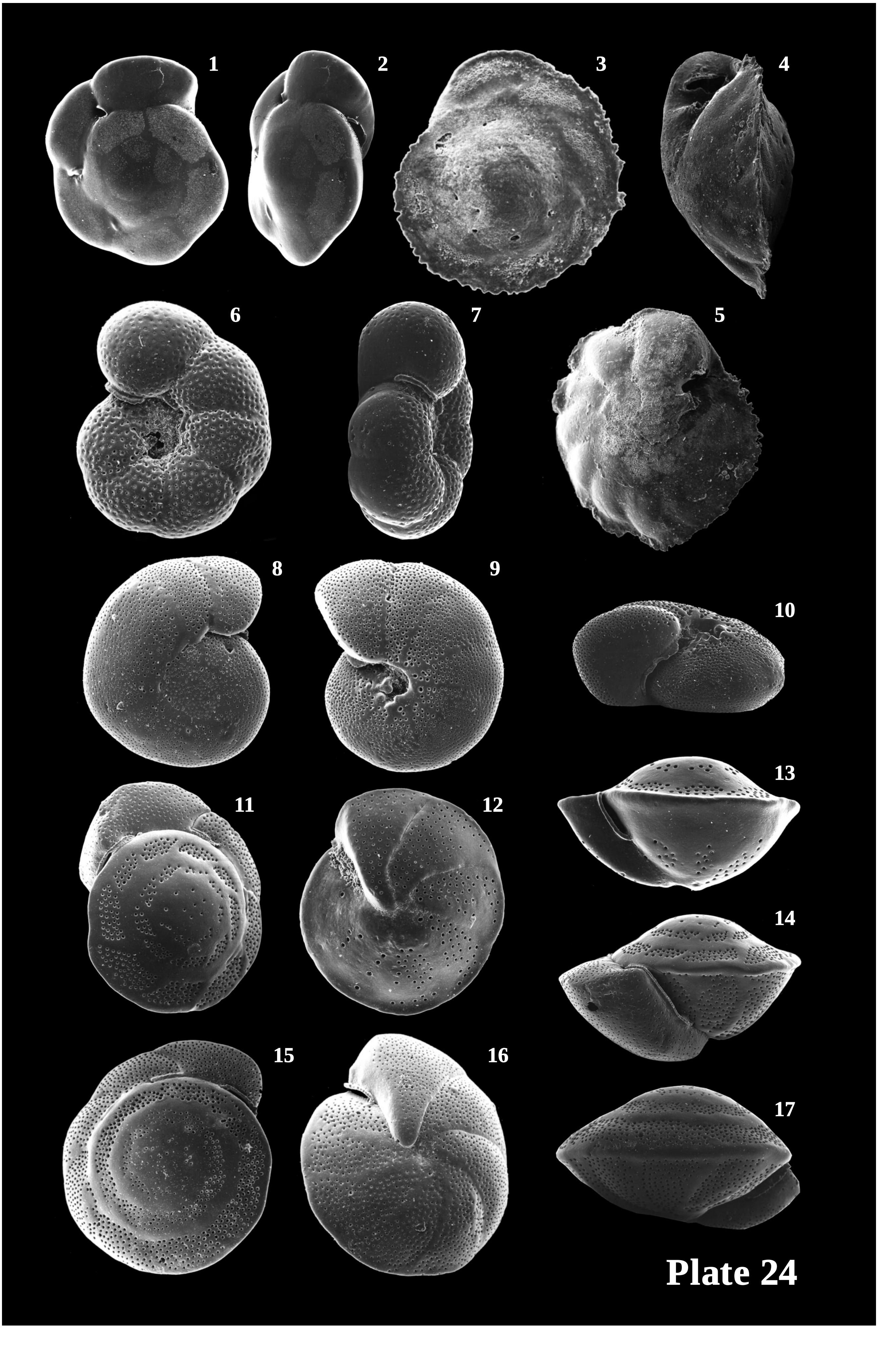

Plate 24

Plate 25

figs **1-3** *Heterolepa praecincta* (Karrer, 1868), (**1**) dorsal, stained, 550 µm, station 18311, (**2**) periphery, stained, 560 µm, station 18311, (**3**) ventral, 750 µm, station 18311

figs **4-7** *Heterolepa margaritifera* (Brady, 1881), (**4**) dorsal, 708 µm, station 18304, (**5**) periphery, 955 µm, station 18304, (**6**) periphery, 713 µm, station 18304, (**7**) ventral, 1047 µm, station 18304

figs **8-10** *Gyroidina altiformis* R.E. & K.C. Stewart, 1930, (**8**) dorsal, 313 µm, station 18284, (**9**) periphery, 263 µm, station 18268, (**10**) ventral, 260 µm, station 18268

figs **11-12** *Gyroidina broeckhiana* (Karrer, 1878), (**11**) dorsal, 433 µm, station 18292, (**12**) ventral, 456 µm, station 18268

figs **13-15** *Gyroidina lamarckiana* (d'Orbigny, 1839), (**13**) dorsal, 280 µm, station 18302, (**14**) periphery, 288 µm, station 18292, (**15**) ventral, 313 µm, station 18268

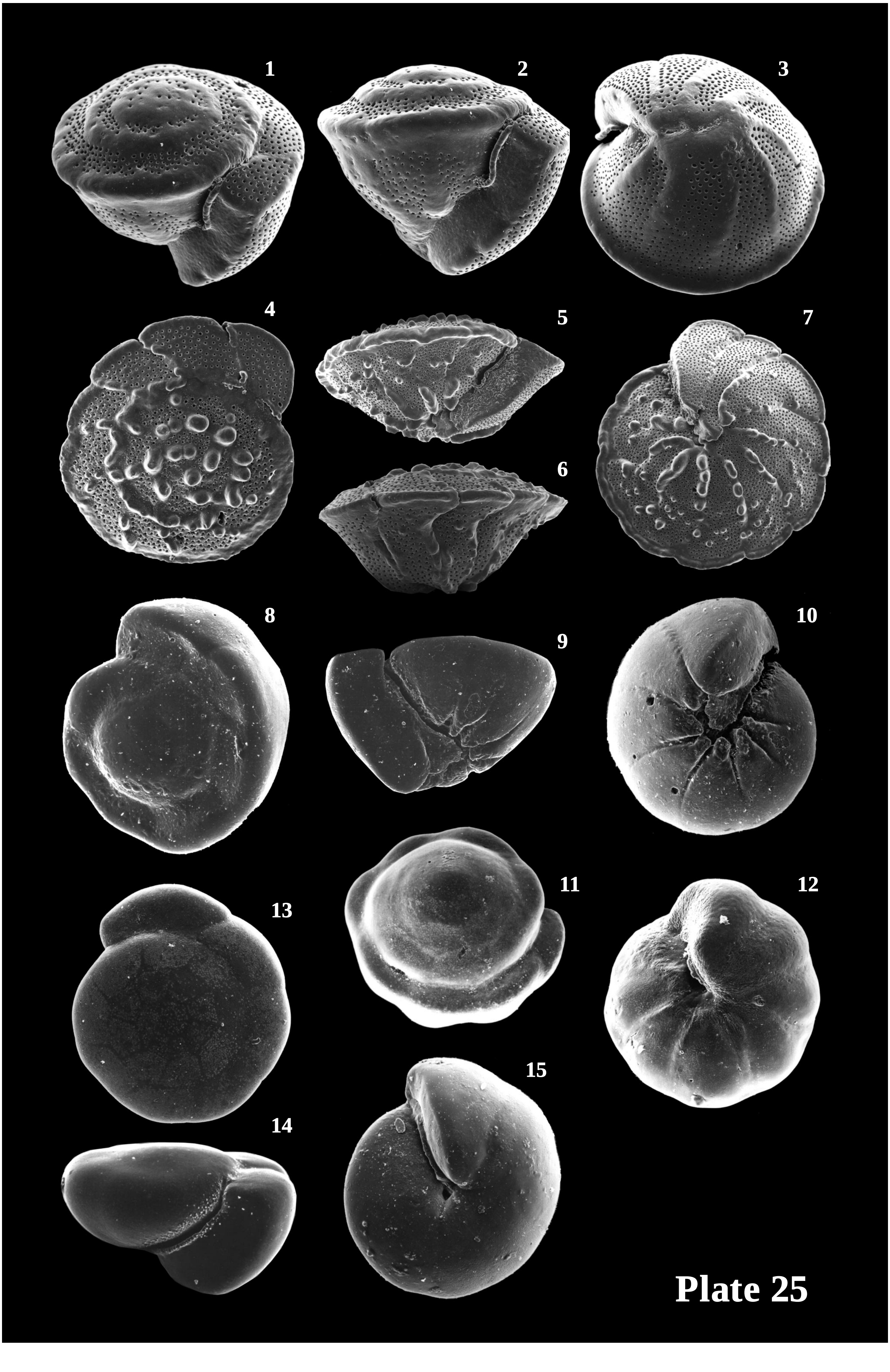

Plate 25

Plate 26

figs **1-3** *Gyroidina neosoldanii* Brotzen, 1936, (**1**) dorsal, 467 µm, station 18292, (**2**) periphery, 514 µm, station 18292, (**3**) ventral, 531 µm, station 18292

figs **4-5** *Gyroidina orbicularis* (Parker, Jones & Brady, 1865), (**4**) dorsal, 322 µm, station 18287, (**5**) periphery, 321 µm, station 18287

figs **6-7** *Hanzawaia grossepunctata* (Earland, 1934), (**6**) right-side, stained, 520 µm, station 18311, (**7**) front, stained, 472 µm, station 18311

fig. **8** *Pararotalia stellata* (de Férussac, 1827), dorsal, 590 µm, station 18311

figs **9-10, 12** *Pararotalia* sp. 1, (**9**) dorsal, 303 µm, station 18283, (**10**) ventral, 313 µm, station 18284, (**12**) periphery, 340 µm, station 18284

fig. **11** *Pararotalia* sp. 2, dorsal, 280 µm, station 18283

figs **13-15** *Ammonia beccarii* (Linné, 1758), (**13**) dorsal, 326 µm, station 18302, (**14**) ventral, 270 µm, station 18302, (**15**) periphery, 297 µm, station 18302

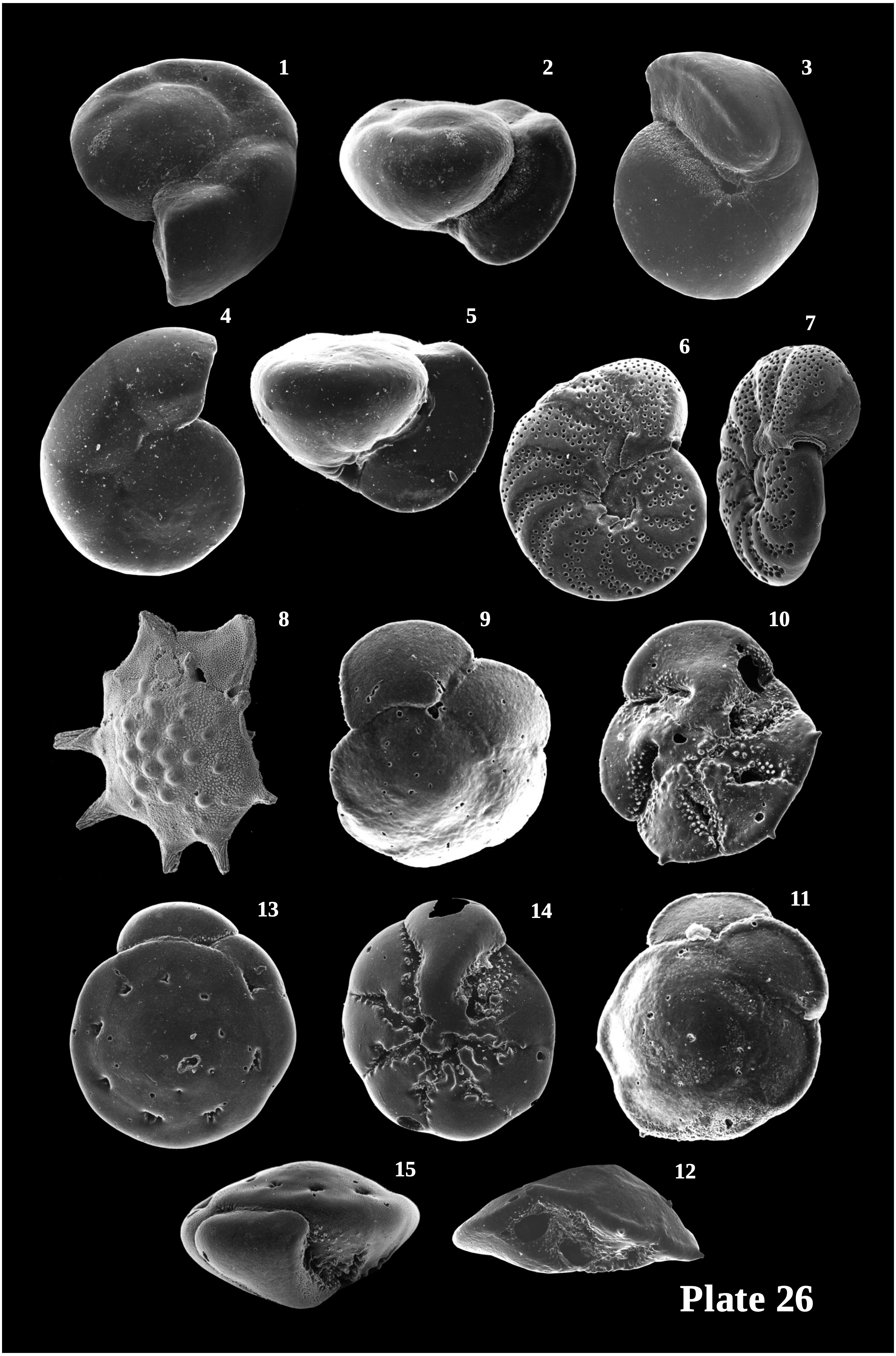

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Plate 27

figs **1-3** *Asterorotalia* (?) *concinna* (Millett, 1904), (**1**) dorsal, 925 µm, station 18315, (**2**) ventral, 825 µm, station 18315, (**3**) periphery, 850 µm, station 18315

figs **4-6** *Pseudorotalia indopacifica* (Thalmann, 1935), (**4**) dorsal, 971 µm, station 18271, (**5**) ventral, 1029 µm, station 18271, (**6**) periphery, 1088 µm, station 18271

figs **7-8** *Asterorotalia gaimardii* (d'Orbigny, 1826), (**7**) dorsal, 584 µm, station 18284, (**8**) ventral, 617 µm, station 18308

figs **9-10** *Pseudorotalia* sp. 1, (**9**) dorsal, 417 µm, station 18284, (**10**) periphery, stained, 440 µm, station 18311

figs **11-12** *Asterorotalia pulchella* (d'Orbigny, 1839), (**11**) ventral, 913 µm, station 18284, (**12**) dorsal, 1120 µm, station 18311

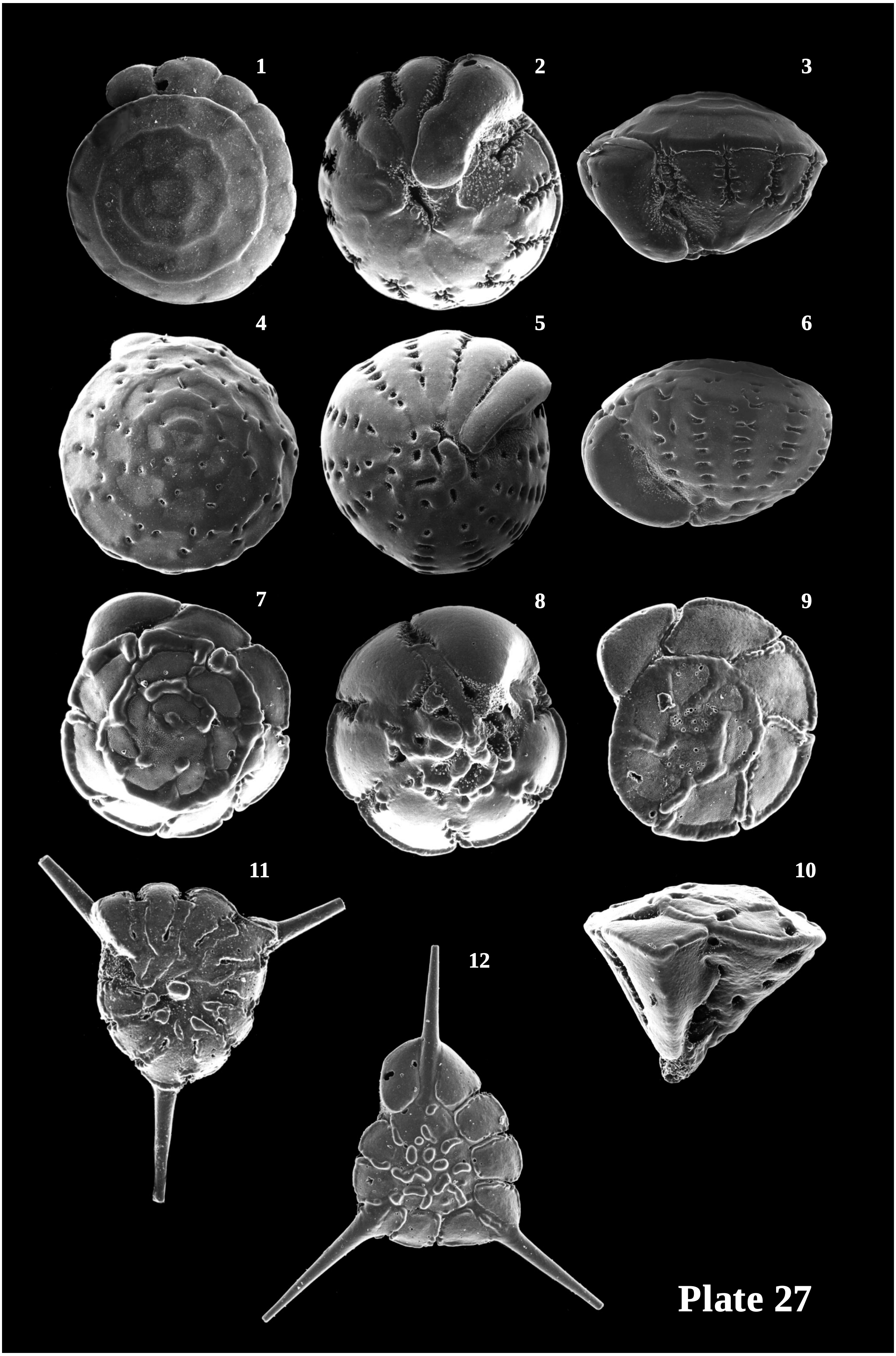


Plate 27

Plate 28

fig. **1** *Cellanthus craticulatus* (Fichtel &Moll, 1798), right-side, stained, 1110 µm, station 18311

fig. **2** *Elphidium advenum* (Cushman, 1922), right-side, 304 µm, station 18279

fig. **3** *Elphidium crispum* (Linné, 1758), left-side, 929 µm, station 18314

fig. **4** *Calcarina mayori* Cushman, 1924, dorsal, 580 µm, station 18311

figs **5-6** *Heterostegina depressa* d'Orbigny, 1826, (**5**) right-side, 1083 µm, station 18322, (**6**) right-side, 3400 µm, station 18322

figs **7-9** *Nummulites venosus* (Fichtel & Moll, 1798), (**7**) right-side, 2333 µm, station 18266,
(**8**) front, 2375 µm, station 18266, (**9**) detail, 235 µm, station 18266

figs **10-14** *Operculina* ex gr. *ammonoides* (Gronovius, 1781), (**10**) right-side, 440 µm, station 18302, (**11**) front, 360 µm, station 18302, (**12**) left-side, 1000 µm, station 18316, (**13**) right-side, 1230 µm, station 18311, (**14**) left-side, stained, 910 µm, station 18311

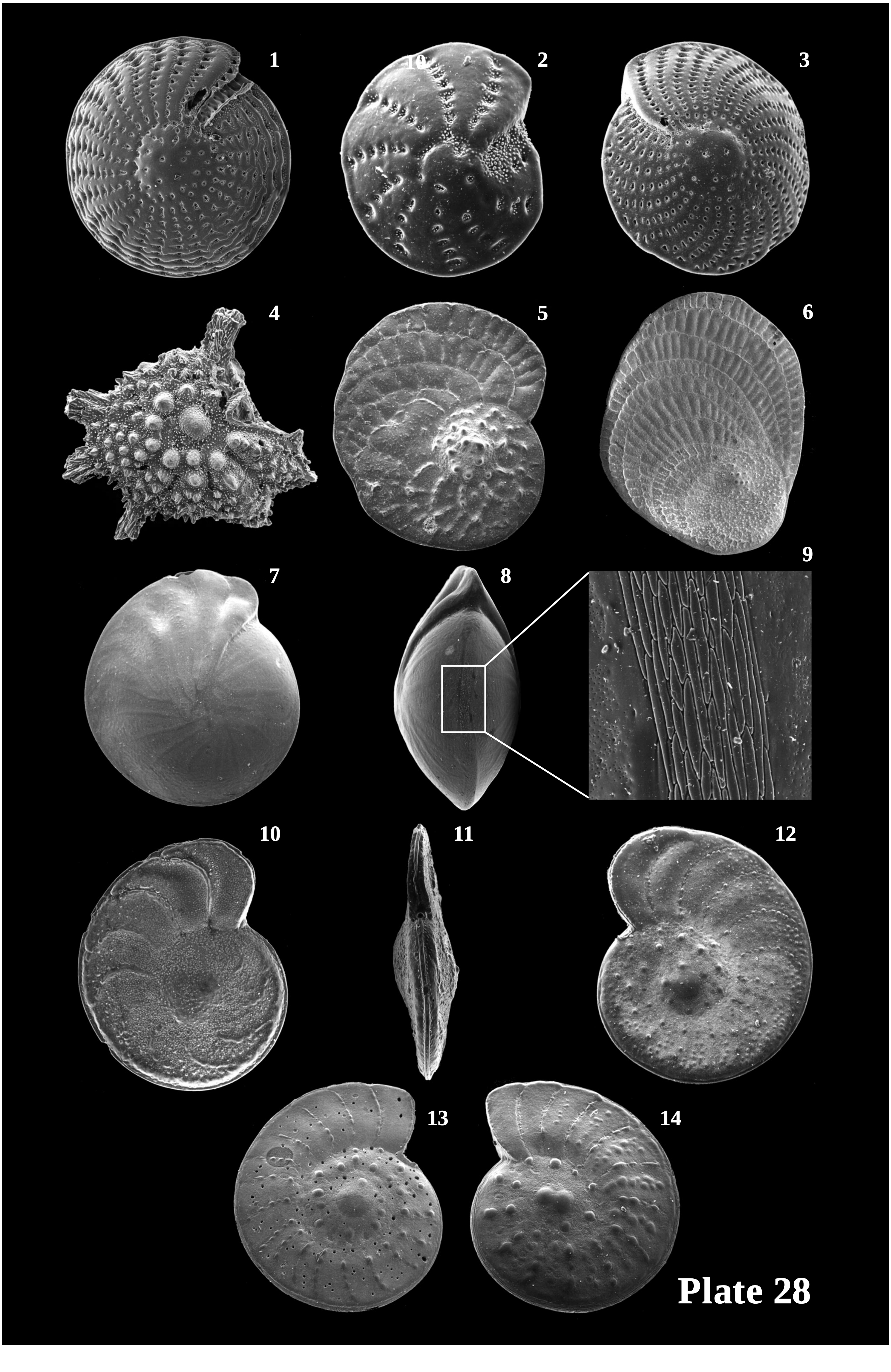


Plate 28

DATA TABLES

APPENDIX B

Appendix B.1. List of the benthic foraminiferal taxa

1. catalogue number: A - agglutinated species; C - calcareous species; X - Xenophyophora; no. of slide; no. of cell
2. (+) - empty; (*) - stained; (φ) - reworked
3. sum of individuals picked from fraction >150 μm
4. occurrence
5. depth range: inner shelf < 100 m; outer shelf 100-200 m; uppermost bathyal 200-400 m; upper bathyal 400-800 m; middle bathyal 800-1400 m; lower bathyal > 1400 m

					Vietnamese Shelf 18 - (248-266)								Sunda Shelf 18 - (267-323)						
	collection no. (1)			taxa (2)	(+)	(φ)	(*)	∑	(+)	(φ)	(*)	all	(+)	(*)	∑	(+)	(*)	all	(5) depth range
					(3) picked				(4) occurrence				picked			occurrence			
1	A	6	54	**Adercotryma glomeratum** (Brady, 1878)	7		6	13	2		2	2	39	44	83	8	8	8	middle bathyal – lower bathyal
2	A	4	49	**Aggerostramen rustica** (Heron-Allen & Earland, 1912)									2		2	2		2	upper bathyal – lower bathyal
3	A	3	55	**Ammobaculites agglutinans** (d'Orbigny, 1846)	1		2	3	1		2	3	40	139	179	19	35	41	inner shelf – middle bathyal
4	A	3	49	**Ammobaculites baculusalsus** Schiebel & Timm, 1996	2		3	5	2		1	2	44	12	56	10	6	10	upper bathyal – lower bathyal
5	A	3	50	**Ammobaculites filiformis** (Earland, 1934)										4	4		2	2	middle bathyal
6	A	3	43	**Ammobaculites sp. 1**	6			6	1			1	37	5	42	16	3	16	shelf
7	A	3	60	**Ammobaculites (?) sp. 2**			1	1			1	1		1	1		1	1	middle bathyal
8				**Ammobaculites spp.**			3	3			2	2	3	23	26	3	8	9	inner shelf – middle bathyal
9	A	3	27	**Ammodiscoides sp.**	10			10	1			1	30	12	42	6	4	6	upper bathyal – lower bathyal
10	A	3	18	**Ammodiscus anguillae** Höglund, 1947									7	6	13	4	3	5	upper bathyal – middle bathyal
11	A	3	28	**Ammodiscus catinus** Höglund, 1947			3	3			1	1	69	81	150	24	33	44	full range
12	A	3	17	**Ammodiscus cretaceus** (Reuss, 1845)	1			1	1			1	2	1	3	1	1	1	lower bathyal
13	A	3	13	**Ammodiscus planorbis** Höglund, 1947			3	3			1	1	35	177	212	13	36	39	full range
14	A	3	26	**Ammodiscus sp. 1**									13	3	16	8	3	9	outer shelf – lower bathyal
15	A	3	15	**Ammodiscus tenuis** Brady, 1881	1			1	1			1	14	13	27	6	8	12	outer shelf – lower bathyal
16	A	8	07	**Ammoglobigerina globulosa** (Cushman, 1920)	5			5	2			2	8	9	17	3	4	5	middle bathyal – lower bathyal
17	A	3	07	**Ammolagena clavata** (Jones & Parker, 1860)	5			5	2			2	100	95	195	25	28	37	full range
18	A	3	31	**Ammomarginulina aff. rostrata** (Heron-Allen & Earland, 1929)	1			1	1			1	16	10	26	5	7	10	inner shelf – middle bathyal
19	A	3	46	**Ammoscalaria compressa** (Cushman & McCulloch, 1939)									38	11	49	11	4	14	outer shelf – upper bathyal
20	A	3	47	**Ammoscalaria pseudospiralis** (Williamson, 1858)									10	27	37	7	7	10	inner shelf – uppermost bathyal
21	A	3	42	**Ammoscalaria tenuimargo** (Brady, 1882)									7	17	24	3	9	11	outer shelf – uppermost bathyal
22	A	3	41	**Ammoscalaria sp. 1**									10	41	51	6	10	13	inner shelf – upper bathyal
23	A	3	44	**Ammoscalaria sp. 2**									1	1	2	1	1	2	outer shelf
24	A			**Ammoscalaria spp.**									3	18	21	2	5	6	shelf
25	A	6	12	**Ammosphaeroidina sphaeroidiniformis** (Brady, 1884)			1	1			1	1	8	2	10	4	2	5	inner shelf – upper bathyal
26	A	1	52	**Astrammina rara** Rhumbler, 1931									1		1	1		1	1404 m
27	A	1	53	**Astrammina sphaerica** (Heron-Allen & Earland, 1932)									14	1	15	4	1	5	middle bathyal – lower bathyal
28	A	1	56	**Astrorhiza arenaria** Norman, 1876			25	25			2	2	19	1	20	4	1	4	shelf
29	A	1	58	**Astrorhiza crassatina** Brady, 1881									57	71	128	17	13	23	full range
30	A	1	60	**Astrorhiza sp. 1**										5	5		3	3	shelf
31	A			**Astrorhiza spp.**			1	1			1	1	4	1	5	2	1	2	shelf
32	A	1	43	**Bathysiphon filiformis** G.O. Sars, 1872	6			6	1			1	1		1	1		1	uppermost bathyal – lower bathyal
33	A			**Bathysiphon spp.**	7			7	2			2	4		4	3		3	inner shelf – middle bathyal
34	A	9	06	**Bigenerina nodosaria** d'Orbigny, 1826	111		5	116	10		3	10	329	92	421	43	23	43	inner shelf – uppermost bathyal
35	A	9	08	**Bigenerina sp. 1**									5	120	125	4	24	24	shelf
36	A	6	01	**Buzasina ringens** (Brady, 1879)	9		7	16	2		2	2	29	31	60	9	8	10	uppermost bathyal – lower bathyal
37	A	9	05	**Clavulina crustata** (Cushman, 1937)										1	1		1	1	291 m
38	A	9	03	**Clavulina humilis** Brady, 1884									51	3	54	13	2	13	outer shelf – uppermost bathyal
39	A	9	09	**Cribrobigenerina robustiformis** Zheng, 1988	23			23	5			5	275	63	338	30	21	33	inner shelf – upper bathyal
40	A	9	10	**Cribrobigenerina textularioidea** (Göes, 1894)	19			19	3			3	39	3	42	10	3	13	shelf
41	A	9	60	**Cribrobigenerina sp. 1**									13	9	22	3	3	6	shelf
42	A			**Cribrobigenerina spp.**	24			24	7			7	35		35	5		5	shelf
43	A	9	20	**Cribrogoesella robusta** (Brady, 1881)									3		3	1		1	595 m
44	A	6	26	**Cribrostomoides nitidus** (Goës, 1896)	7		5	12	2		2	2	30	13	43	10	7	10	upper bathyal – lower bathyal
45	A	6	27	**Cribrostomoides scitulus** (Brady, 1881)	15		7	22	2		3	3	17	54	71	10	25	31	full range
46	A	6	25	**Cribrostomoides subglobosus** (M. Sars, 1869)	1		2	3	1		1	1	20	59	79	7	16	18	full range
47	A	2	39	**Crithionina hispida** (Flint, 1899)									1	17	18	1	11	11	full range
48	A	2	41	**Crithionina mamilla** Goës, 1894									3	84	87	2	21	23	shelf
49	A	2	40	**Crithionina pisum** Goës, 1896			5	5			2	2	6	79	85	3	23	25	full range
50	A	6	18	**Cyclammina cancellata** Brady, 1879	4		4	8	2		4	4	31	7	37	8	6	9	upper bathyal – lower bathyal
51	A	6	15	**Cyclammina pusilla** Brady, 1881									1		1	1		1	978 m
52	A	6	04	**Cyclammina subtrullissata** (Parr, 1950)									8	18	26	7	12	17	full range
53	A	6	13	**Cyclammina trullissata** (Brady, 1879)	9		2	11	2		2	2	20	15	34	6	7	8	outer shelf – lower bathyal
54	A	9	11	**Cylindroclavulina bradyi** (Cushman, 1911)	5			5	3			3	27	10	37	15	8	21	inner shelf – upper bathyal
55	A	9	13	**Cylindroclavulina ovata** Zheng, 1988									1		1	1		1	106 m
56	A	6	11	**Cystammina pauciloculata** (Brady, 1879)									19	5	24	5	4	6	uppermost bathyal – middle bathyal
57	A	1	51	**Dendrophrya sp.**	2			2	1			1	6	13	19	2	6	6	outer shelf – middle bathyal
58	A	8	18	**Deuterammina grisea** (Earland, 1934)	2		1	3	2		1	2	16	9	25	6	4	7	upper bathyal – lower bathyal
59	A	8	16	**Deuterammina montagui** Brönnimann & Whittaker, 1988									16	7	23	5	5	5	uppermost bathyal – middle bathyal
60	A	3	37	**Discammina compressa** (Goës, 1882)									20	8	28	2	2	3	upper bathyal – middle bathyal
61	A	9	44	**Dorothia rotunda** (Chapman, 1902)									4	2	6	3	2	4	middle bathyal
62	A	9	42	**Dorothia scabra** (Brady, 1884)	1			1	1			1	20	35	55	10	23	26	full range
63	A	9	54	**Dorothia sp. 1**	1			1	1			1	34	15	49	9	7	10	outer shelf – lower bathyal
64	A	9	56	**Dorothia sp. 2**			1	1			1	1	3	3	6	2	1	2	inner shelf – upper bathyal
65	A	7	13	**Duquepsammia bulbosa** (Cushman, 1911)									2		2	2		2	uppermost bathyal – middle bathyal
66	A	8	25	**Earlandammina cf. drakensis** Brönnimann & Whittaker, 1988	1			1	1			1	8	9	17	3	3	3	middle bathyal – lower bathyal
67	A	9	25	**Eggerella bradyi** (Cushman, 1911)	33		5	38	2		2	2	172	48	220	12	11	12	uppermost bathyal – lower bathyal
68	A			**Eratidus foliaceus** (Brady)	1		1	2	1		1	2	4	6	10	4	4	8	outer shelf – lower bathyal
69	A	3	53	**Eratidus recurvus** (Earland, 1934)									33	30	63	7	9	10	upper bathyal – lower bathyal
70	A	6	57	**Evolutinella rotulata** (Brady, 1881)	1			1	1			1	2		2	2		2	middle bathyal
71	A	7	38	**Gaudryina collinsi** Cushman, 1936										1	1		1	1	595 m
72	A	7	40	**Gaudryina flintii** Cushman, 1911	1			1	1			1	19	7	26	11	5	13	outer shelf – lower bathyal
73	A	7	37	**Gaudryina quadrangularis** Bagg, 1908	13			13	3			3	4	2	6	3	2	5	shelf
74	A	7	41	**Gaudryina robusta** Cushman, 1913	64	2	1	67	10	2	1	10	29	6	35	18	6	20	shelf
75	A	3	39	**Glaphyrammina americana** (Cushman, 1910)	2		1	3	2		1	3	15	40	55	6	14	16	inner shelf – middle bathyal
76	A	3	02	**Glomospira glomerata** Höglund, 1947	22		5	27	2		2	2	62	24	86	11	6	13	uppermost bathyal – lower bathyal
77	A	3	29	**Glomospira gordialis** (Jones & Parker, 1860)	11			11	2			2	77	25	102	10	8	11	outer shelf – lower bathyal
78	A	6	37	**Haplophragmoides bradyi** (Robertson, 1891)	5		3	8	3		1	3	28	16	44	11	11	17	full range

	collection			taxa ②	(+)	(φ)	(*)	Σ	(+)	(φ)	(*)	all	(+)	(*)	Σ	(+)	(*)	all	⑤
	no. ①			taxa	③ picked				④ occurrence				picked			occurrence			depth range
79	A	6	42	**Haplophragmoides grandiformis** Cushman, 1910	2			2	2			2	11	37	48	8	16	18	shelf
80	A	6	41	**Haplophragmoides quadratus** Uchio, 1960			1	1			1	1							middle bathyal – lower bathyal
81	A	6	38	**Haplophragmoides sphaeriloculum** Cushman, 1910	10		3	13	2		2	2	71	30	101	12	14	19	full range
82	A	6	44	**Haplophragmoides sp. 1**	1			1	1			1	2	19	21	2	5	6	inner shelf – middle bathyal
83	A	6	43	**Haplophragmoides sp. 2**			1	1			1	1	8	2	10	5	2	6	uppermost bathyal – lower bathyal
84	A	6	56	**Haplophragmoides sp. 3**									4	2	6	3	1	3	middle bathyal
85	A			**Haplophragmoides spp.**	1			1	1			1	12	6	18	5	4	8	inner shelf – middle bathyal
86	A	2	49	**Hippocrepinella alba** Heron-Allen & Earland, 1932			3	3			2	2		7	7		6	6	upper bathyal – lower bathyal
87	A	2	50	**Hippocrepinella crassa** Heron-Allen & Earland, 1932										13	13		8	8	shelf
88	A	5	02	**Hormosina globulifera** Brady, 1879	29		2	31	2		1	2	31	8	39	6	6	8	upper bathyal – lower bathyal
89	A	5	01	**Hormosina normanii** Brady, 1881	6		2	8	2		1	2	25	9	34	7	2	7	upper bathyal – lower bathyal
90	A	5	08	**Hormosina pilulifera** (Brady, 1884)	1		1	2	1		1	2	62	52	113	10	12	12	outer shelf – lower bathyal
91	A	5	06	**Hormosina sp. 1 (?)**	1			1	1			1	2	40	42	2	5	7	shelf
92	A	5	07	**Hormosina sp. 2**									14	21	35	3	5	6	outer shelf – middle bathyal
93	A	5	03	**Hormosina spiculifera** Hofker, 1972										1	1		1	1	1974 m
94	A	5	18	**Hormosinella distans** (Brady, 1881)	1			1	1			1	72	38	109	10	3	10	upper bathyal – lower bathyal
95	A	5	20	**Hormosinella distans** (Brady, 1881) type 1									7	4	11	2	2	3	full range
96	A	5	21	**Hormosinella guttifera** (Brady, 1881)	1		7	8	1		2	2	44	27	70	10	8	11	outer shelf – lower bathyal
97	A	5	24	**Hormosinella guttifera** (Brady, 1881) type 1	1			1	1			1	17	4	21	8	3	9	upper bathyal – lower bathyal
98	A	5	22	**Hormosinella guttifera** (Brady, 1881) type 2									7	6	13	5	4	7	upper bathyal – middle bathyal
99	A	1	16	**Hyperammina distorta** Cushman, 1918	7			7	2			2	28	21	49	7	4	9	full range
100	A	1	14	**Hyperammina elongata** Brady, 1878	1			1	1			1	15	8	23	8	4	10	full range
101	A	1	13	**Hyperammina laevigata** Wright, 1891	10			10	2			2	21	8	29	8	3	8	uppermost bathyal – lower bathyal
102	A	1	15	**Hyperammina spiculifera** Lacroix, 1928									8	18	26	6	3	8	full range
103	A	1	19	**Hyperammina sp. 1**									5		5	2		2	middle bathyal – lower bathyal
104	A	1	20	**Hyperammina sp. 2**									6		6	5		5	upper bathyal – lower bathyal
105	A	1	36	**Hyperammina sp. 3**									4	1	5	2	1	3	inner shelf – middle bathyal
106	A			**Hyperammina spp.**			1	1			1	1	9	10	19	6	6	11	full range
107	A	1	49	**Jaculella cf. acuta** Brady, 1879									8	28	36	2	8	9	shelf
108	A	9	51	**Karreriella bradyi** (Cushman, 1911)	1			1	1			1	19	11	30	8	7	8	uppermost bathyal – middle bathyal
109	A	9	52	**Karreriella novangliae** (Cushman, 1922)									12	2	14	6	2	7	upper bathyal – lower bathyal
110	A	9	49	**Karreriella pupiformis** Zheng, 1988	11		1	12	3		1	3	39	167	205	12	27	28	outer shelf – lower bathyal
111	A	7	19	**Karreriella cf. siphonella** (Reuss, 1851)									10	26	36	5	12	16	inner shelf – middle bathyal
112	A	7	32	**Karrerulina apicularis** (Cushman, 1911)	1			1	1			1	54	119	172	11	17	19	outer shelf – lower bathyal
113	A	7	36	**Karrerulina attenuata** Collins, 1958			1	1			1	1	9	9	18	4	1	4	inner shelf – middle bathyal
114	A	7	34	**Karrerulina erigona** (Saidova, 1975)	1			1	1			1		13	13		6	6	outer shelf – upper bathyal
115	A	2	01	**Lagenammina arenulata** (Skinner, 1961)									161	338	499	33	36	44	full range
116	A	2	04	**Lagenammina difflugiformis** Brady, 1879	24		55	79	2		2	2	274	188	462	13	16	18	full range
117	A	2	09	**Lagenammina tubulata** (Rhumbler, 1931)	1			1	1			1	17	12	29	7	5	10	upper bathyal – lower bathyal
118	A			**Lagenammina spp.**	32			32	2			2	16	45	61	8	11	13	full range
119	A			**Lana neglecta**									5		5	4		4	middle bathyal – lower bathyal
120	A	7	49	**Liebusella improcera** Loeblich & Tappan, 1994			2	2			1	1	8	5	13	5	4	9	uppermost bathyal – lower bathyal
121	A	7	50	**Liebusella (?) sp. 1**	2			2	1			1	1		1	1		1	outer shelf – lower bathyal
122	A	3	57	**Lituola lituilinoidea** (Goës, 1896)	2			2	1			1	42	8	50	10	5	10	uppermost bathyal – middle bathyal
123	A	3	59	**Lituola sp. 1**									10	2	12	2	1	3	outer shelf
124	A	3	30	**Lituotuba lituiformis** (Brady, 1879)									11	2	13	4	1	4	upper bathyal – middle bathyal
125	A	5	49	**Loeblichopsis cylindrica** (Brady, 1884)															842 m
126	A	1	37	**Marsipella cylindrica** Brady, 1882	5			5	2			2	4	9	13	2	3	4	inner shelf – upper bathyal
127	A	1	50	**Marsipella elongata** Norman, 1878										3	3		1	1	60 m
128	A	9	02	**Martinottiella communis** (d'Orbigny, 1826)	18		5	23	2		1	2	68	29	97	10	8	10	uppermost bathyal – lower bathyal
129	A	9	01	**Martinottiella milletti** (Cushman, 1936)									10	6	16	5	3	7	middle bathyal – lower bathyal
130	A	1	48	**Nodellum membranaceum** (Brady, 1879)	1			1	1			1	5		5	4		4	full range
131	A	5	25	**Nodosinum gaussicum** (Rhumbler, 1913)									6	2	8	4	2	5	middle bathyal – lower bathyal
132	A	5	28	**Nodosinum mortenseni** (Hofker, 1972)	4			4	2			2	1		1	1		1	middle bathyal – lower bathyal
133	A	7	55	**Nouria harrisii** Heron-Allen & Earland, 1914									5	31	36	3	19	21	inner shelf – middle bathyal
134	A	7	54	**Nouria polymorphinoides** Heron-Allen & Earland, 1914			1	1			1	1	1	35	36	1	16	16	inner shelf – uppermost bathyal
135	A	8	13	**Paratrochammina challengeri** Brönnimann & Whittaker, 1988	28		10	38	2		2	2	195	113	308	11	17	18	full range
136	A	8	20	**Paratrochammina madeirae** Brönnimann, 1979															1852 m
137	A	8	11	**Paratrochammina simplissima** (Cushman & McCulloch, 1948)	4		1	5	2		1	2	3	52	55	2	19	21	inner shelf – middle bathyal
138	A	8	29	**Paratrochammina sp. 1**	4		1	5	2		1	2	12	6	18	7	3	8	full range
139	A	8	30	**Paratrochammina sp. 2**									1	3	4	1	2	3	inner shelf – middle bathyal
140	A	7	52	**Parvigenerina sinensis** (Zheng, 1988)									11	7	18	4	2	4	uppermost bathyal – upper bathyal
141	A			**Pelosina cylindrica** Brady, 1884	2		2	4	1		1	2	5	3	8	3	2	5	outer shelf – lower bathyal
142	A	2	52	**Pelosina rotundata** Brady, 1879															101 m
143	A			**Pelosina variabilis** Brady, 1879									2		2	1		1	145 m
144	A			**Pelosina spp.**	1			1	1			1	16	6	22	5	2	7	inner shelf – middle bathyal
145	A	3	52	**Placopsilina bradyi** Cushman & McCulloch, 1939	8		2	10	6		2	7	91	37	128	29	21	39	inner shelf – upper bathyal
146	A	3	51	**Placopsilina confusa** Cushman, 1920									1	3	4	1	3	3	outer shelf – upper bathyal
147	A	3	54	**Placopsilina sp. 1**	2		1	3	1		1	2	1		1	1		1	shelf
148	A	8	17	**Polystomammina elongata** (Zheng, 1979)									6	7	13	4	6	8	inner shelf – middle bathyal
149	A	2	25	**Psammosphaera fusca** Schulze, 1875	1			1	1			1	31	12	43	10	5	12	full range
150	A	7	01	**Pseudoblivina nasostoma** Zheng, 1988									21	29	50	14	19	28	shelf
151	A	7	02	**Pseudobolivina sp. 1**										1	1		1	1	80 m
152	A	9	04	**Pseudoclavulina serventyi** (Chapman & Parr, 1935)									38	5	43	13	4	15	outer shelf – uppermost bathyal
153	A	9	40	**Pseudogaudryina pacifica** Cushman & McCulloch, 1939	27	7	2	36	11	1	2	12	280	34	314	43	19	43	inner shelf – uppermost bathyal
154	A	5	14	**Pseudonodosinella bacillaris** (Brady, 1881)									17	9	26	5	4	6	upper bathyal – middle bathyal
155	A	5	15	**Pseudonodosinella sp. 1**	1		4	5	1		2	2	28	16	44	10	8	10	uppermost bathyal – lower bathyal
156	A	5	26	**Pseudonodosinella sp. 2**	1		1	2	1		1	2	41	6	47	19	3	19	shelf
157	A	8	22	**Pseudotrochammina atlantica** (Parker, 1952)									7	6	13	4	6	7	upper bathyal – lower bathyal
158	A	8	26	**Pseudotrochammina dehiscens** (Frerichs, 1969)			4	4			1	1	19	14	33	9	13	20	full range
159	A	8	27	**Pseudotrochammina sp. 1**	1			1	1			1	12	17	29	3	6	6	outer shelf – lower bathyal
160	A	8	28	**Pseudotrochammina sp. 2**									26	11	37	5	4	6	middle bathyal – lower bathyal
161	A	6	49	**Recurvoides contortus** Earland, 1934	22		9	31	2		3	3	88	88	176	14	19	20	full range
162	A	6	51	**Recurvoides trochamminiformis** Saidova, 1961									3	1	4	2	1	2	upper bathyal – middle bathyal
163	A	6	53	**Recurvoides sp. 1**										20	20		1	1	1852 m
164	A			**Recurvoides spp.**									78	38	116	15	11	21	full range
165	A	5	37	**Reophanus oviculus** (Brady, 1879)	2		1	3	1		1	2	20	7	27	7	5	8	upper bathyal – lower bathyal
166	A	5	38	**Reophanus oviculus var. mexicanus** (Cushman, 1920)									17	1	18	4	1	4	upper bathyal – middle bathyal
167	A	4	38	**Reophax bilocularis** Flint, 1899	11		3	14	2		1	2	101	167	267	24	25	33	full range
168	A	4	20	**Reophax bradyi** Brönnimann & Whittaker, 1980	5			5	3			3	28	123	151	9	20	24	inner shelf – middle bathyal

	collection no. (1)	taxa (2)	(+) (3) picked	(ϕ)	(*)	∑	(+) (4) occurrence	(ϕ)	(*)	all	(+) picked	(*)	∑	(+) occurrence	(*)	all	(5) depth range
169	A 4 28	**Reophax curtus** Cushman, 1920									2		2	1		1	70 m
170	A 4 01	**Reophax dentaliniformis** Brady, 1881	7		14	21	2		1	2	82	81	163	13	26	29	full range
171	A 4 43	**Reophax fusiformis** (Williamson, 1858)									1		1	1		1	842 m
172	A 4 42	**Reophax helenae** (Rhumbler, 1911)									4		4	4		4	middle bathyal
173	A 4 51	**Reophax hispidulus** Cushman, 1920									1		1	1		1	404 m
174	A 4 41	**Reophax longicollaris** Zheng, 1988	1			1	1			1	4	9	13	3	2	5	inner shelf – middle bathyal
175	A 4 04	**Reophax micaceus** Earland, 1934									3	12	15	3	5	7	inner shelf – middle bathyal
176	A 4 17	**Reophax pesciculus** Saidova, 1975									1	6	7	1	3	4	inner shelf – middle bathyal
177	A 4 19	**Reophax regularis** Höglund, 1947	3			3	3			3	27	57	84	9	21	25	inner shelf – middle bathyal
178	A 4 27	**Reophax scorpiurus** de Montfort, 1808	20		7	27	7		2	8	99	213	312	24	33	37	inner shelf – middle bathyal
179	A 4 11	**Reophax spiculifer** Brady, 1879	1		2	3	1		1	2	4	5	9	4	3	5	outer shelf – lower bathyal
180	A 4 02	**Reophax subdentaliniformis** Parr, 1950	3		1	4	2		1	2	41	87	128	11	25	29	full range
181	A 4 25	**Reophax subfusiformis** Earland, 1933			3	3			2	2	32	32	64	4	8	9	outer shelf – lower bathyal
182	A 4 14	**Reophax tubulus** Zheng, 1988			1	1			1	1	70	17	87	9	7	14	full range
183	A 4 16	**Reophax sp. 1**									8	4	11	4	3	6	middle bathyal – lower bathyal
184	A	**Reophax sp. 2**	69			69	1			1							88 m
185	A 4 26	**Reophax sp. 3**	3		13	16	1		2	2	37	91	128	11	14	15	outer shelf – lower bathyal
186	A	**Reophax spp.**	44		8	52	11		4	11	395	405	800	50	51	55	full range
187	A 1 27	**Rhabdammina abyssorum** M. Sars, 1869	6		3	9	1		2	3	1		1	1		1	outer shelf – lower bathyal
188	A 1 25	**Rhabdammina discreta** Brady, 1881	41		1	42	2		1	2	64	22	85	12	9	15	full range
189	A 1 29	**Rhabdammina linearis** Brady, 1879									15	72	86	7	12	15	full range
190	A 1 30	**Rhabdammina pacifica** Shchedrina, 1952	6		2	8	2		2	3	56	138	194	15	27	29	inner shelf – middle bathyal
191	A	**Rhabdammina spp.**	11		1	12	3		1	4	13	27	40	6	9	14	full range
192	A 1 05	**Rhizammina algaeformis** Brady, 1879	16		27	43	2		2	2	441	388	828	16	21	24	full range
193	A 1 01	**Rhizammina indivisa** Brady, 1884	16			16	3			3	81	231	312	17	33	35	full range
194	A 7 16	**Rhumblerella sepetibaensis** Brönnimann, 1981	3		2	5	1		1	2	16	10	26	5	5	7	outer shelf – middle bathyal
195	A 2 27	**Saccammina edita** (Saidova, 1975)	3		1	4	1		1	2	20		20	3		3	full range
196	A 2 26	**Saccammina sphaerica** G.O. Sars, 1872	28			28	2			2	243	15	257	10	7	11	outer shelf – lower bathyal
197	A 1 11	**Saccorhiza ramosa** (Brady, 1879)	85		26	111	2		2	2	313	214	526	16	24	25	outer shelf – lower bathyal
198	A 10 04	**Sahulia barkeri** (Hofker, 1978)	14			14	8			8	22	4	26	10	3	11	shelf
199	A 10 01	**Sahulia conica** (d'Orbigny, 1839)	61	3	1	65	12	1	1	13	72	21	93	28	12	28	shelf
200	A 10 05	**Sahulia sp. 1**									1		1	1		1	118 m
201	A 4 09	**Scherochorella moniliforme** (Siddall, 1886)									2	1	3	2	1	2	middle bathyal
202	A	**Septuma sp.**									1		1	1		1	1974 m
203	A 10 45	**Siphotextularia crassisepta** (Cushman, 1911)															226 m
204	A 10 41	**Siphotextularia curta** (Cushman, 1922)	5			5	4			4	30		30	17		17	shelf
205	A 10 37	**Siphotextularia flintii** (Cushman, 1911)									25	3	28	10	3	10	upper bathyal – lower bathyal
206	A 10 40	**Siphotextularia foliosa** Zheng, 1988									53	51	104	4	3	5	outer shelf – upper bathyal
207	A 10 38	**Siphotextularia mestayerae** Vella, 1957	6			6	5			5	115	20	135	30	8	31	inner shelf – uppermost bathyal
208	A 10 44	**Siphotextularia philippinensis** (Keijzer, 1953)	2			2	1			1	1	1	2	1	1	1	middle bathyal
209	A 10 46	**Siphotextularia rolshauseni** (Phleger & Parker, 1951)	4		1	5	2		1	3	25	1	26	4	1	5	full range
210	A 10 39	**Siphotextularia subplanoides** Zheng, 1988	6			6	3			3	214	17	231	33	11	35	inner shelf – uppermost bathyal
211	A 10 42	**Siphotextularia cf. wairoana** Finlay, 1939	3			3	3			3	77	9	86	31	8	32	shelf
212	A 10 47	**Siphotextularia (?) sp. 1**	57			57	8			8	960	41	1001	43	20	43	shelf
213	A 10 48	**Siphotextularia sp. 2**	2			2	2			2	1	1	2	1	1	2	shelf
214	A 2 37	**Sorosphaera consociata** (Rhumbler, 1931)	2			2	1			1	23	27	50	8	4	10	outer shelf – lower bathyal
215	A 7 03	**Spiroplectinella higuchii** (Takayanagi, 1953)	91	21	1	113	14	1	1	14	195	22	217	40	12	41	inner shelf – uppermost bathyal
216	A 7 08	**Spiroplectinella kerimbaensis** (Said, 1949)	31			31	6			6	15	8	23	6	6	9	inner shelf – uppermost bathyal
217	A 7 05	**Spiroplectinella proxispira** Vella, 1957	8			8	4			4							shelf
218	A 7 06	**Spiroplectinella pseudocarinata** (Cushman, 1921)	126		1	127	11		1	11	225	28	253	36	17	37	inner shelf – uppermost bathyal
219	A 7 04	**Spiroplectinella wrightii** (Silvestri, 1903)	14		1	15	3		1	3	41	2	43	10	2	11	inner shelf – uppermost bathyal
220	A	**Spiroplectinella spp.**	3			3	3			3		5	5		4	4	shelf
221	A 7 09	**Spirotextularia fistulosa** (Brady, 1884)	4		1	5	3		1	3	39	32	71	19	11	24	inner shelf – uppermost bathyal
222	A 7 10	**Spirotextularia floridana** (Cushman, 1922)	49	8	1	58	12	3	1	14	617	67	684	46	21	46	inner shelf – upper bathyal
223	A 4 23	**Subreophax aduncus** (Brady, 1882)			2	2			2	2	73	23	96	10	7	10	upper bathyal – lower bathyal
224	A 4 31	**Subreophax monile** (Brady, 1881)	1			1	1			1							lower bathyal
225	A 4 05	**Subreophax sp. 1**	3			3	1			1	14		14	5		5	upper bathyal – middle bathyal
226	A	**Subreophax spp.**	1		2	3	1		1	1	3		3	1		1	middle bathyal – lower bathyal
227	A 2 45	**Technitella legumen** Norman, 1878			1	1			1	1		18	18		11	11	inner shelf – middle bathyal
228	A 2 44	**Technitella melo** Norman, 1878			1	1			1	1		12	12		3	3	shelf
229	A 10 33	**Textularia aff. abbreviata** d'Orbigny, 1846	29	2	1	32	8	1	1	8	12	2	14	8	2	10	shelf
230	A 10 17	**Textularia agglutinans** d'Orbigny, 1839	39			39	8			8	339	31	370	41	13	42	inner shelf – uppermost bathyal
231	A 10 28	**Textularia bocki** Höglund, 1947	4			4	2			2	490	243	733	43	38	47	inner shelf – upper bathyal
232	A 10 10	**Textularia aff. cuneata** Hada, 1931	23	2		25	8	1		8	25	6	31	10	2	12	shelf
233	A 10 35	**Textularia foliacea** Heron-Allen & Earland, 1915	2			2	1			1	42	14	56	10	7	11	shelf
234	A 10 36	**Textularia hauerii** d'Orbigny, 1846	13			13	6			6	10	7	17	3	5	6	shelf
235	A 10 59	**Textularia lancea** Lalicker & McCulloch, 1940	35	1		36	8	1		8	281	20	301	33	8	33	shelf
236	A 10 25	**Textularia lateralis** Lalicker, 1935	30	5	1	36	10	3	1	11	56	15	71	24	6	28	inner shelf – middle bathyal
237	A 10 24	**Textularia cf. lythostrota** (Schwager, 1866)	49	6		55	12	2		13	996	29	1025	42	10	42	shelf
238	A 10 08	**Textularia cf. milletti** Cushman, 1911	4			4	1			1	4	5	9	4	3	5	middle bathyal – lower bathyal
239	A 10 52	**Textularia oceanica** Cushman, 1932	90			90	15			15		1	1		1	1	outer shelf
240	A 10 13	**Textularia parvula** Cushman, 1922									8	3	11	3	2	4	upper bathyal – middle bathyal
241	A 10 14	**Textularia porrecta** Brady, 1884	3			3	1			1	8	22	30	4	6	7	upper bathyal – middle bathyal
242	A 10 18	**Textularia pseudogramen** Chapman & Parr, 1937	23			23	11			11	89	32	121	29	17	35	inner shelf – uppermost bathyal
243	A 10 07	**Textularia cf. pseudosolita** Zheng, 1988									15		15	5		5	outer shelf – uppermost bathyal
244	A 10 34	**Textularia cf. scrupula** Lalicker & McCulloch, 1940															152 m
245	A 10 32	**Textularia secasensis** Lalicker & McCulloch, 1940									7		7	3		3	inner shelf
246	A 7 11	**Textularia stricta** Cushman, 1911	54	5	1	60	9	1	1	10	162	26	188	33	16	38	inner shelf – uppermost bathyal
247	A 10 06	**Textularia subantarctica** Vella, 1957									3		3	3		3	outer shelf – lower bathyal
248	A 10 09	**Textularia sp. 1**	5			5	3			3	2		2	1		1	inner shelf
249	A 10 20	**Textularia sp. 2**										2	2		1	1	60 m
250	A 10 21	**Textularia sp. 3**									4	8	12	3	4	7	shelf
251	A 10 22	**Textularia sp. (22)**	6			6	4			4	21	1	22	9	1	10	shelf
252	A 10 23	**Textularia sp. 4**									5	2	7	2	1	3	shelf
253	A 10 56	**Textularia sp. 5**	8			8	2			2	209	99	308	19	20	24	shelf
254	A	**Textularia spp.**	120	10	1	131	12	4	1	13	345	51	396	45	22	46	inner shelf – middle bathyal
255	A 2 13	**Thurammina compressa** Brady, 1879	3		2	5	1		1	1	1	1	2	1	1	2	middle bathyal – lower bathyal
256	A 2 14	**Thurammina papillata** Brady, 1879			3	3			2	2	14	3	17	7	3	8	outer shelf – lower bathyal
257	A 2 15	**Thurammina papyracea** Cushman, 1913									2		2	1		1	1309 m
258	A 3 04	**Tolypammina vagans** (Brady, 1879)			1	1			1	1	200	100	300	15	17	23	full range

	collection no. (1)			taxa (2)	(+) (3) picked	(ϕ)	(*)	∑	(+) (4) occurrence	(ϕ)	(*)	all	(+) picked	(*)	∑	(+) occurrence	(*)	all	(5) depth range
259	A	9	15	**Tritaxilina atlantica** Cushman, 1922									24	2	26	11	2	12	outer shelf – upper bathyal
260	A	9	16	**Tritaxilina caperata** (Brady, 1881)									7		7	3		3	outer shelf
261	A	8	09	**Tritaxis challengeri** (Hedley, Hurdle & Burdett, 1964)	3		1	4	1		1	1	6	22	28	5	11	13	shelf
262	A	8	10	**Tritaxis fusca** (Williamson, 1858)	2			2	1			1	3	2	5	3	2	4	inner shelf – middle bathyal
263	A	8	12	**Tritaxis primitiva** Brönnimann & Whittaker, 1988			1	1			1	1	3	14	17	3	8	9	shelf
264	A	8	19	**Trochammina inflata** (Montagu, 1808)									7	9	15	6	4	8	full range
265	A	8	24	**Trochammina nana** (Brady, 1881)									2	4	5	2	3	3	middle bathyal – lower bathyal
266	A	8	14	**Trochammina subglobigeriniformis** Mikhalevich, 1972	8		1	9	2		1	2	44	21	65	7	6	10	uppermost bathyal – lower bathyal
267	A	8	23	**Trochammina tasmanica** Parr, 1950									1	4	5	1	3	4	full range
268	A			**Trochammina spp.**	4		1	5	3		1	3	6	11	17	5	9	14	full range
269	A	8	02	**Trochamminopsis parvus** Brönnimann & Whittaker, 1988	7		2	9	1		1	1		1	1		1	1	middle bathyal – lower bathyal
270	A	8	01	**Trochamminopsis quadriloba** (Höglund, 1948)	1		1	2	1		1	1	8	4	12	2	3	3	middle bathyal – lower bathyal
271	A	3	01	**Usbekistania charoides** (Jones & Parker, 1860)	30		1	31	2		1	2	67	36	102	10	9	11	uppermost bathyal – lower bathyal
272	A	1	38	**Vanhoeffenella sp.**			2	2			1	1		36	36		3	3	outer shelf
273	A	6	08	**Veleroninoides crassimargo** (Norman, 1892)									1		1	1		1	upper bathyal – lower bathyal
274	A	6	06	**Veleroninoides jeffreysii** (Williamson)									5	11	16	5	9	14	full range
275	A	6	05	**Veleroninoides kosterensis** (Höglund, 1947)	1		1	2	1		1	2	5	10	15	4	9	11	full range
276	A	6	07	**Veleroninoides wiesneri** (Parr, 1950)									10	4	13	6	4	9	outer shelf – lower bathyal
277	A			**Verneuilinulla affixa** (Cushman, 1911)	1			1	1			1							1479 m
278	A	7	30	**Verneuilinulla propinqua** (Brady, 1884)	1		1	2	1		1	1	14	9	23	6	6	7	upper bathyal – lower bathyal
279	A	7	29	**Verneuilinulla superba** (Earland, 1934)									6	2	8	5	2	5	upper bathyal – middle bathyal
280	A	7	31	**Verneuilinulla sp. 1**	18		6	24	2		2	2	3	5	8	3	3	6	upper bathyal – lower bathyal
281				**"MUD Balls"**	28			28	3			3	212	31	243	26	6	26	full range
282				**UAF (unidentified agglutinated foraminifera)**	50		1	51	9		1	10	762	262	1023	54	51	56	
283	C			**Acervulina inhaerens** Schultze, 1854	1			1	1			1							68 m
284	C	2	30	**Adelosina laevigata** d'Orbigny, 1826									2	2	4	2	2	4	inner shelf – middle bathyal
285	C	2	29	**Adelosina litoralis** Martinotti, 1921	1			1	1			1	51	2	53	21	2	23	shelf
286	C	2	33	**Adelosina spp.**	10	1		11	6	1		7	10	2	12	7	1	8	shelf
287	C	20	05	**Agglutinella agglutinans** (d'Orbigny, 1839)	186	7		193	16	3		16	321	23	344	40	10	40	shelf
288	C	20	27	**Agglutinella arenata** (Said, 1949)									48	5	53	17	5	18	inner shelf – uppermost bathyal
289	C	20	06	**Agglutinella reinemunde** (Haque, 1959)	43	1		44	13	1		13	14		14	7		7	shelf
290	C			**Agglutinella spp.**	49			49	7			7	108	1	109	14	1	14	shelf
291	C	11	21	**Alectinella elongata** (Millett, 1900)	1			1	1			1	2		2	2		2	shelf
292	C	11	36	**Allassoida virgula** (Brady, 1879)	1			1	1			1	15		15	9		9	shelf
293	C	10	37	**Alliatina variabilis** (Zheng, 1978)									2		2	2		2	shelf
294	C	10	38	**Alliatinella differens** (McCulloch, 1977)									5	1	6	4	1	5	shelf
295	C	20	15	**Ammomassilina alveoliniformis** (Millett, 1898)	46	2	2	50	11	1	2	12	1363	75	1438	47	31	48	inner shelf – upper bathyal
296	C	17	09	**Ammonia beccarii** (Linné, 1758)	164	27		191	15	11		16	592	100	692	49	36	49	inner shelf – middle bathyal
297	C	17	12	**Ammonia parkinsoniana** (d'Orbigny, 1839)	6	10		16	3	6		7	12		12	5		5	inner shelf – uppermost bathyal
298	C	17	11	**Ammonia pauciloculata** (Phleger & Parker, 1951)	31	2	1	34	10	1	1	10	91	9	100	27	6	28	inner shelf – uppermost bathyal
299	C	17	22	**Ammonia tepida** (Cushman, 1926)	5			5	1			1	20	5	25	13	1	13	shelf
300	C			**Ammonia spp.**	1			1	1			1	6	2	8	3	1	4	inner shelf – uppermost bathyal
301	C	4	01	**Amphicoryna hirsuta** (d'Orbigny, 1826)	1			1	1			1	233	50	283	29	20	31	inner shelf – upper bathyal
302	C	4	27	**Amphicoryna intercellularis** (Brady, 1881)															291 m
303	C	4	06	**Amphicoryna meringella** Loeblich & Tappan, 1994															60 m
304	C	4	07	**Amphicoryna papillosa** (O. Silvestri, 1872)	91	11	1	103	2	1	1	2	52	14	66	19	7	22	inner shelf – upper bathyal
305	C	4	14	**Amphicoryna scalaris** (Batsch, 1791)	11			11	5			5	81	17	98	20	9	22	inner shelf – upper bathyal
306	C	4	16	**Amphicoryna separans** (Brady, 1884)									77	4	81	18	2	18	outer shelf – uppermost bathyal
307	C	4	03	**Amphicoryna sublineata** (Brady, 1884)	7			7	4			4	90	17	107	34	14	37	inner shelf – upper bathyal
308	C	4	28	**Amphicoryna substriatula** (Cushman 1917)									2		2	1		1	404 m
309	C			**Amphicoryna spp.**	4			4	3			3	33	6	39	17	6	20	inner shelf – upper bathyal
310	C			**Amphistegina lessoni** d'Orbigny, 1926	517	64	10	591	14	11	5	16							shelf
311	C	14	01	**Amphistegina papillosa** Said, 1949	622	11	9	642	16	6	5	16	109	7	116	19	6	20	inner shelf – upper bathyal
312	C	14	05	**Amphistegina radiata** (Fichtel & Moll, 1798)	275	28	2	305	8	8	2	9	2		2	2		2	shelf
313	C			**Amphistegina spp.**	17	31		48	3	3		5							shelf
314	C	11	47	**Angulogerina bradyana** Cushman, 1932	8	1		9	4	1		4	7		7	6		6	outer shelf
315	C	15	29	**Anomalinoides colligerus** (Chapman & Parr, 1937)	2			2	2			2	30	14	44	13	4	15	inner shelf – middle bathyal
316	C	15	27	**Anomalinoides globulosus** (Chapman & Parr, 1937)	5			5	2			2	25	10	35	14	8	20	full range
317	C	15	28	**Anomalinoides cf. welleri** (Plummer, 1926)	4		1	5	2		1	3	123	7	130	30	4	30	inner shelf – uppermost bathyal
318	C			**Anomalinoides sp. 1**										2	2		1	1	595 m
319	C	9	31	**Anturina haynesi** Jones, 1984									3		3	3		3	uppermost bathyal – lower bathyal
320	C	1	47	**Articularia sagra** (d'Orbigny, 1839)									2		2	2		2	outer shelf
321	C			**Articulina alticostata** Cushman, 1944	13	6		19	8	5		10							shelf
322	C			**Articulina mayori** Cushman, 1944	1	2		3	1	1		2							shelf
323	C			**Astacolus crepidulus** (Fichtel & Moll, 1798)	1			1	1			1	2		2	1		1	shelf
324	C	18	16	**Asterorotalia compressiuscula** (Brady, 1884)	4			4	3			3	90	42	132	14	9	19	shelf
325	C	18	32	**Asterorotalia (?) concinna** (Millett, 1904)	4			4	3			3	15	22	37	7	4	8	inner shelf
326	C	18	25	**Asterorotalia gaimardii** (d'Orbigny, 1826)	199	34	4	237	12	8	3	12	1546	370	1916	46	43	46	inner shelf – uppermost bathyal
327	C	18	15	**Asterorotalia milletti** Billman, Hottinger & Oesterle, 1980									55	12	67	8	3	9	shelf
328	C	18	13	**Asterorotalia pulchella** (d'Orbigny, 1839)	1	3		4	1	2		2	994	23	1017	40	11	41	inner shelf – uppermost bathyal
329	C	18	14	**Asterorotalia sp. 1**	1	2		3	1	1		2	3		3	3		3	outer shelf
330	C			**Asterorotalia ? sp.**									32	7	39	11	6	15	shelf
331	C			**Asterorotalia spp.**	4			4	2			2	4	2	6	3	1	4	shelf
332	C	16	03	**Astrononion novozealandicum** Cushman & Edwards, 1937	12		1	13	2		1	2	92	12	104	5	5	7	full range
333	C	16	06	**Astrononion stelligerum** (d'Orbigny, 1839)									23	4	27	20	4	23	full range
334	C			**Astrononion spp.**									4	2	6	4	2	5	outer shelf – upper bathyal
335	C	13	07	**Baggina indica** (Cushman, 1921)	13		1	14	5		1	5	3	8	11	3	5	7	outer shelf
336	C	3	25	**Biloculinella inflata** (Wright, 1902)									17	4	21	11	3	12	shelf
337	C	3	29	**Biloculinella labiata** (Schlumberger, 1891)	2			2	2			2	50	23	73	27	17	34	inner shelf – upper bathyal
338	C	11	16	**Bolivina earlandi** Parr, 1950									24	2	26	10	2	11	inner shelf – upper bathyal
339	C	11	05	**Bolivina glutinata** Egger, 1893	122	53	4	179	13	11	3	14	141	11	152	27	10	28	inner shelf – upper bathyal
340	C	11	17	**Bolivina macella** Belford, 1966	16	2	2	20	5	2	2	6	13	9	22	9	6	12	shelf
341	C	11	15	**Bolivina pusilla** Schwager, 1866									1		1	1		1	117 m
342	C	11	01	**Bolivina robusta** Brady, 1881	8			8	1			1	92	26	118	9	6	10	outer shelf – middle bathyal
343	C	11	02	**Bolivina spathulata** (Williamson, 1858)	77	2		79	10	2		10	177	21	198	32	11	33	inner shelf – upper bathyal
344	C			**Bolivina spinata** Cushman, 1936		1		1		1		1							88 m
345	C	11	13	**Bolivina subaenariensis var. mexicana** Cushman, 1922	17	2		19	7	2		7	56	1	57	3	1	3	inner shelf – uppermost bathyal
346	C	11	04	**Bolivina subreticulata** Parr, 1932	32	4	1	37	9	1	1	9	147	13	160	11	8	16	outer shelf – lower bathyal
347	C			**Bolivina spp.**	1	3		4	1	3		4	2	2	4	2	2	4	inner shelf – uppermost bathyal
348	C	8	41	**Bombulina echinata** (Millett, 1902)	2			2	1			1	43	76	119	20	28	34	shelf

	collection no. (1)			taxa (2)	(+)	(ϕ)	(*)	Σ	(+)	(ϕ)	(*)	all	(+)	(*)	Σ	(+)	(*)	all	(5) depth range
					(3) picked				(4) occurrence				picked			occurrence			
349	C			**Borelis melo** (Fichtel & Moll, 1798)	1			1	1			1							88 m
350	C	12	01	**Bulimina aculeata** d'Orbigny, 1826	18		2	20	2		1	2	36	8	43	9	5	9	upper bathyal – lower bathyal
351	C	12	13	**Bulimina affinis** d'Orbigny, 1839	4		1	5	3		1	3	14	6	20	5	2	5	upper bathyal – middle bathyal
352	C			**Bulimina elongata** d'Orbigny, 1826	2			2	1			1							148 m
353	C	12	07	**Bulimina marginata** d'Orbigny, 1826	25	10	5	40	8	6	2	11	742	112	854	47	31	47	inner shelf – middle bathyal
354	C	12	02	**Bulimina mexicana** Cushman, 1922	13			13	2			2	113	12	124	11	7	12	uppermost bathyal – lower bathyal
355	C	12	05	**Bulimina rostrata** Brady, 1884									16	2	18	6	1	7	upper bathyal – lower bathyal
356	C	12	03	**Bulimina striata** d'Orbigny, 1826	1		3	4	1		2	2	30	6	36	8	4	9	uppermost bathyal – lower bathyal
357	C			**Calcarina hispida** Brady, 1876	3		1	4	2		1	3	1		1	1		1	301 m
358	C			**Calcarina spengleri** (Gmelin, 1791)	11	7		18	3	2		3							shelf
359	C	18	37	**Calcarina mayori** Cushman, 1924															inner shelf
360	C	13	01	**Cancris auriculus** (Fichtel & Moll, 1798)	41		1	42	14		1	14	219	125	344	44	30	44	inner shelf – uppermost bathyal
361	C	13	03	**Cancris carinatus** (Millett, 1904)	4			4	2			2	26	43	69	13	13	19	shelf
362	C	13	05	**Cancris oblongus** (d'Orbigny, 1839)			1	1			1	1	28	3	31	13	3	13	inner shelf – upper bathyal
363	C	15	10	**Caribeanella philippinensis** McCulloch, 1977									28	6	34	13	3	14	shelf
364	C			**Carpenteria balaniformis** Gray, 1858	1			1	1			1							102 m
365	C			**Carpenteria proteiformis** Goës, 1882	7	3		10	3	1		3							shelf
366	C			**Carterina spiculotesta** (Brady, 1884)										1	1		1	1	71 m
367	C	11	32	**Cassidelina complanata** (Egger, 1893)									1		1	1		1	101 m
368	C	11	33	**Cassidelina regina** (Zhang, 1988)									1		1	1		1	134 m
369	C	11	50	**Cassidelina subcapitata** (Zheng, 1979)	11	1		12	4	1		4	21	20	41	13	10	18	shelf
370	C	12	32	**Cassidulina carinata** Silvestri, 1896	16			16	3			3	109	12	121	12	7	12	full range
371	C	12	34	**Cassidulina crassa** d'Orbigny, 1839	3			3	2			2	3		3	2		2	inner shelf – uppermost bathyal
372	C	12	33	**Cassidulina obusta** Williamson, 1858									2		2	2		2	uppermost bathyal – middle bathyal
373	C	18	60	**Cellanthus craticulatus** (Fichtel &Moll, 1798)	30	7		37	8	4		9	5		5	4		4	shelf
374	C	10	01	**Ceratobulimina jonesiana** (Brady, 1881)	17		11	28	2		2	2	52	48	100	8	9	9	middle bathyal – lower bathyal
375	C	16	51	**Chilostomella cushmani** Chapman, 1941									12	4	16	5	3	5	uppermost bathyal – middle bathyal
376	C	16	50	**Chilostomella oolina** Schwager, 1878	1			1	1			1	11	3	14	5	2	5	outer shelf – lower bathyal
377	C	16	49	**Chilostomella ovoidea** Reuss, 1850	1			1	1			1	19	4	22	7	4	8	outer shelf – lower bathyal
378	C			**Chrysalidinella dimorpha** (Brady, 1881)	1			1	1			1							145 m
379	C	15	14	**Cibicides deprimus** Phleger & Parker, 1951	34			34	11			11	276	37	313	25	11	30	inner shelf – middle bathyal
380	C	15	19	**Cibicides kullenbergi** Parker, 1953	29		1	30	6		1	6	38	29	67	10	11	15	inner shelf – middle bathyal
381	C	15	09	**Cibicides lobatulus** (Walker & Jacob, 1798)	97	2	3	102	14	2	3	14	195	64	259	37	22	41	inner shelf – middle bathyal
382	C	15	04	**Cibicides reflugens** de Montfort, 1808	186	16	2	204	15	7	2	15	83	2	85	10	2	10	inner shelf – uppermost bathyal
383	C	15	18	**Cibicides sp. 1**	13	3		16	5	1		5	327	89	416	28	21	31	shelf
384	C	15	16	**Cibicidoides cicatricosus** (Schwager, 1866)	6			6	2			2	32	7	39	11	5	13	full range
385	C	15	20	**Cibicidoides ex gr. pachyderma** (Rzehak, 1886)	359	17	4	380	18	6	2	18	782	86	868	52	25	52	full range
386	C	15	03	**Cibicidoides robertsonianus** (Brady, 1881)	11		5	16	2		3	3	22	39	61	5	8	9	full range
387	C	15	24	**Cibicidoides sp. 1**	23		2	25	5		2	6	19	2	21	8	2	9	shelf
388	C			**Cibicidoides spp.**	17		1	18	8		1	9	29	24	53	14	12	23	inner shelf – middle bathyal
389	C			**Conicospirillinoides inaequalis** (Brady, 1879)	1			1	1			1							88 m
390	C	1	17	**Cornuloculina inconstans** (Brady, 1879)									1	1	2	1	1	1	595 m
391	C	1	51	**Cornuspira carinata** (Costa, 1856)									2		2	2		2	outer shelf
392	C	1	52	**Cornuspira foliacea** (Philippi, 1844)									18	4	22	14	4	16	shelf
393	C	1	49	**Cornuspira involvens** (Reuss, 1850)									15	22	37	9	2	10	full range
394	C	1	50	**Cornuspira planorbis** Schultze, 1854	1			1	1			1	24	6	30	18	6	21	full range
395	C	15	32	**Coronatoplanulina okinawaensis** Ujiié, 1990									5	2	7	3	2	3	middle bathyal – lower bathyal
396	C			**Cyclorbiculina compressa** (d'Orbigny, 1839)	1			1	1			1							88 m
397	C	14	59	**Cymbaloporetta bradyi** (Cushman, 1915)	1			1	1			1	4		4	2		2	shelf
398	C	14	57	**Cymbaloporetta squammosa** (d'Orbigny, 1839)	2			2	2			2	45		45	8		8	shelf
399	C	11	42	**Delosina complexa** (Sidebottom, 1907)															842 m
400	C			**Cushmanina desmophora** (R. Jones, 1872)	2			2	1			1							1277 m
401	C			**Dendritina sp.**		2		2		1		1							102 m
402	C	5	38	**Dentalina albatrossi** (Cushman, 1923)		1		1		1		1	16	6	22	12	5	13	inner shelf – uppermost bathyal
403	C	4	53	**Dentalina catenulata** (Brady, 1884)									9	2	11	7	1	7	outer shelf – uppermost bathyal
404	C			**Dentalina flintii** (Cushman, 1923)									1		1	1		1	137 m
405	C	5	52	**Dentalina mutsui** Hada, 1931	5	1	1	7	4	1	1	5	4	4	8	4	3	6	outer shelf
406	C	5	06	**Dentalina plebeia** Reuss, 1855										1	1		1	1	404 m
407	C	5	18	**Dentalina ruidarostrata** Loeblich & Tappan, 1994									1	3	4	1	3	4	shelf
408	C	5	15	**Dentalina sp. 1**									3		3	2		2	outer shelf – uppermost bathyal
409	C	5	39	**Dentalina sp. 2**									1	1	2	1	1	2	uppermost bathyal – middle bathyal
410	C			**Dentalina spp.**									7	1	8	7	1	8	inner shelf – upper bathyal
411	C	5	54	**Dimorphina nodosaria** d'Orbigny, 1846									5		5	5		5	outer shelf – upper bathyal
412	C	15	40	**Discorbia candeiana** (d'Orbigny, 1839)	1			1	1			1	53	17	70	13	8	20	shelf
413	C	14	17	**Discorbinella araucana** (d'Orbigny, 1839)	6			6	3			3	12	6	18	4	2	5	outer shelf – uppermost bathyal
414	C	14	13	**Discorbinella bertheloti** (d'Orbigny, 1839)	19			19	9			9	308	56	364	37	28	41	inner shelf – middle bathyal
415	C	14	15	**Discorbinella bodjongensis** (LeRoy, 1941)	27			27	9			9	31	10	41	10	5	12	shelf
416	C	14	14	**Discorbinella montereyensis** Cushman & Martin, 1935									12	2	14	10	2	12	inner shelf – uppermost bathyal
417	C	14	16	**Discorbinella sp. 1**	19	5	5	29	7	3	4	8	20	15	35	9	9	13	shelf
418	C			**Discorbinella spp.**									2	5	7	2	3	4	outer shelf
419	C	2	31	**Edentostomina cultrata** (Brady, 1881)	1		1	2	1		1	2	14	26	40	11	15	21	shelf
420	C	2	32	**Edentostomina milletti** (Cushman, 1917)	2			2	2			2		2	2		1	1	inner shelf
421	C			**Edentostomina rupertiana** (Brady, 1881)	3			3	3			3							shelf
422	C	11	55	**Ehrenbergina undulata** Parker, 1953									83	9	92	6	2	6	outer shelf – middle bathyal
423	C			**Elphidiella arctica** (Parker & Jones, 1864)	6	1		7	3	1		4							shelf
424	C	18	49	**Elphidium advenum** (Cushman, 1922)	88	21	1	110	12	8	1	12	393	51	444	41	18	42	inner shelf – uppermost bathyal
425	C	18	50	**Elphidium crispum** (Linné, 1758)	87	9		96	16	6		16	36		36	13		13	inner shelf – uppermost bathyal
426	C			**Elphidium incertum** (Williamson, 1858)	15	5	2	22	7	3	1	7							shelf
427	C	18	52	**Elphidium jenseni** (Cushman, 1924)	15	4		19	5	2		5	35	3	38	12	2	12	shelf
428	C	18	51	**Elphidium macellum** (Fichtel & Moll, 1798)	71	6		77	9	2		9	28		28	11		11	shelf
429	C	18	53	**Elphidium reticulosum** Cushman, 1933									14		14	7		7	shelf
430	C	18	54	**Elphidium singaporense** McCulloch, 1977	40	2		42	10	2		11	13	1	14	5	1	5	shelf
431	C	18	58	**Elphidium vitreum** Collins, 1974	1			1	1			1	3		3	3		3	shelf
432	C			**Elphidium spp.**	23	14		37	8	4		9	11	1	12	9	1	10	shelf
433	C	5	05	**Enantiodentalina muraii** Uchio, 1953										1	1		1	1	116 m
434	C	13	26	**Eponides cribrorepandus** (Asano & Uchio, 1951)	9		1	10	6		1	6	14	1	15	11	1	11	shelf
435	C	13	25	**Eponides repandus** (Fichtel & Moll, 1798)	46	1		47	11	1		12	48	17	65	24	8	27	shelf
436	C	11	19	**Euloxostomum alata** (Seguenza, 1862)															291 m
437	C	11	18	**Euloxostomum bradyi** (Asano, 1938)									1		1	1		1	226 m
438	C	11	20	**Euloxostomum pseudobeyrichi** (Cushman, 1926)	1			1	1			1	33	1	34	7	1	7	outer shelf – uppermost bathyal

	collection no. (1)			taxa (2)	(+)	(φ)	(*)	Σ	(+)	(φ)	(*)	all	(+)	(*)	Σ	(+)	(*)	all	(5) depth range
					(3) picked				(4) occurrence				picked			occurrence			
439	C	13	58	**Eusphaeroidina inflata** Ujiié, 1990	4		5	9	2		3	3		4	4		2	2	outer shelf – middle bathyal
440	C			**Evolutononion shansiense** N.W. Wang, 1964									1		1	1		1	291 m
441	C			**Evolvocassidulina orientalis** (Cushman, 1922)			2	2			2	2							middle bathyal – lower bathyal
442	C	14	54	**Facetocochlea pulchra** (Cushman, 1933)	2	1		3	2	1		2	591	213	804	45	39	45	inner shelf – uppermost bathyal
443	C	16	05	**Fijinonion fijiense** (Cushman & Edwards, 1937)	20	1	1	22	9	1	1	10	185	23	208	45	13	45	inner shelf – middle bathyal
444	C	1	43	**Fischerina pellucida** Millett, 1898									1		1	1		1	404 m
445	C	1	53	**Fischerinella diversa** McCulloch, 1977									1		1	1		1	101 m
446	C	9	06	**Fissurina bradii** Silvestri, 1902									2	1	3	1	1	2	outer shelf – middle bathyal
447	C	9	01	**Fissurina bradyiformata** (McCulloch, 1977)									16	3	19	6	2	7	full range
448	C	9	02	**Fissurina formosa** (Schwager, 1866)									14	2	16	10	2	10	outer shelf – middle bathyal
449	C	9	03	**Fissurina orbignyana** Seguenza, 1862									2		2	2		2	middle bathyal
450	C	9	07	**Fissurina submarginata** (Boomgaart, 1949)									14	1	15	8	1	8	outer shelf – lower bathyal
451	C			**Fissurina spp.**	4			4	2			2	21	7	28	13	4	14	full range
452	C	12	18	**Floresina philippinensis** (McCulloch, 1977)	3			3	3			3	9	1	10	8	1	9	shelf
453	C	15	02	**Fontbotia wuellerstorfi** (Schwager, 1866)	26		3	29	2		2	2	69	15	84	9	9	10	upper bathyal – lower bathyal
454	C			**Frondicularia kiensis** Barker, 1960									1		1	1		1	127 m
455	C	11	31	**Fursenkoina pauciloculata** (Brady, 1884)									3	1	4	3	1	4	inner shelf – middle bathyal
456	C	11	30	**Fursenkoina schreibersiana** (Cǐjlek, 1848)	3			3	2			2	3		3	2		2	inner shelf – upper bathyal
457	C	13	42	**Gavelinopsis lobatulus** (Parr, 1950)	3			3	1			1	51	10	61	9	5	11	uppermost bathyal – lower bathyal
458	C	13	41	**Gavelinopsis praegeri** (Heron-Allen & Earland, 1913)	4	1		5	2	1		2	28	1	29	9	1	9	inner shelf – uppermost bathyal
459	C	13	43	**Gavelinopsis translucens** (Phleger & Parker, 1951)	3			3	2			2	20	21	41	8	7	9	upper bathyal – middle bathyal
460	C	13	38	**Gavelinopsis sp. 1**									8		8	5		5	inner shelf – uppermost bathyal
461	C	10	39	**Geminospira bradyi** Bermúdez, 1952	1			1	1			1	1	1	2	1	1	2	shelf
462	C			**Glabratella tabernacularis** (Brady, 1881)	1			1	1			1							102 m
463	C	8	40	**Glandulina laevigata** d'Orbigny, 1826)									34	24	58	21	13	27	shelf
464	C	8	39	**Glandulina (?) torrida** (Cushman, 1923)									13	12	25	11	9	18	inner shelf – upper bathyal
465	C			**Glandulina spp.**									2	1	3	1	1	2	inner shelf – upper bathyal
466	C	12	16	**Globobulimina pacifica** Cushman, 1927	1		1	2	1		1	2	7	4	11	3	3	6	outer shelf – middle bathyal
467	C	12	29	**Globocassidulina elegans** (Sidebottom, 1910)															1852 m
468	C	12	26	**Globocassidulina gemma** (Todd, 1954)			1	1			1	1	7	4	11	4	3	7	uppermost bathyal – lower bathyal
469	C	12	28	**Globocassidulina minima** (Saidova, 1975)									5	1	6	3	1	3	middle bathyal – lower bathyal
470	C	12	27	**Globocassidulina subglobosa** (Brady, 1881)	39	3	1	43	11	3	1	11	86	31	117	9	11	12	full range
471	C			**Globulina gibba** d'Orbigny, 1826	7		1	8	5		1	5							shelf
472	C			**Globulina inaequalis** (Deshayes, 1830)	1			1	1			1							47 m
473	C			**Globulina regina** (Brady, Parker & Jones, 1871)	12			12	5			5							shelf
474	C	8	13	**Globulotuba entosoleniformis** Collins, 1958		1		1		1		1	1		1	1		1	outer shelf – uppermost bathyal
475	C	1	55	**Gordiospira elongata** Collins, 1958									1	2	3	1	2	3	inner shelf – middle bathyal
476	C	4	49	**Grigelis orectus** Loeblich & Tappan, 1994	1			1	1			1	14		14	10		10	inner shelf – middle bathyal
477	C	4	50	**Grigelis semirugosus** (d'Orbigny, 1846)	1			1	1			1	10	1	11	7	1	7	inner shelf – upper bathyal
478	C	8	16	**Guttulina communis** (d'Orbigny, 1826)	1			1	1			1		1	1		1	1	shelf
479	C	8	15	**Guttulina lehneri** Cushman & Ozawa, 1930									1		1	1		1	842 m
480	C	17	02	**Gyroidina altiformis** R.E. & K.C. Stewart, 1930	45	1	2	48	12	1	1	12	43	7	49	19	5	20	full range
481	C	17	03	**Gyroidina broeckhiana** (Karrer, 1878)	1		1	2	1		1	2	50	24	74	10	9	11	upper bathyal – lower bathyal
482	C	17	15	**Gyroidina lamarckiana** (d'Orbigny, 1839)	1		2	3	1		2	3	16	11	27	10	6	10	outer shelf – lower bathyal
483	C	17	04	**Gyroidina neosoldanii** Brotzen, 1936	1		1	2	1		1	2	18	2	19	8	2	8	outer shelf – lower bathyal
484	C	17	06	**Gyroidina orbicularis** (Parker, Jones & Brady, 1865)	15	1		16	8	1		8	19	8	26	9	5	10	full range
485	C	17	14	**Gyroidina sp. 1**			1	1			1	1	4	1	5	2	1	3	middle bathyal – lower bathyal
486	C			**Gyroidina spp.**	3	1		4	3	1		4	4	1	5	3	1	3	uppermost bathyal – lower bathyal
487	C	17	01	**Gyroidinoides nipponicus** (Ishizaki, 1944)									8	3	11	8	2	8	uppermost bathyal – lower bathyal
488	C	17	16	**Gyroidinoides soldanii** (d'Orbigny, 1826)			5	5			2	2	13		13	3		3	uppermost bathyal – upper bathyal
489	C	17	13	**Gyroidinoides sp. 1**									3		3	2		2	uppermost bathyal
490	C	17	33	**Hanzawaia boueana** (d'Orbigny, 1846)	14	4		18	5	2		5	30	3	33	12	3	13	shelf
491	C	17	32	**Hanzawaia concentrica** (Cushman, 1918)									44	14	58	15	5	16	inner shelf – upper bathyal
492	C	17	34	**Hanzawaia grossepunctata** (Earland, 1934)	45	3	2	50	12	2	2	12	716	128	844	46	31	46	inner shelf – uppermost bathyal
493	C	17	36	**Hanzawaia nipponica** Asano, 1944	60	27	3	90	11	7	3	13	410	12	422	31	4	31	inner shelf – uppermost bathyal
494	C	1	54	**Hauerina fragilissima** (Brady, 1884)	4			4	2			2	21		21	6		6	shelf
495	C	13	29	**Helenina anderseni** (Warren, 1957)	23	1		24	11	1		11	169	56	225	44	25	45	inner shelf – uppermost bathyal
496	C	15	22	**Heterolepa aff. dutemplei** (d'Orbigny, 1846)	374	40	6	420	14	12	3	15	2729	430	3159	46	36	46	inner shelf – uppermost bathyal
497	C	15	36	**Heterolepa margaritifera** (Brady, 1881)	57		1	58	6		1	6	222	83	305	29	22	32	inner shelf – uppermost bathyal
498	C	15	34	**Heterolepa margaritifera** (Brady, 1881) type 1									20	15	35	8	4	11	outer shelf
499	C	15	35	**Heterolepa margaritifera** (Brady, 1881) type 2									129	70	199	18	10	19	outer shelf – uppermost bathyal
500	C	15	33	**Heterolepa ornata** (Cushman, 1921)									2	2	4	2	1	3	outer shelf – upper bathyal
501	C	15	05	**Heterolepa praecincta** (Karrer, 1868)	94	9	2	105	13	5	1	13	171	48	219	32	20	39	inner shelf – uppermost bathyal
502	C	15	08	**Heterolepa subhaidingerii** (Parr, 1950)	77			77	15			15	195	36	231	32	18	36	inner shelf – upper bathyal
503	C	15	06	**Heterolepa sp. 1**	3			3	1			1	59	31	90	23	16	32	inner shelf – upper bathyal
504	C	19	40	**Heterostegina depressa** d'Orbigny, 1826	5			5	4			4	13	6	19	6	3	6	shelf
505	C	10	49	**Hoeglundina elegans** (d'Orbigny, 1826)	80		8	88	12		4	12	421	487	908	44	42	46	full range
506	C	10	52	**Hoeglundina elegans** (d'Orbigny, 1826) type 3	16			16	8			8	50	19	69	14	6	17	inner shelf – middle bathyal
507	C			**Hopkinsinella glabra** (Millett, 1903)									1		1	1		1	101 m
508	C	15	30	**Hyalinea balthica** (Schröter, 1783)	4			4	2			2	139	8	147	31	4	31	inner shelf – upper bathyal
509	C	9	46	**Hyalinonetrion distomapolitum** (Parker & Jones, 1865)									1		1	1		1	101 m
510	C	9	45	**Hyalinonetrion sahulense** Patterson & Richardson, 1987	1			1	1			1	2	3	5	2	3	4	outer shelf – middle bathyal
511	C	1	01	**Inaequalina disparilis** (Terquem, 1878)	2			2	1			1	20	1	21	14	1	15	inner shelf – uppermost bathyal
512	C	1	02	**Inaequalina venusta** (Cushman & Todd, 1944)									17	1	18	12	1	13	shelf
513	C	12	58	**Islandiella japonica** (Asano & Nakamura, 1937)	36	3	1	40	11	3	1	11	402	58	460	41	15	41	inner shelf – uppermost bathyal
514	C	8	05	**Krebsina subtenuis** (Cushman, 1936)									1		1	1		1	60 m
515	C	2	25	**Lachlanella compressiostoma** (Zheng, 1988)	11	2		13	5	1		6	81	15	96	32	11	33	inner shelf – uppermost bathyal
516	C	5	01	**Laevidentalina bradyensis** (Dervieux, 1893)	2		1	3	2		1	3	14	6	20	12	6	16	full range
517	C	5	02	**Laevidentalina filiformis** (d'Orbigny, 1826)	1			1	1			1	3	3	6	3	2	5	inner shelf – middle bathyal
518	C	5	03	**Laevidentalina inflexa** (Reuss, 1866)									6	4	10	5	3	8	outer shelf – lower bathyal
519	C	5	09	**Laevidentalina sidebottomi** (Cushman, 1933)									8	6	14	4	5	8	outer shelf – middle bathyal
520	C	5	04	**Laevidentalina subemaciata** Parr, 1950	2		1	3	2		1	2	9	5	14	7	5	12	full range
521	C	4	16	**Laevidentalina subsoluta** (Cushman, 1923)	1			1	1			1	17	13	30	14	13	24	full range
522	C	5	17	**Laevidentalina sp. 1**									1		1	1		1	790 m
523	C	5	14	**Laevidentalina sp. 2**	1			1	1			1	1		1	1		1	outer shelf – middle bathyal
524	C			**Laevidentalina spp.**	2		2	4	2		1	3	8	3	11	7	2	9	full range
525	C	9	51	**Lagena alticostata** Cushman, 1913															1852 m
526	C	9	56	**Lagena annellatrachia** Loeblich & Tappan, 1994									22	2	24	10	2	10	shelf
527	C	9	41	**Lagena crenata** Parker & Jones, 1865															145 m
528	C	9	59	**Lagena dorbignyi** Jones, 1984									11		11	7		7	inner shelf – middle bathyal

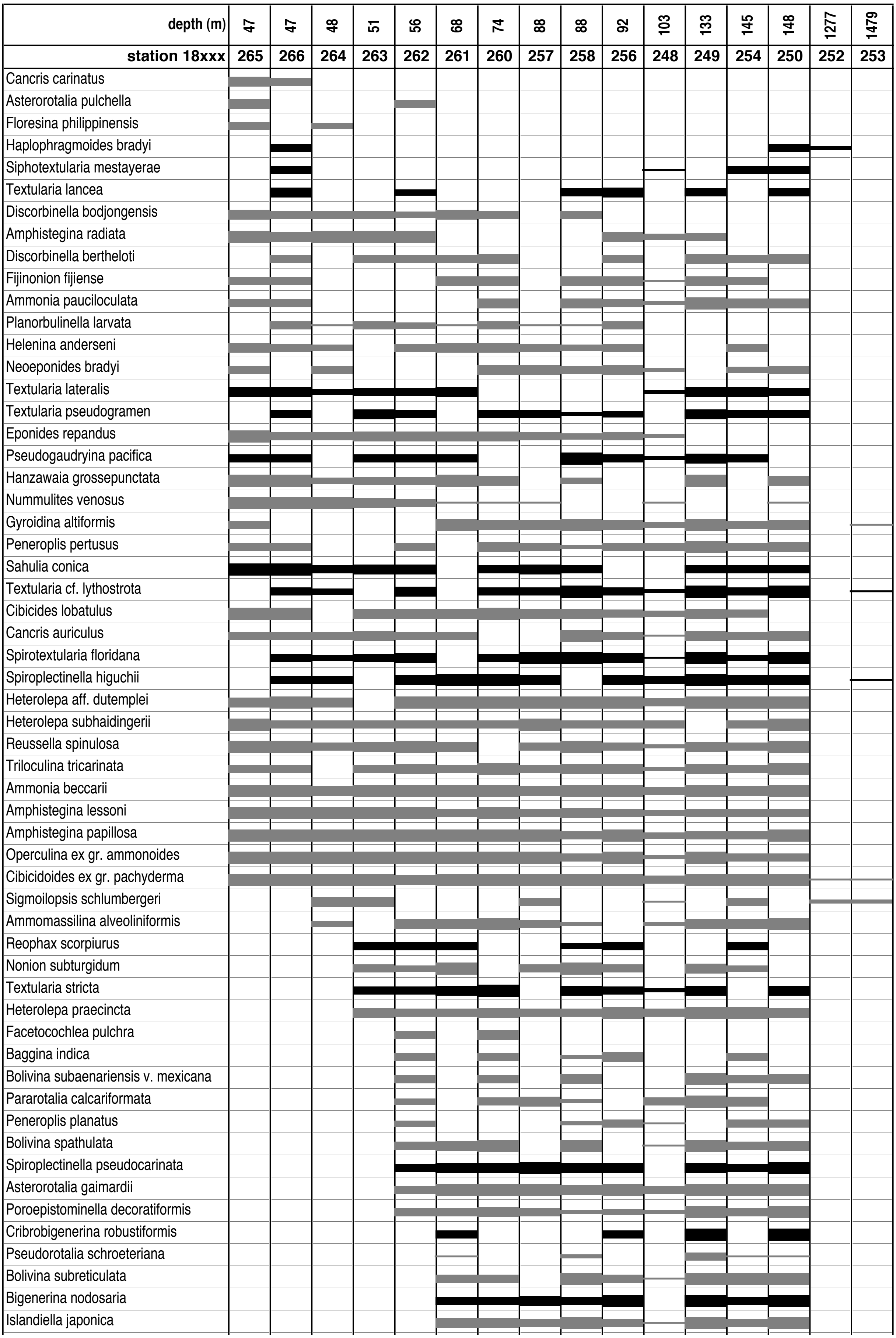
	collection			②	(+)	(ϕ)	(*)	∑	(+)	(ϕ)	(*)	all	(+)	(*)	∑	(+)	(*)	all	⑤
	no. ①			taxa	③ picked				④ occurrence				picked			occurrence			depth range
529	C	9	43	**Lagena gibbera** Buchner, 1940	1			1	1			1	3	2	5	2	2	2	middle bathyal
530	C	9	34	**Lagena hispida** Reuss, 1858	1			1	1			1	2	1	3	2	1	3	outer shelf – middle bathyal
531	C	9	35	**Lagena hispidula** Cushman, 1913	2			2	1			1	6	4	10	5	2	6	outer shelf – lower bathyal
532	C	9	39	**Lagena perlucida** (Montagu, 1803)									4	1	5	3	1	4	outer shelf – uppermost bathyal
533	C	9	38	**Lagena semistriata** Williamson, 1848									8		8	6		6	shelf
534	C	9	42	**Lagena stelligera** Brady, 1881									4		4	3		3	outer shelf – lower bathyal
535	C	9	57	**Lagena striata** (d'Orbigny, 1839)									17	3	20	10	2	11	inner shelf – upper bathyal
536	C	9	58	**Lagena substriata** Williamson, 1848									19	3	22	11	3	13	full range
537	C	9	50	**Lagena cf. sulcata** (Walker & Jacob, 1798)										1	1		1	1	69 m
538	C	9	49	**Lagena sp. 1**									3		3	1		1	1852 m
539	C			**Lagena spp.**	5			5	3			3	20	5	25	13	4	16	full range
540	C	10	26	**Lamarckina scabra** (Brady, 1884)	9			9	6			6	47	2	49	19	2	20	shelf
541	C	10	25	**Lamarckina ventricosa** (Brady, 1884)	5			5	1			1	21	3	24	11	2	12	shelf
542	C	14	25	**Laticarinina pauperata** (Parker & Jones, 1865)	1			1	1			1	25	7	31	7	4	7	middle bathyal – lower bathyal
543	C	6	41	**Lenticulina anaglypta** (Loeblich & Tappan, 1987)	5		1	6	2		1	3	46	26	72	15	13	19	shelf
544	C	6	36	**Lenticulina antillea** (Cushman, 1923)									10		10	6		6	outer shelf
545	C	6	27	**Lenticulina atlantica** (Barker, 1960)	114	4	2	120	12	4	2	13	181	55	236	31	27	40	inner shelf – middle bathyal
546	C	6	20	**Lenticulina calcar** (Linné, 1758)	32	5	4	41	10	2	2	10	300	62	362	36	25	38	inner shelf – upper bathyal
547	C	6	43	**Lenticulina compressa** (Loeblich & Tappan, 1994)	1			1	1			1	2	1	3	2	1	2	outer shelf
548	C	6	01	**Lenticulina convergens** (Bornemann, 1855)									7		7	3		3	outer shelf – upper bathyal
549	C	6	37	**Lenticulina echinata** (d'Orbigny, 1846)	23		3	26	7		2	7	83	60	143	20	18	22	inner shelf – uppermost bathyal
550	C	6	13	**Lenticulina gibba** (d'Orbigny, 1839)	4	1	1	6	3	1	1	3	53	11	64	21	5	21	full range
551	C	6	34	**Lenticulina iota** (Cushman, 1923)	2			2	1			1	4	4	8	3	3	5	outer shelf
552	C	6	25	**Lenticulina melvilli** (Cushman & Renz, 1941)	3			3	2			2	15		15	8		8	inner shelf – uppermost bathyal
553	C	6	08	**Lenticulina cf. nicobariensis** (Schwager, 1866)															120 m
554	C	6	31	**Lenticulina orbicularis var. subumbonata** (Cushman, 1917)	4		2	6	2		1	2							outer shelf
555	C	6	35	**Lenticulina submamilligera** (Cushman, 1917)	38	5	3	46	10	3	3	11	47	29	76	22	13	26	inner shelf – upper bathyal
556	C	6	24	**Lenticulina suborbicularis** Parr, 1950	6			6	3			3	22	3	25	13	3	15	inner shelf – upper bathyal
557	C	6	32	**Lenticulina thalmanni** (Hessland, 1943)	49	5	6	60	10	4	4	13	25	18	43	15	15	25	inner shelf – middle bathyal
558	C	6	23	**Lenticulina vortex** (Fichtel & Moll, 1798)	7			7	4			4	10	7	17	6	5	11	outer shelf
559	C	6	02	**Lenticulina sp. 1**			1	1			1	1	8	4	12	4	4	8	inner shelf – upper bathyal
560	C	6	12	**Lenticulina sp. 2**									10		10	7		7	shelf
561	C	6	49	**Lenticulina spp. (juv.)**									5	2	7	5	1	6	outer shelf – middle bathyal
562	C			**Lenticulina spp.**	17	1	1	19	8	1	1	10	107	17	124	40	13	40	full range
563	C	12	36	**Lernella inflata** (LeRoy, 1944)									4	3	7	4	3	6	outer shelf – middle bathyal
564	C			**Lernella sp.**										1	1		1	1	166 m
565	C			**Loxostomina costulata** (Cushman, 1922)	3			3	1			1							47 m
566	C	11	08	**Loxostomina mayori** (Cushman, 1922)	6			6	2			2	2		2	2		2	inner shelf
567	C	7	13	**Marginulina glabra** d'Orbigny, 1826	1			1	1			1	4		4	2		2	uppermost bathyal – middle bathyal
568	C	7	16	**Marginulina musai** Saidova, 1975									2	1	3	2	1	3	outer shelf – middle bathyal
569	C	7	14	**Marginulina obesa** Cushman, 1923									2	3	5	2	3	5	outer shelf – lower bathyal
570	C	7	15	**Marginulina striata** d'Orbigny, 1852									8	2	10	6	2	8	outer shelf – upper bathyal
571	C			**Marginulina spp.**									15	6	21	12	6	17	inner shelf – middle bathyal
572	C	7	17	**Marginulinopsis cf. philippinensis** (Cushman, 1921)									5	3	8	4	3	7	outer shelf
573	C	7	18	**Marginulinopsis tenuis** (Bornemann, 1855)									2		2	2		2	outer shelf – uppermost bathyal
574	C	16	01	**Melonis affinis** (Reuss, 1851)	23	1	7	31	3	1	2	3	112	28	140	13	11	14	full range
575	C			**Miliolinella suborbicularis** (d'Orbigny, 1839)	4			4	4			4							shelf
576	C	2	38	**Miliolinella subrotunda** (Montagu, 1803)	1			1	1			1	8	1	9	5	1	6	outer shelf – lower bathyal
577	C			**Miliolinella spp.**	6	2		8	3	1		4	15	7	22	8	5	9	outer shelf – middle bathyal
578	C	14	56	**Millettiana millettii** (Heron-Allen & Earland, 1915)									50	8	58	6	4	8	shelf
579	C	13	37	**Mississippina chathamensis** McCulloch, 1977	1			1	1			1	23	10	33	12	9	16	shelf
580	C			**Monalysidum politum** Chapman, 1900	7	1		8	5	1		6							shelf
581	C	11	51	**Neocassidulina abbreviata** (Heron-Allen & Earland, 1924)	10	2		12	6	2		7	6	3	9	3	3	6	inner shelf – uppermost bathyal
582	C	13	50	**Neoconorbina communis** Ujiié, 1992									4		4	1		1	60 m
583	C			**Neoconorbina marginata** Hofker, 1951	29	8		37	10	4		10							shelf
584	C	13	51	**Neoconorbina terquemi** (Rzehak, 1888)	2			2	2			2	1		1	1		1	shelf
585	C	13	49	**Neoconorbina tuberocapitata** (Chapman, 1900)	1			1	1			1	10		10	5		5	inner shelf – uppermost bathyal
586	C	13	45	**Neoeponides auberii** (d'Orbigny, 1839)	43	6		49	13	4		14	6	7	13	6	6	12	shelf
587	C	13	13	**Neoeponides bradyi** Le Calvez 1974	56	2	3	61	11	1	3	11	35	22	57	20	16	27	shelf
588	C			**Neoeponides procerus** (Brady, 1884)	1			1	1			1							92 m
589	C	13	14	**Neoeponides sp. 1**	1			1	1			1	5	1	6	3	1	4	shelf
590	C	6	18	**Neolenticulina peregrina** (Schwager, 1866)	3			3	2			2	47	15	62	24	11	29	inner shelf – middle bathyal
591	C	12	42	**Neouvigerina ampullacea** (Brady, 1884)									40	34	74	12	7	12	full range
592	C	12	44	**Neouvigerina interrupta** (Brady, 1879)									9	4	13	5	4	9	inner shelf – uppermost bathyal
593	C	12	45	**Neouvigerina proboscidea** Schwager, 1866)	6	1		7	5	1		5	543	87	630	39	19	39	inner shelf – middle bathyal
594	C	1	60	**Nodophthalmidium simplex** Cushman & Todd, 1944	4			4	1			1	76	41	117	27	12	30	shelf
595	C	5	49	**Nodosaria lamnulifera** Thalmann, 1950									5		5	4		4	outer shelf
596	C			**Nodosaria sp. 1**									1		1	1		1	121 m
597	C	16	17	**Nonion fabum** (Fichtel & Moll, 1798)	1			1	1			1	15		15	3		3	outer shelf – uppermost bathyal
598	C	16	15	**Nonion japonicum** Asano, 1938	75	17	2	94	13	6	2	14	67	2	69	14	2	14	inner shelf – uppermost bathyal
599	C	16	16	**Nonion subturgidum** (Cushman, 1924)	23	2		25	9	2		9	41	20	61	12	9	16	inner shelf – uppermost bathyal
600	C			**Nonion sp. 1**	3			3	1			1							88 m
601	C	16	13	**Nonionoides grateloupi** (d'Orbigny, 1826)									2	2	4	2	2	4	outer shelf – middle bathyal
602	C			**Nubeculina advena** Cushman, 1924	97			97	10			10							shelf
603	C	20	49	**Nubeculina divaricata** (Brady, 1879)									355	14	369	35	7	37	shelf
604	C			**Nummulites venosus** (Fichtel & Moll, 1798)	327	819	67	1213	7	10	5	12							shelf
605	C	3	28	**Nummulopyrgo anomala** (Schlumberger, 1891)									3	4	7	3	2	5	shelf
606	C	3	26	**Nummulopyrgo globulus** (Hofker, 1983)	2	2	2	6	2	1	1	4	45	30	75	30	17	38	inner shelf – middle bathyal
607	C	14	38	**Nuttallides rugosus** (Phleger & Parker, 1951)									96	16	112	7	3	7	upper bathyal – middle bathyal
608	C	9	26	**Oolina apiopleura** (Loeblich & Tappan, 1953)									4		4	1		1	842 m
609	C	9	25	**Oolina globosa** (Montagu, 1803)									1		1	1		1	1309 m
610	C	9	28	**Oolina hexagona** (Williamson, 1848)									5		5	4		4	outer shelf
611	C	9	29	**Oolina squamosa** (Montagu, 1803)	1			1	1			1	6		6	6		6	inner shelf – uppermost bathyal
612	C			**Oolina spp.**	1			1	1			1	3	1	4	3	1	4	full range
613	C	19	13	**Operculina ammonoides** (Gronovius, 1781)	1421	554	65	2040	16	14	10	16	1207	245	1452	38	18	38	shelf
614	C	19	30	**Operculina bartschi** Cushman, 1921	227	42	50	319	12	4	7	12	99	4	103	9	2	9	shelf
615	C	19	03	**Operculina sp. 1**									14	1	15	4	1	5	shelf
616	C	19	14	**Operculina sp. 2**	80		23	103	4		2	5	95	4	99	15	3	16	inner shelf – uppermost bathyal
617	C	19	16	**Operculina sp. 3**			1	1			1	1	23	60	83	3	2	4	inner shelf
618	C	19	17	**Operculina sp. 4**									6	17	23	3	1	3	shelf

	collection no. (1)			taxa (2)	(+)	(ϕ)	(*)	∑	(+)	(ϕ)	(*)	all	(+)	(*)	∑	(+)	(*)	all	(5) depth range
					(3) picked				(4) occurrence				picked			occurrence			
619	C			**Operculina spp.**	18	1	1	20	6	1	1	7	33	10	43	12	4	14	shelf
620	C	16	25	**Oridorsalis umbonatus** (Reuss, 1851)	31		3	34	5		2	5	124	37	161	24	13	27	outer shelf – lower bathyal
621	C	16	27	**Oridorsalis sp. 1**									4	3	7	2	2	4	middle bathyal – lower bathyal
622	C	15	37	**Osangularia culter** (Parker & Jones, 1865)	12		4	16	1		2	2	53	36	89	9	10	10	uppermost bathyal – lower bathyal
623	C	12	35	**Paracassidulina minuta** (Cushman, 1933)									12	2	14	5	2	5	uppermost bathyal – middle bathyal
624	C	15	17	**Paracibicides endomica** Perelis & Reiss, 1975	13			13	4			4	92	10	102	24	7	27	inner shelf – upper bathyal
625	C	9	17	**Parafissurina basispinata** McCulloch, 1977									1		1	1		1	842 m
626	C	9	16	**Parafissurina carinata** (Buchner, 1940)									2		2	1		1	978 m
627	C	9	19	**Parafissurina curvitubulosa** (McCulloch, 1977)									2		2	1		1	1208 m
628	C	9	20	**Parafissurina lata** (Wiesner, 1931)	1		1	2	1		1	2	1		1	1		1	uppermost bathyal – lower bathyal
629	C	9	14	**Parafissurina lateralis** (Cushman, 1913)	1			1	1			1	7	1	7	3	1	3	outer shelf – lower bathyal
630	C	9	13	**Parafissurina subventricosa** McCulloch, 1977	2			2	1			1	19	4	23	10	4	11	outer shelf – lower bathyal
631	C			**Parafissurina spp.**	4			4	1			1	8	2	10	6	2	7	inner shelf – middle bathyal
632	C			**Pararotalia calcariformata** McCulloch, 1977	14	18		32	6	6		8							shelf
633	C	18	4	**Pararotalia stellata** (de Férussac, 1827)	17	5		22	4	3		5	1		1	1		1	shelf
634	C	18	01	**Pararotalia sp. 1**									299	5	304	11	2	11	inner shelf – uppermost bathyal
635	C	18	02	**Pararotalia sp. 2**									106		106	8		8	inner shelf – uppermost bathyal
636	C			**Parrellina hispidula** (Cushman, 1936)	3			3	2			2							outer shelf
637	C	14	37	**Parrelloides bradyi** (Trauth, 1918)	27		18	45	2		2	2	112	89	201	10	11	11	upper bathyal – lower bathyal
638	C			**Patellina corrugata** Williamson, 1858	1			1	1			1							88 m
639	C	3	50	**Peneroplis carinatus** d'Orbigny, 1839	2			2	2			2	3		3	1		1	shelf
640	C	3	49	**Peneroplis pertusus** (Forskål, 1775)	16	18	1	35	10	11	1	13	2		2	1		1	outer shelf
641	C			**Peneroplis planatus** (Fichtel & Moll, 1798)	12	1		13	8	1		8							shelf
642	C	1	57	**Planispirinella exigua** (Brady, 1879)	19	2		21	7	2		8	28	1	29	10	1	10	shelf
643	C			**Planorbulina distoma** (Terquem, 1876)	3			3	3			3							outer shelf
644	C	14	44	**Planorbulinella larvata** (Parker & Jones, 1865)	50	1	3	54	9	1	3	11	23		23	8		8	shelf
645	C	7	28	**Planularia californica** (Galloway & Wissler, 1927)	6			6	3			3	17	3	20	12	2	13	outer shelf – uppermost bathyal
646	C	7	25	**Planularia gemmat**a (Brady, 1881)	2	1		3	2	1		2	76	23	99	28	11	29	inner shelf – uppermost bathyal
647	C	7	29	**Planularia patens** (Brady, 1884)									3		3	3		3	outer shelf – uppermost bathyal
648	C			**Planularia perculta** McCulloch, 1977	96	3	9	108	11	1	4	11							shelf
649	C	15	31	**Planulina ariminensis** d'Orbigny, 1826									2		2	1		1	226 m
650	C	15	21	**Planulina floridana** (Cushman, 1918)	7			7	2			2	61	3	64	20	2	21	inner shelf – middle bathyal
651	C	15	25	**Planulina retia** Belford, 1966	19			19	8			8	15	2	17	8	2	9	inner shelf – middle bathyal
652	C	15	26	**Planulina sp. 1**									6		6	2		2	uppermost bathyal
653	C			**Pleurostomella sp.**										1	1		1	1	842 m
654	C	8	02	**Polymorphina group**									6	1	7	5	1	6	full range
655	C	14	53	**Poroepistominella decoratiformis** (McCulloch, 1977)	28	2	1	31	12	1	1	12	376	194	570	42	40	44	inner shelf – uppermost bathyal
656	C	12	14	**Praeglobobulimina ovata** (d'Orbigny, 1846)	5		1	6	3		1	4	40	6	46	19	5	20	full range
657	C	12	15	**Praeglobobulimina spinescens** (Brady, 1884)	1			1	1			1	5	2	7	4	2	6	outer shelf – middle bathyal
658	C	20	28	**Proemassilina arenaria** (Brady, 1884)	1			1	1			1	3		3	3		3	shelf
659	C	20	02	**Proemassilina sp. 1**									49	2	51	2	1	2	uppermost bathyal
660	C			**Proxifrons advena** (Cushman, 1923)	1			1	1			1	1		1	1		1	uppermost bathyal – middle bathyal
661	C	13	28	**Pseudoeponides japonicus** Uchio, 1950	1			1	1			1	14	1	15	8	1	8	upper bathyal – lower bathyal
662	C	20	37	**Pseudoflintina laculata** Loeblich & Tappan, 1994	4			4	3			3	31	2	33	12	2	13	outer shelf
663	C	20	38	**Pseudoflintina triquetra** (Brady, 1879)	1			1	1			1	4	1	5	4	1	5	outer shelf
664	C	1	59	**Pseudohauerina orientalis** (Cushman, 1946)	11	6		17	9	5		11	8	1	9	4	1	4	shelf
665	C	13	30	**Pseudohelenina cf. collinsi** (Parr, 1932)									3	4	7	1	3	4	outer shelf
666	C	2	16	**Pseudolachlanella artusoris** (Zheng, 1988)									15	3	18	11	3	14	inner shelf – uppermost bathyal
667	C	2	11	**Pseudolachlanella slitella** Langer, 1992	1			1	1			1	9	9	18	7	4	10	inner shelf – middle bathyal
668	C	5	20	**Pseudonodosaria discreta** (Reuss, 1850)															404 m
669	C	5	21	**Pseudonodosaria glanduliniformis** (Dervieux, 1893)	1			1	1			1	6	6	12	4	4	7	inner shelf – middle bathyal
670	C	16	14	**Pseudononion granuloumbilicatum** Zheng, 1979	1		1	2	1		1	1	7	1	8	6	1	7	outer shelf
671	C	14	39	**Pseudoparrella exigua** (Brady, 1884)	3			3	1			1	3	2	5	2	2	3	upper bathyal – lower bathyal
672	C	8	01	**Pseudopolymorphina ligua** (Roemer, 1838)									1		1	1		1	842 m
673	C	18	29	**Pseudorotalia indopacifica** (Thalmann, 1935)	537	26	64	627	9	5	9	11	815	354	1169	37	38	41	shelf
674	C	18	28	**Pseudorotalia indopacifica juv.** (Thalmann, 1935)	16	1		17	4	1		4	150	97	247	34	27	39	inner shelf – uppermost bathyal
675	C	18	30	**Pseudorotalia schroeteriana** (Parker & Jones, 1862)	5	2	3	10	4	2	2	6	502	181	683	37	24	37	shelf
676	C	9	18	**Pseudosolenina wiesneri** (Barker, 1960)									4	1	5	2	1	2	upper bathyal – lower bathyal
677	C	3	37	**Pseudotriloculina cyclostoma** (Reuss, 1850)									1		1	1		1	60 m
678	C	3	38	**Pseudotriloculina lunata** (Zheng, 1988)									3		3	3		3	outer shelf
679	C	16	39	**Pullenia bulloides** (d'Orbigny, 1826)	15		3	18	2		1	2	102	42	144	13	12	13	uppermost bathyal – lower bathyal
680	C	16	38	**Pullenia quadriloba** Reuss, 1867	9			9	2			2	15	1	16	6	1	7	full range
681	C	16	37	**Pullenia quinqueloba** (Reuss, 1851)	3		1	4	2		1	3	68	10	78	25	8	26	full range
682	C	16	42	**Pullenia salisburyi** R.E. & K.C. Stewart, 1930	2			2	2			2	8	3	11	7	2	9	outer shelf – lower bathyal
683	C	16	41	**Pullenia sp. 2**									2	2	4	2	1	2	upper bathyal – middle bathyal
684	C	9	36	**Pygmaeoseistron nebulosa** (Cushman, 1923)	1			1	1			1	3	2	5	1	2	2	middle bathyal – lower bathyal
685	C	9	37	**Pygmaeoseistron setigera** (Millett, 1901)									2		2	2		2	shelf
686	C	4	26	**Pyramidulina catesbyi** (d'Orbigny, 1839)	3		2	5	2		2	3	4	2	6	1	2	3	shelf
687	C	4	25	**Pyramidulina luzonensis** (Cushman, 1921)	10			10	7			7	58	28	86	23	16	27	inner shelf – uppermost bathyal
688	C	3	07	**Pyrgo bougainvillei** (d'Orbigny, 1839)									3		3	2		2	outer shelf
689	C	3	30	**Pyrgo depressa** (d'Orbigny, 1826)	5		1	6	4		1	4	74	14	88	33	13	38	full range
690	C	3	01	**Pyrgo murrhina** (Schwager, 1866)	1			1	1			1	14	2	16	5	2	5	middle bathyal – lower bathyal
691	C	3	08	**Pyrgo nasuta** Cushman, 1935	1			1	1			1	13	3	16	7	3	9	outer shelf – lower bathyal
692	C	3	09	**Pyrgo pacifica** Asano, 1956									4		4	3		3	outer shelf – middle bathyal
693	C	3	11	**Pyrgo sarsi** (Schlumberger, 1891)	16		1	17	6		1	6	39	28	67	24	16	29	full range
694	C	3	03	**Pyrgo serrata** (Bailey, 1863)	2		1	3	1		1	1	2	5	7	2	3	5	full range
695	C	3	02	**Pyrgo sp. 1**	2			2	2			2	18	7	25	10	4	12	shelf
696	C	3	04	**Pyrgo sp. 2**									8		8	2		2	middle bathyal – lower bathyal
697	C			**Pyrgo spp.**	7			7	4			4	23	4	27	16	4	18	full range
698	C			**Pyrgoella irregularis** (d'Orbigny, 1839)										1	1		1	1	790 m
699	C	3	27	**Pyrgoella tenuiaperta** (Huang, 1970)	6			6	4			4	123	58	181	38	25	41	shelf
700	C	8	25	**Pyrulina angusta** (Egger, 1857)									1	4	5	1	3	4	full range
701	C			**Pyrulina sp.**										1	1		1	1	114 m
702	C	9	24	**Pytine paradoxa** (Sidebottom, 1912)									1		1	1		1	166 m
703	C	2	09	**Quinqueloculina adiazeta** Loeblich & Tappan, 1994	2			2	1			1	1	1	2	1	1	2	inner shelf
704	C	2	03	**Quinqueloculina akneriana** d'Orbigny, 1846									6		6	4		4	uppermost bathyal – middle bathyal
705	C	2	02	**Quinqueloculina ex gr. auberiana** d'Orbigny, 1839	36	7	2	45	10	3	1	11	146	28	174	41	17	46	full range
706	C	2	18	**Quinqueloculina bicarinata** d'Orbigny, 1826	20	1		21	9	1		10	49	4	53	29	3	31	shelf
707	C	2	26	**Quinqueloculina collumnosa** Cushman, 1922	11		1	12	7		1	8	25	9	34	16	7	19	shelf
708	C	2	13	**Quinqueloculina fichteliana** (d'Orbigny, 1839)	5	3		8	3	1		3	18	2	20	12	2	13	shelf

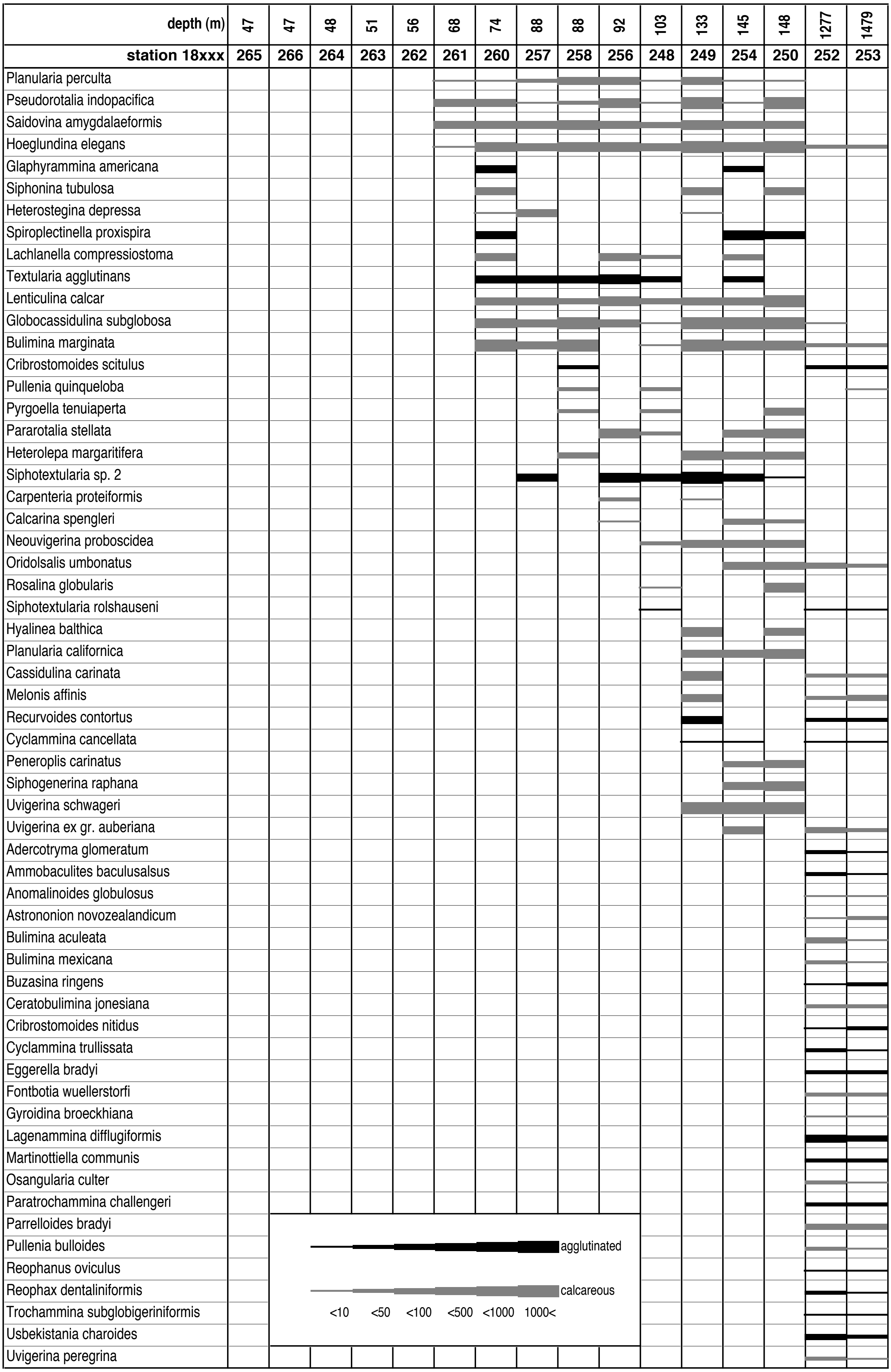
	collection			②	(+)	(ϕ)	(*)	∑	(+)	(ϕ)	(*)	all	(+)	(*)	∑	(+)	(*)	all	⑤
	no.	①		taxa	③ picked				④ occurrence				picked			occurrence			depth range
709	C	2	07	**Quinqueloculina laevigata** d'Orbigny, 1826	19	16		35	7	5		9	29	12	41	13	5	14	inner shelf – upper bathyal
710	C	2	06	**Quinqueloculina lamarckiana** d'Orbigny, 1839	7			7	4			4	155	34	189	37	20	42	inner shelf – middle bathyal
711	C	2	23	**Quinqueloculina ex gr. philippinensis** Cushman, 1921	44	17		61	10	2		10	166	24	190	38	11	38	inner shelf – uppermost bathyal
712	C	2	12	**Quinqueloculina pseudoreticulata** Parr, 1941	44	7	1	52	12	4	1	12	41	6	47	17	5	17	shelf
713	C	2	17	**Quinqueloculina pygmaea** Reuss, 1850	1	2		3	1	1		2		3	3		3	3	full range
714	C	2	15	**Quinqueloculina quinquecarinata** Collins, 1958	1			1	1			1	4	8	12	3	5	8	shelf
715	C	2	01	**Quinqueloculina sagamiensis** Asano, 1936	16	1		17	4	1		4	36	5	41	14	5	19	shelf
716	C	2	05	**Quinqueloculina seminulum** (Linné, 1758)	227	111	5	343	17	13	3	17	859	309	1168	46	31	48	full range
717	C			**Quinqueloculina subcurta** Zheng, 1988	13			13	3			3							shelf
718	C	2	14	**Quinqueloculina tropicalis** Cushman, 1924	5	1		6	3	1		4	6	3	9	5	3	7	inner shelf – middle bathyal
719	C	2	08	**Quinqueloculina venusta** Karrer, 1868									3		3	3		3	outer shelf – lower bathyal
720	C	2	28	**Quinqueloculina sp. 1**									57	8	65	21	6	24	shelf
721	C			**Quinqueloculina spp.**	228	261		489	16	15		16	336	61	397	50	25	51	full range
722	C	8	51	**Ramulina angusta** Loeblich & Tappan, 1994									27		27	10		10	outer shelf – upper bathyal
723	C	8	49	**Ramulina globulifera** Brady, 1879									68	2	70	20	1	20	inner shelf – upper bathyal
724	C	11	59	**Reussella pulchra** Cushman, 1945	5	3		8	4	1		4	21	6	27	10	5	15	shelf
725	C	11	60	**Reussella simplex** (Cushman, 1929)	75		1	76	15		1	15	160	11	171	36	7	37	inner shelf – uppermost bathyal
726	C	10	04	**Robertina subcylindrica** (Brady, 1881)			2	2			2	2		2	2		2	2	inner shelf – middle bathyal
727	C	10	05	**Robertina tasmanica** Parr, 1950									4		4	2		2	outer shelf
728	C	10	07	**Robertinoides bradyi** (Cushman & Parker, 1936)										2	2		2	2	middle bathyal – lower bathyal
729	C	10	06	**Robertinoides wiesneri** (Parr, 1950)									20	5	25	13	4	16	full range
730	C	13	39	**Rosalina globularis** d'Orbigny, 1826	3			3	2			2	53	20	73	24	12	30	inner shelf – upper bathyal
731	C	13	40	**Rosalina vilardeboana** d'Orbigny, 1839									11	2	13	7	2	9	outer shelf – upper bathyal
732	C			**Rosalina spp.**	4			4	1			1	9	3	12	5	3	8	inner shelf – middle bathyal
733	C	17	18	**Rotaliatinopsis semiinvoluta** (Germeraad, 1946)									3		3	1		1	595 m
734	C	11	12	**Rugobolivinella elegans** (Parr, 1932)															60 m
735	C			**Rupertina stabilis** (Wallich, 1877)	2			2	2			2							outer shelf
736	C	11	25	**Rutherfordoides mexicanus** (Cushman, 1922)									1		1	1		1	291 m
737	C	11	29	**Rutherfordoides virga** (Nomura, 1983)									1		1	1		1	291 m
738	C			**Sagrina jugosa** (Brady, 1884)	2	1		3	2	1		2	1		1	1		1	shelf
739	C	11	35	**Sagrina zanzibarica** (Cushman, 1936)	2			2	2			2	3		3	3		3	inner shelf – upper bathyal
740	C	11	06	**Saidovina amygdalaeformis** (Brady, 1881)	29			29	11			11	201	131	332	40	34	43	inner shelf – uppermost bathyal
741	C	11	11	**Saidovina carinata** (Millett, 1900)									8		8	1		1	226 m
742	C	11	10	**Saidovina subangularis** (Brady, 1881)		1		1		1		1	3		3	2		2	uppermost bathyal
743	C	10	27	**Saintclairoides toreutus** Loeblich & Tappan, 1994	2			2	2			2	41	1	42	15	1	16	inner shelf – uppermost bathyal
744	C	7	02	**Saracenaria altifrons** (Parr, 1950)									15	4	19	11	4	12	inner shelf – middle bathyal
745	C	7	03	**Saracenaria angularis** Natland, 1938	1			1	1			1	3		3	3		3	inner shelf – uppermost bathyal
746	C	7	06	**Saracenaria italica** Defrance, 1824	2			2	2			2	13	3	16	10	3	13	inner shelf – middle bathyal
747	C			**Schlumbergerina alveoliniformis** (Brady, 1879)	11	3		14	3	1		4							inner shelf
748	C	8	53	**Seabrookia pellucida** Brady, 1890									11	5	16	6	5	8	shelf
749	C			**Sigmoidella elegantissima** (Parker & Jones, 1865)	31	2	2	35	10	2	2	10							shelf
750	C	1	58	**Sigmoihauerina bradyi** (Cushman, 1917)	22	5		27	6	4		7							shelf
751	C	20	14	**Sigmoilinita asperula** (Karrer, 1868)	14	2		16	7	2		7	63		63	18		18	inner shelf – uppermost bathyal
752	C	20	13	**Sigmoilopsis carinata** Zheng, 1988	7			7	2			2	82	3	85	8	2	8	outer shelf – upper bathyal
753	C	20	03	**Sigmoilopsis moyi** Atkinson, 1968									6		6	2		2	upper bathyal – middle bathyal
754	C	20	04	**Sigmoilopsis orientalis** Zheng, 1988									71	6	77	24	3	24	inner shelf – upper bathyal
755	C	20	01	**Sigmoilopsis schlumbergeri** (Silvestri, 1904)	16	11		27	4	3		7	80	9	88	11	8	11	full range
756	C	3	13	**Sigmopyrgo vespertilio** (Schlumberger, 1891)									3		3	3		3	upper bathyal – middle bathyal
757	C			**Siphogenerina columellaris** (Brady, 1881)															166 m
758	C	11	40	**Siphogenerina raphana** (Parker & Jones, 1865)	11			11	2			2	63	27	90	7	7	7	outer shelf
759	C	11	37	**Siphogenerina striata var. curta** Cushman, 1926									1		1	1		1	94 m
760	C			**Siphogenerina striatula** Cushman, 1913	42	9	1	52	10	5	1	10	72		72	2		2	inner shelf – uppermost bathyal
761	C	11	39	**Siphonaperta crassatina** (Brady, 1884)			1	1			1	1	115	21	136	19	8	21	inner shelf – uppermost bathyal
762	C	20	08	**Siphonaperta spp.**	4			4	4			4	127	21	148	28	5	29	shelf
763	C			**Siphonina bradyana** Cushman, 1927									27	20	47	7	6	8	outer shelf – upper bathyal
764	C	14	49	**Siphonina tubulosa** Cushman, 1924	2	1		3	2	1		3	111	37	148	30	17	35	inner shelf – uppermost bathyal
765	C	14	51	**Sorites marginalis** (Lamarck, 1816)	9	4		13	5	3		6	6		6	2		2	shelf
766	C	19	37	**Sphaeroidina bulloides** d'Orbigny, 1826	21		1	22	9		1	9	167	131	298	44	39	53	full range
767	C	13	55	**Spirolina acicularis** (Batsch, 1791)	28	23		51	9	7		11	1	1	2	1	1	1	shelf
768	C			**Spirolina arietina** (Batsch, 1791)		1		1		1		1							102 m
769	C	3	54	**Spiroloculina communis** Cushman & Todd, 1944	34	3	1	38	7	2	1	8	364	67	431	41	25	43	inner shelf – uppermost bathyal
770	C	1	06	**Spiroloculina depressa** d'Orbigny, 1826									9	2	11	8	1	8	outer shelf – uppermost bathyal
771	C	1	04	**Spiroloculina excisa** Cushman & Todd, 1944	19	5	1	25	7	3	1	8	154	47	201	35	22	37	inner shelf – uppermost bathyal
772	C	1	03	**Spiroloculina eximia** Cushman, 1922	12	2		14	7	2		8	5		5	5		5	shelf
773	C	1	11	**Spiroloculina manifesta** Cushman & Todd, 1944	41	1	1	43	9	1	1	9	225	33	258	40	13	42	shelf
774	C	1	05	**Spiroloculina cf. regularis** Cushman & Todd, 1944	4			4	2			2	6		6	5		5	shelf
775	C	1	10	**Spiroloculina cf. robusta** Brady, 1884	3			3	1			1	3		3	3		3	shelf
776	C	1	09	**Spiroloculina scrobiculata** Cushman, 1921	2			2	2			2	22	13	35	15	10	21	shelf
777	C	1	12	**Spiroloculina tenuiseptata** Brady, 1884									9		9	1		1	404 m
778	C	1	16	**Spiroloculina spp.**	1	1		2	1	1		2	9	1	10	8	1	9	shelf
779	C			**Spirophthalmidium acutimargo** (Brady, 1884)									7	1	8	3	1	3	upper bathyal – middle bathyal
780	C	1	14	**Spirophthalmidium concava** (Wiesner, 1913)									54	23	77	27	9	29	shelf
781	C	1	13	**Spirosigmoilina bradyi** Collins, 1958									10		10	5		5	shelf
782	C	1	38	**Spirosigmoilina parri** Collins, 1958									3	1	4	3	1	4	shelf
783	C	1	41	**Spirosigmoilina pusilla** (Earland, 1934)									16		16	7		7	inner shelf – upper bathyal
784	C	1	25	**Spirosigmoilina tenuis** (Cžjžek, 1848)	1			1	1			1	29	5	34	11	3	12	full range
785	C	20	16	**Spirosigmoilina spp.**									7	1	8	5	1	6	outer shelf – middle bathyal
786	C			**Stomatorbina concentrica** (Parker & Jones, 1864)	2		1	3	2		1	3							shelf
787	C			**Strebloides advenus** (Cushman, 1922)	1			1	1			1							148 m
788	C	14	18	**Tretomphaloides concinnus** (Brady, 1884)	2			2	1			1	14	1	15	3	1	3	shelf
789	C	11	48	**Trifarina bradyi** Cushman, 1923									4	2	6	2	2	3	outer shelf – uppermost bathyal
790	C	2	54	**Triloculina affinis** d'Orbigny, 1826	4			4	2			2	6		6	2		2	inner shelf – upper bathyal
791	C	2	53	**Triloculina elliptica** Galloway & Heminway, 1941	2		1	3	2		1	3	5	5	10	3	5	6	inner shelf – middle bathyal
792	C	2	52	**Triloculina marshallana** Todd, 1954	6			6	4			4	7		7	4		4	inner shelf – middle bathyal
793	C	2	55	**Triloculina cf. pentagonalis** Wang et al., 1978	1			1	1			1	11	2	13	5	1	5	inner shelf
794	C	2	49	**Triloculina tricarinata** d'Orbigny, 1826	53	17	2	72	15	8	2	15	266	80	346	49	29	53	full range
795	C	2	50	**Triloculina trigonula** (Lamarck, 1804)	11	9		20	7	5		8	2		2	2		2	inner shelf – uppermost bathyal
796	C	2	39	**Triloculinella californica** (Rhumbler, 1936)	1		1	2	1		1	2	100	7	107	32	6	33	inner shelf – uppermost bathyal
797	C	2	42	**Triloculinella hornibrooki** (Vella, 1957)									1		1	1		1	118 m
798	C	2	44	**Triloculinella parisa** Loeblich & Tappan, 1994	8	3		11	2	2		3	1		1	1		1	outer shelf

	collection no. (1)			taxa (2)	(+)	(φ)	(*)	∑	(+)	(φ)	(*)	all	(+)	(*)	∑	(+)	(*)	all	(5) depth range
					(3) picked				(4) occurrence				picked			occurrence			
799	C	2	37	**Triloculinella pilasensis** (McCulloch, 1977)	9			9	5			5	30	3	33	14	3	15	shelf
800	C	2	40	**Triloculinella cf. pseudooblonga** (Zheng, 1980)	5			5	4			4	16	35	51	9	21	28	full range
801	C	2	43	**Triloculinella robusta** (Cushman & Todd, 1948)	6	1	1	8	5	1	1	6	34	20	54	15	15	25	shelf
802	C	2	41	**Triloculinella sp. 1**									14	11	25	9	8	16	inner shelf – middle bathyal
803	C			**Triloculinella spp.**	6			6	5			5	10	9	19	5	6	11	shelf
804	C	11	57	**Trimosina multispinata** Collins, 1958									3	1	4	3	1	4	shelf
805	C	12	38	**Uvigerina ex gr. auberiana** d'Orbigny, 1839	27		3	30	3		1	3	451	271	722	14	11	14	full range
806	C	12	41	**Uvigerina cf. bassensis** Parr, 1950									17	38	55	1	3	3	uppermost bathyal – upper bathyal
807	C	12	43	**Uvigerina cf. canariensis** d'Orbigny, 1839	13	1		14	5	1		5	27	7	34	9	6	13	inner shelf – upper bathyal
808	C	12	39	**Uvigerina dirupta** Todd, 1948	9			9	1			1	62	26	88	9	8	9	uppermost bathyal – middle bathyal
809	C	12	37	**Uvigerina hispida** Schwager, 1866			4	4			1	1	42	50	91	8	9	10	upper bathyal – lower bathyal
810	C	12	40	**Uvigerina peregrina** Cushman, 1923	8		13	21	2		1	2	106	31	137	10	9	11	uppermost bathyal – middle bathyal
811	C	12	49	**Uvigerina schwageri** Brady, 1884	66	1	1	68	3	1	1	3	597	517	1114	31	26	32	inner shelf – uppermost bathyal
812	C	12	51	**Uvigerina schwageri** Brady, 1884 type 3									8		8	5		5	outer shelf – uppermost bathyal
813	C	12	53	**Uvigerina semiornata** d'Orbigny, 1846										1	1		1	1	404 m
814	C	12	52	**Uvigerina sp. 1**			1	1			1	1	32	45	77	10	9	13	outer shelf
815	C			**Uvigerina spp.**	1			1	1			1	5		5	2		2	outer shelf – upper bathyal
816	C	5	37	**Vaginulina subelegans** Parr, 1950									6	3	9	4	3	7	outer shelf – middle bathyal
817	C			**Vaginulinopsis reniformis** (d'Orbigny, 1846)									1		1	1		1	1404 m
818	C	7	20	**Vaginulinopsis sublegumen** Parr, 1950	1			1	1			1	5	5	10	4	5	8	inner shelf – upper bathyal
819	C	7	19	**Vaginulinopsis sp. 1**									8	4	12	7	3	9	outer shelf
820	C	13	06	**Valvulineria minuta** (Schubert, 1904)									15	6	21	11	6	12	outer shelf – lower bathyal
821	C			**Vertebralina striata** d'Orbigny, 1826	9	2		11	6	1		7							shelf
822	C	1	56	**Wiesnerella auriculat**a (Egger, 1893)															60 m
823	C			**miscellaneous Miliolids**	3	4		7	1	1		2							shelf
824				**UCF (unidentified calcareous foraminifera)**	32	5	1	38	9	2	1	10	76	46	122	30	23	39	
825	X	I	14	**Aschemonella catenata** (Norman, 1876)	1			1	1			1	14	2	16	6	1	6	middle bathyal
826	X	I	13	**Aschemonella scabra** Brady, 1879									125	22	147	8	4	8	middle bathyal – lower bathyal
827	X	I	17	**Aschemonella sp.**									14	10	24	4	2	4	upper bathyal – lower bathyal

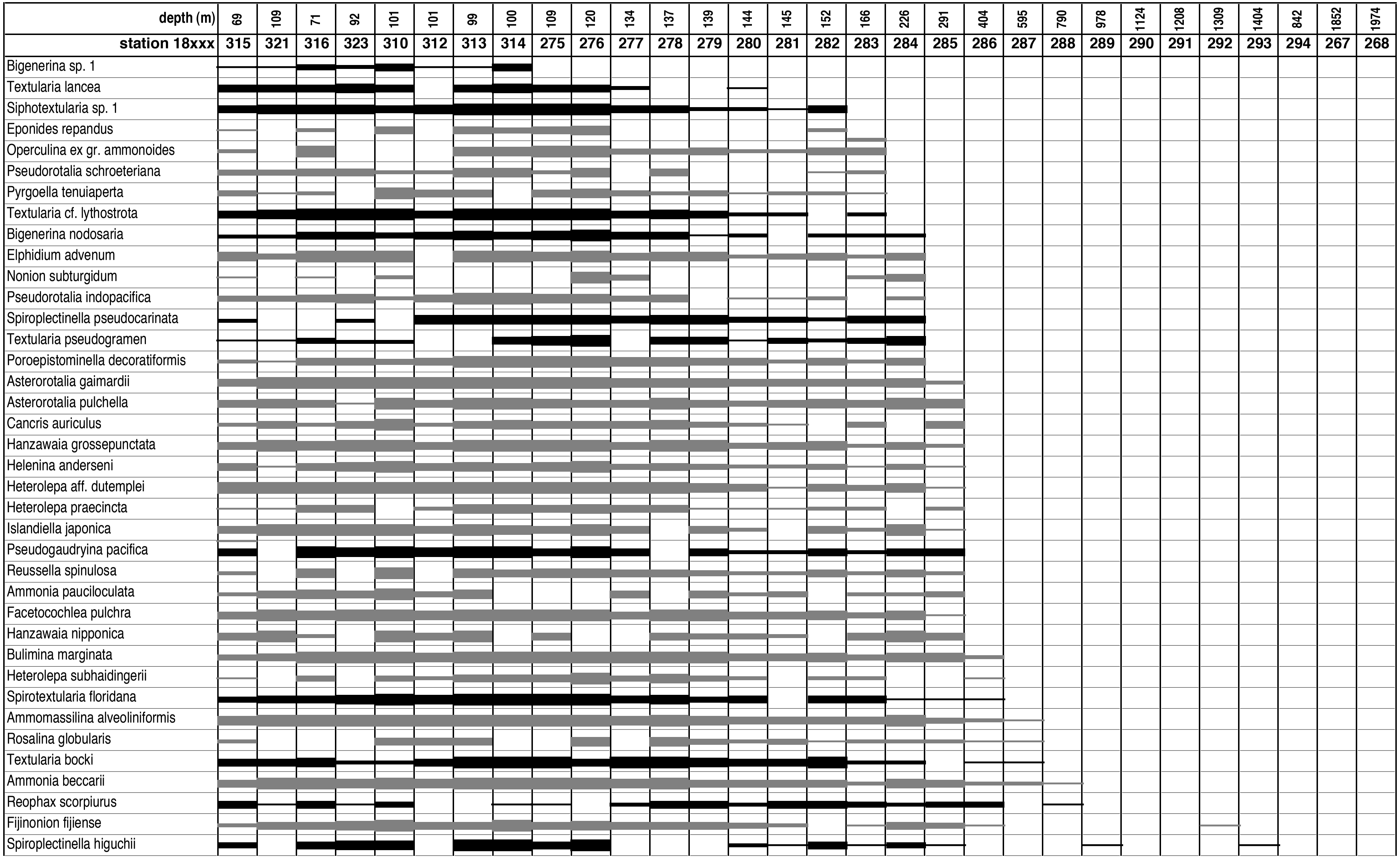
Appendix B.2a. Observed depth ranges and abundances of the common benthic foraminiferal species along the Vietnam Transect. Taxa are arranged in order of the upper limit of occurrence.



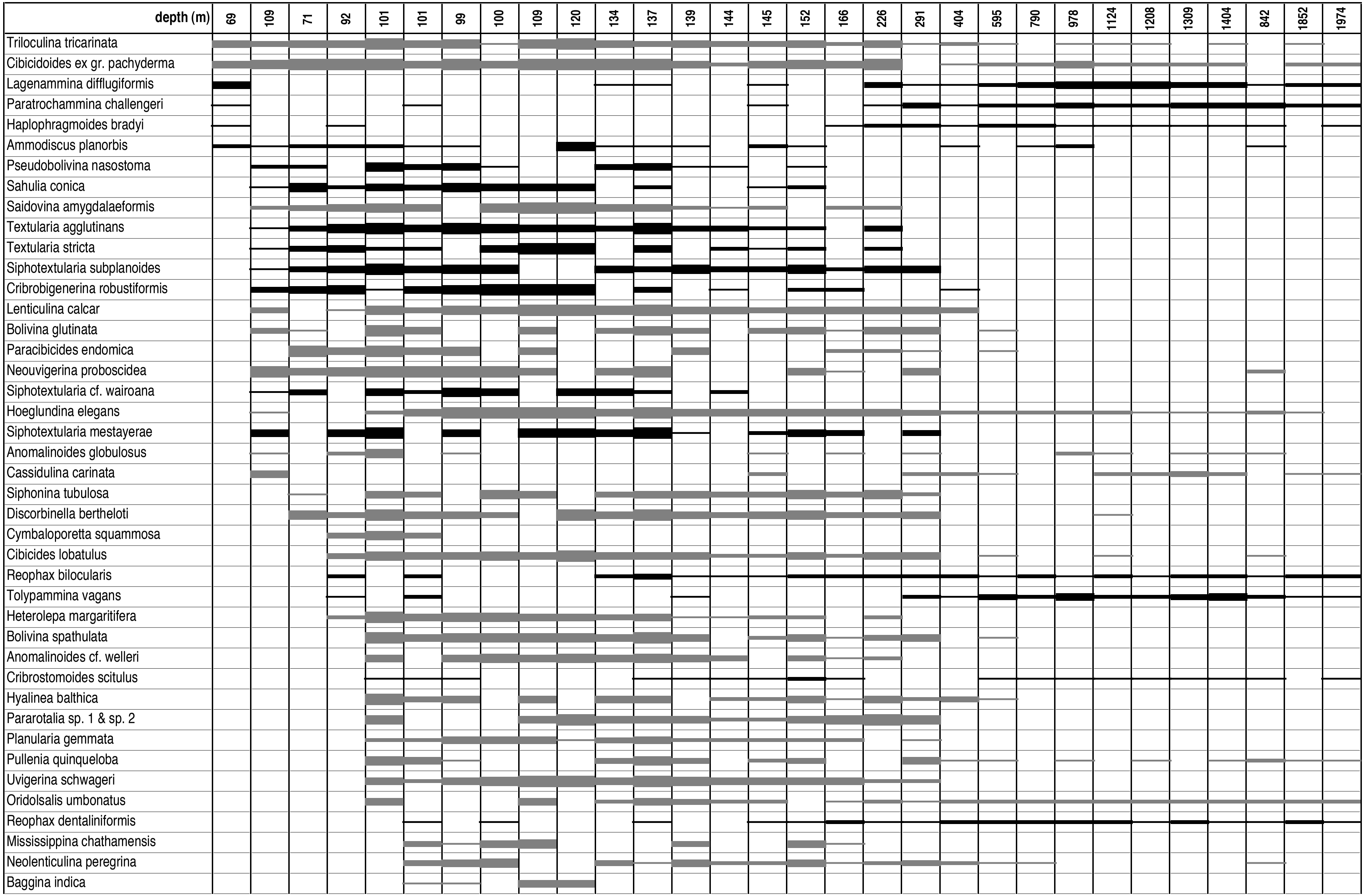
Appendix B.2a Vietnam Transect



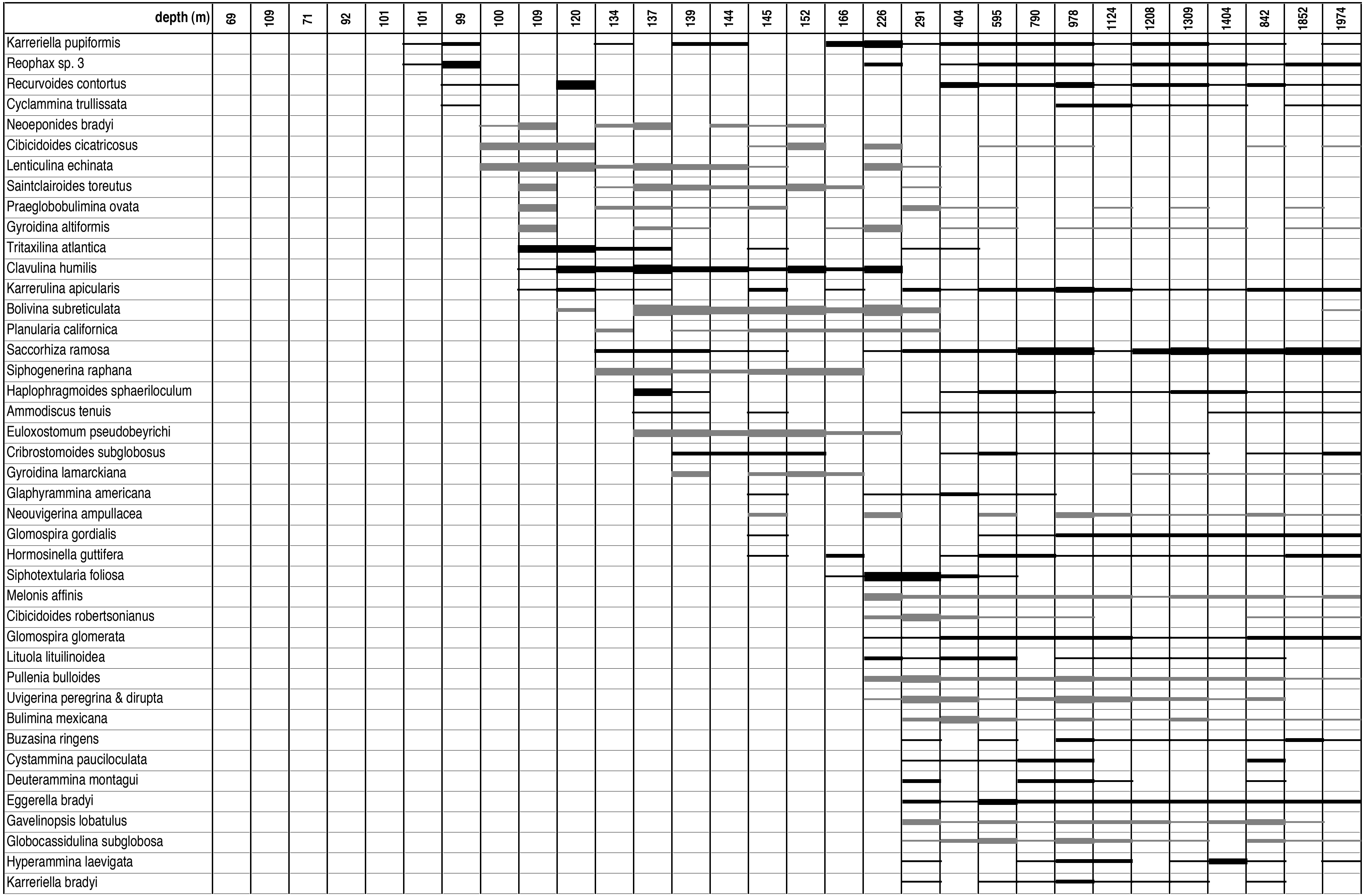
Appendix B.2b. Observed depth ranges and abundances of the common benthic foraminiferal species along the Sunda Transect. Taxa are arranged in order of the upper limit of occurrence.



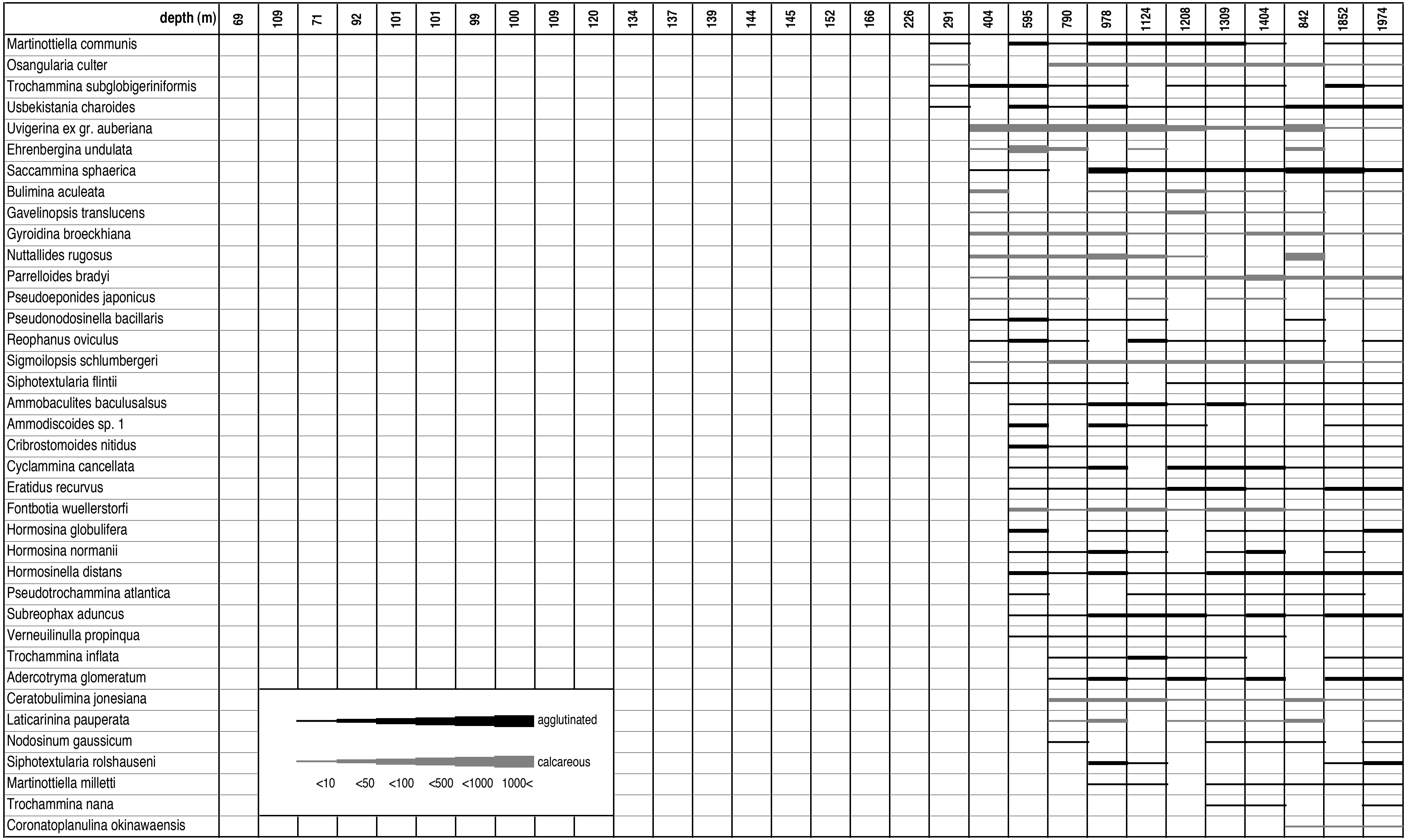
Appendix B.2b. Sunda Transect



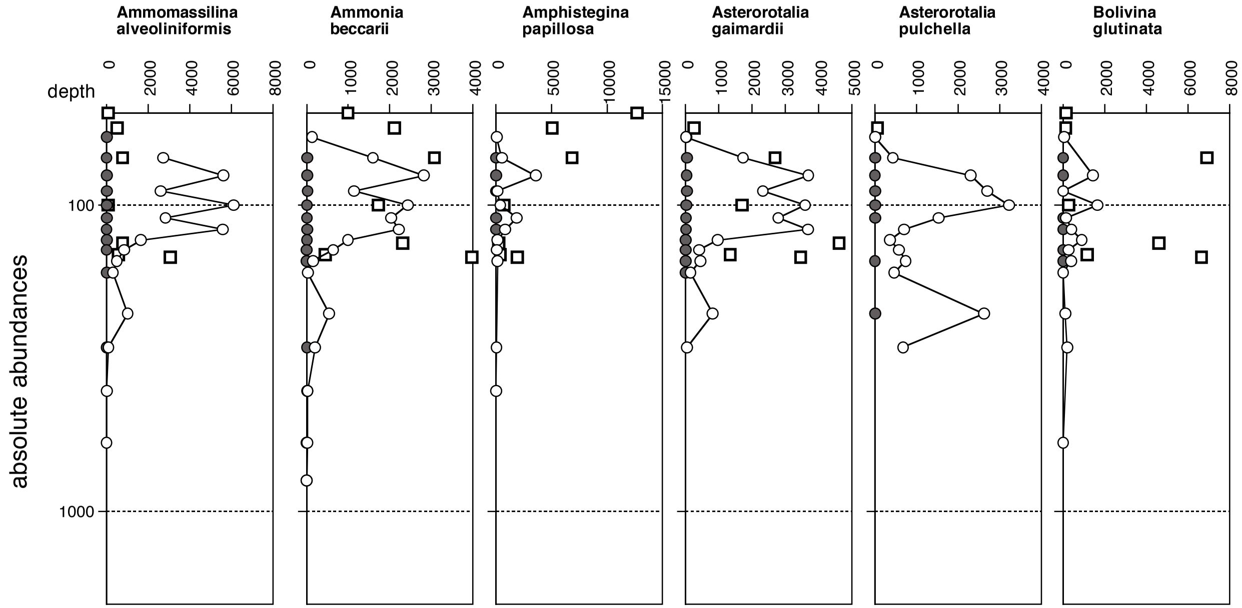
Appendix B.2b. Sunda Transect



Appendix B.2b. Sunda Transect



Appendix B.3. The absolute and relative abundances of dominant species along the bathymetric transects.



Legend
absolute abundances

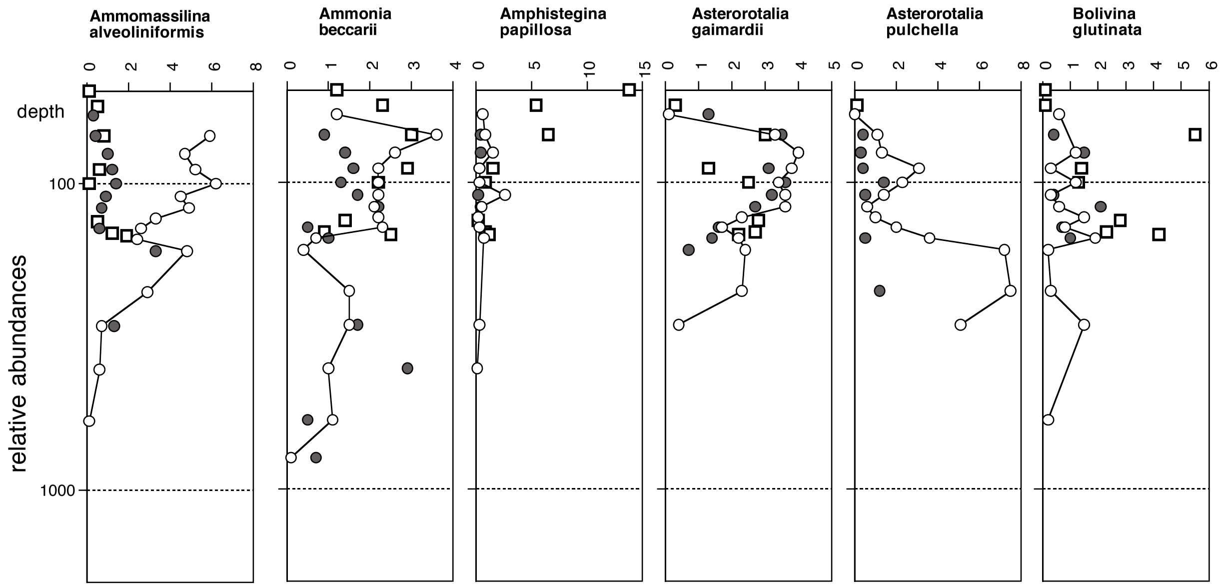
Sunda Transect

—○— no. of dead indiv. / 100 cc

● no. of stained indiv. / 10 cm^2

Vietnam Transect

□ no. of dead indiv. / 100 cc



Legend
relative abundances

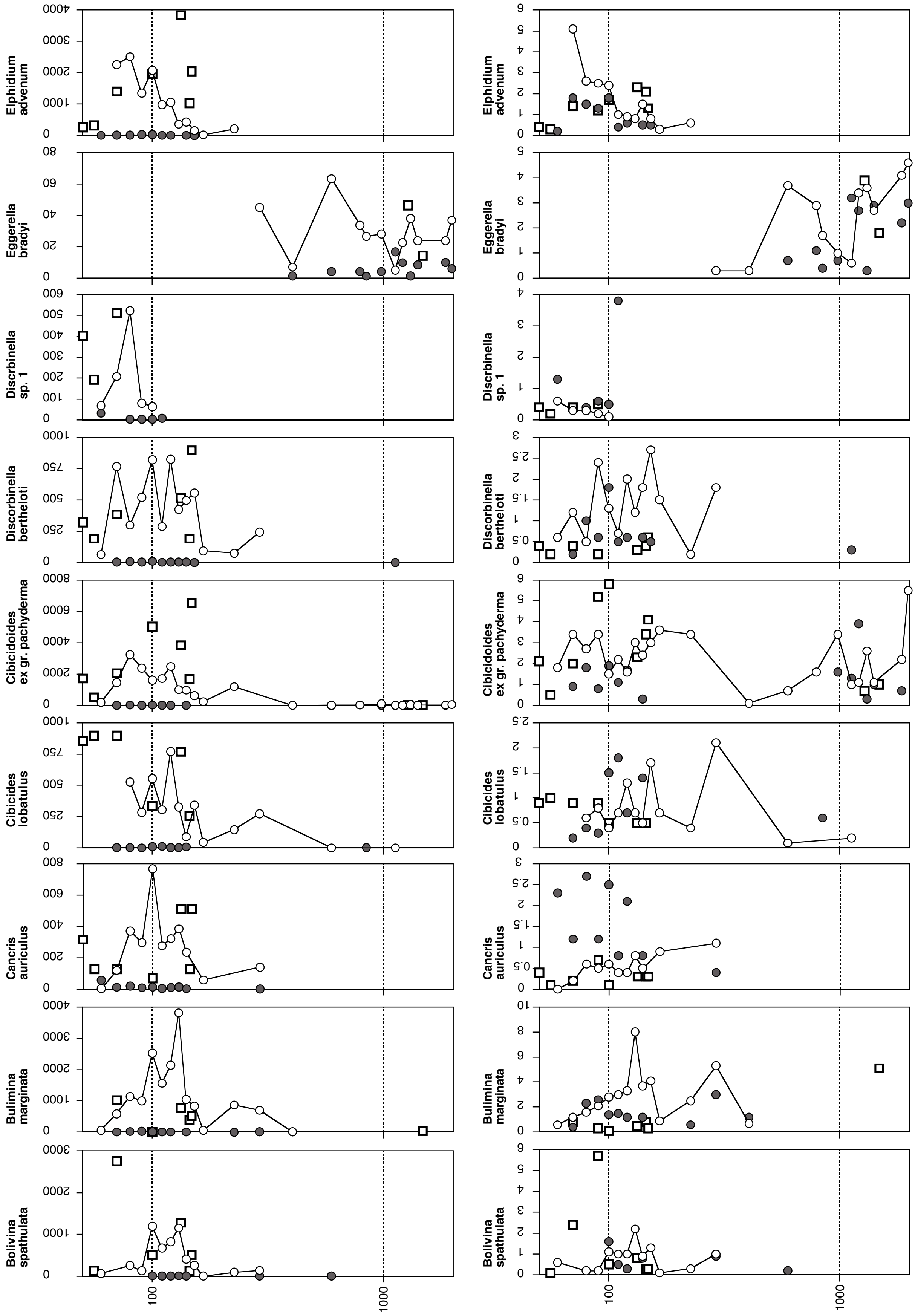
Sunda Transect

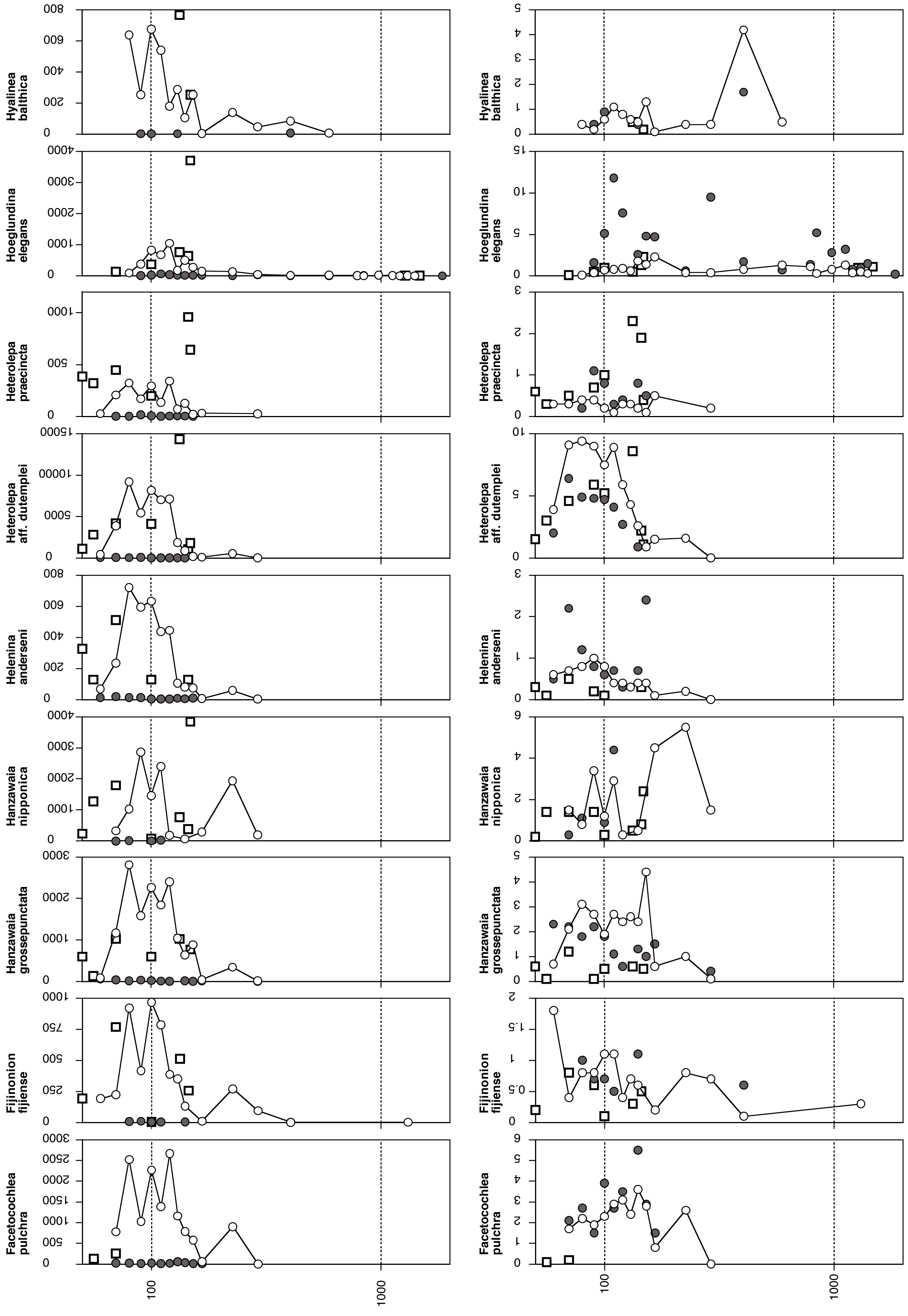
—○— % of dead individuals

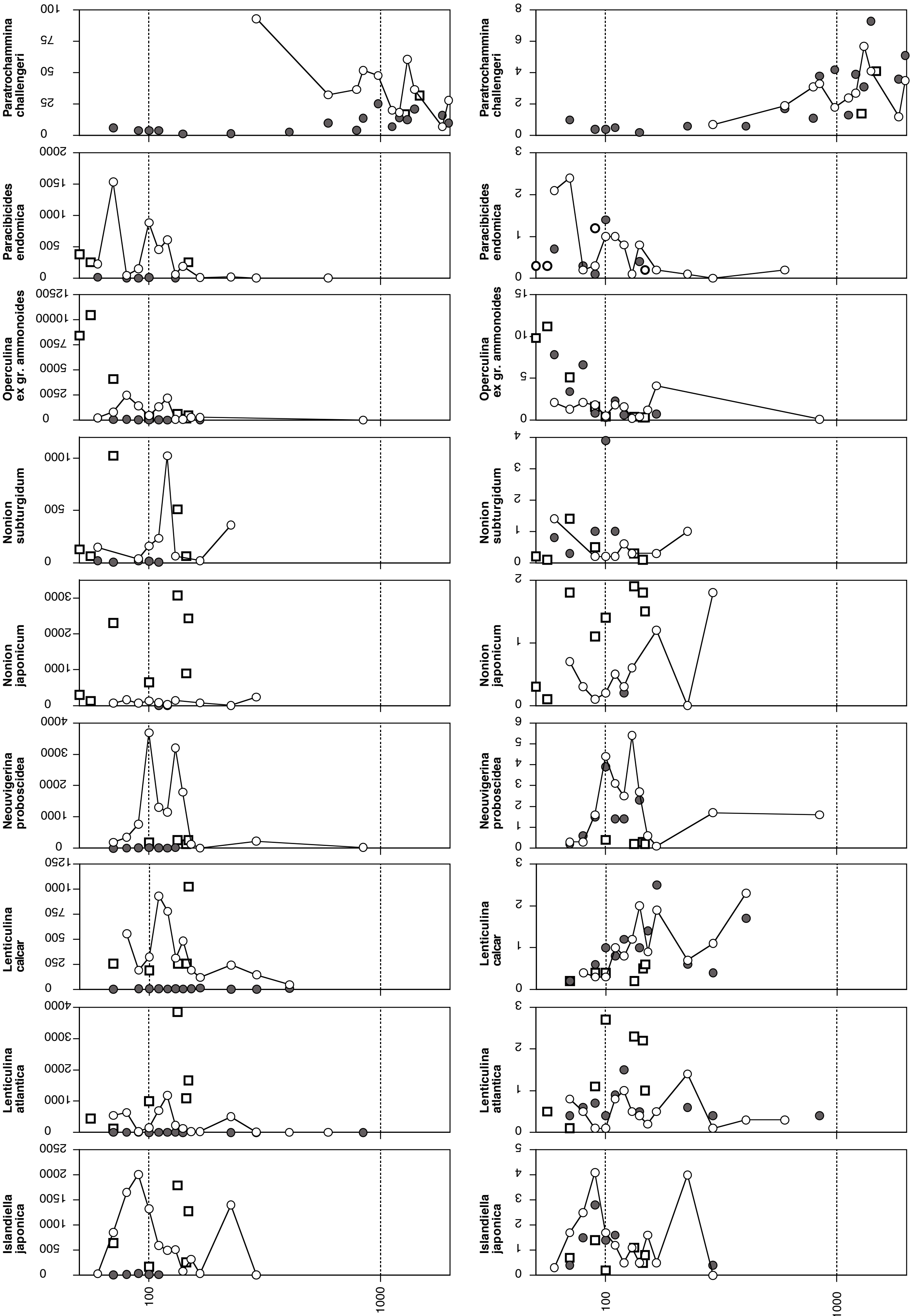
● % of stained individuals

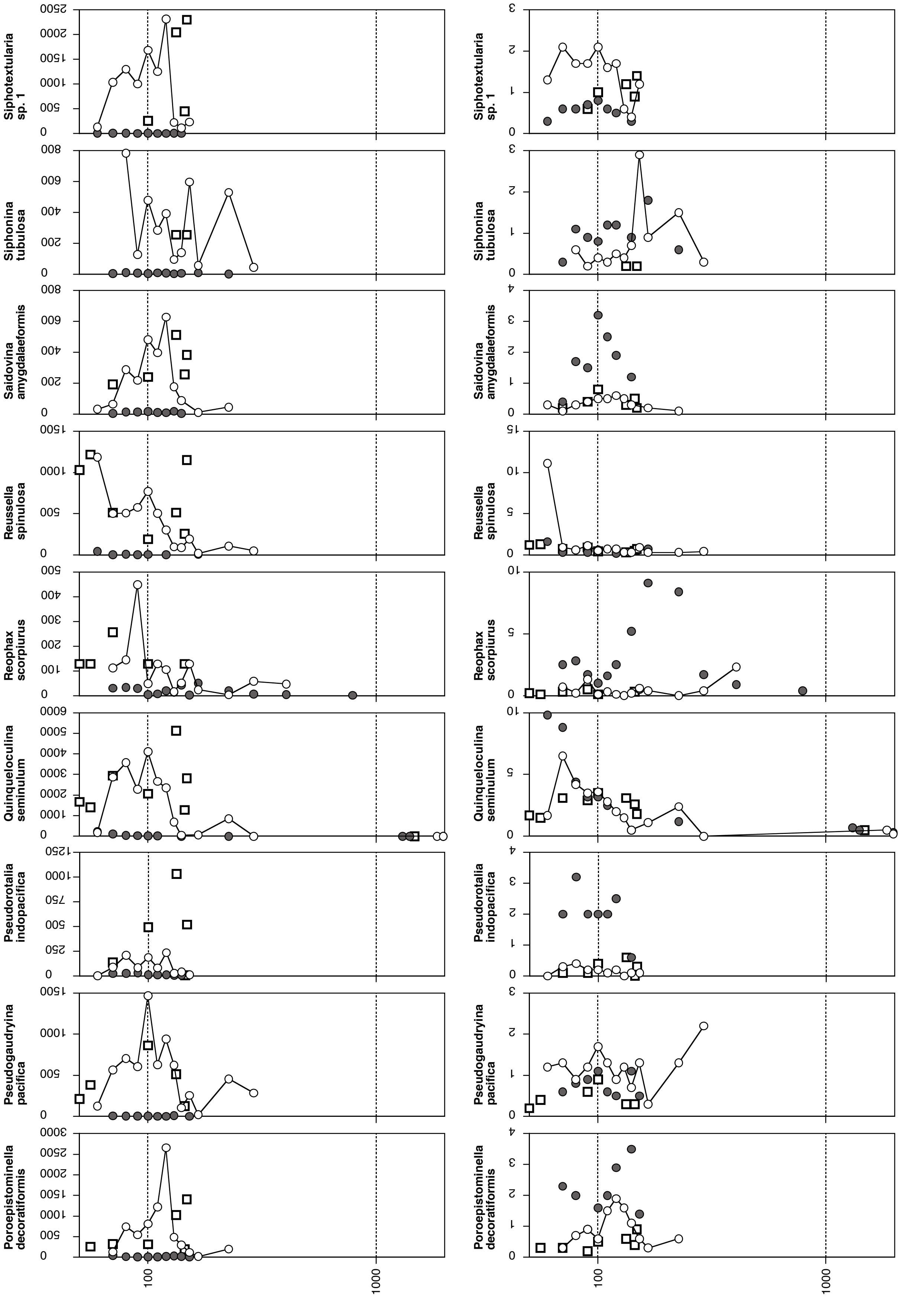
Vietnam Transect

□ % of dead individuals

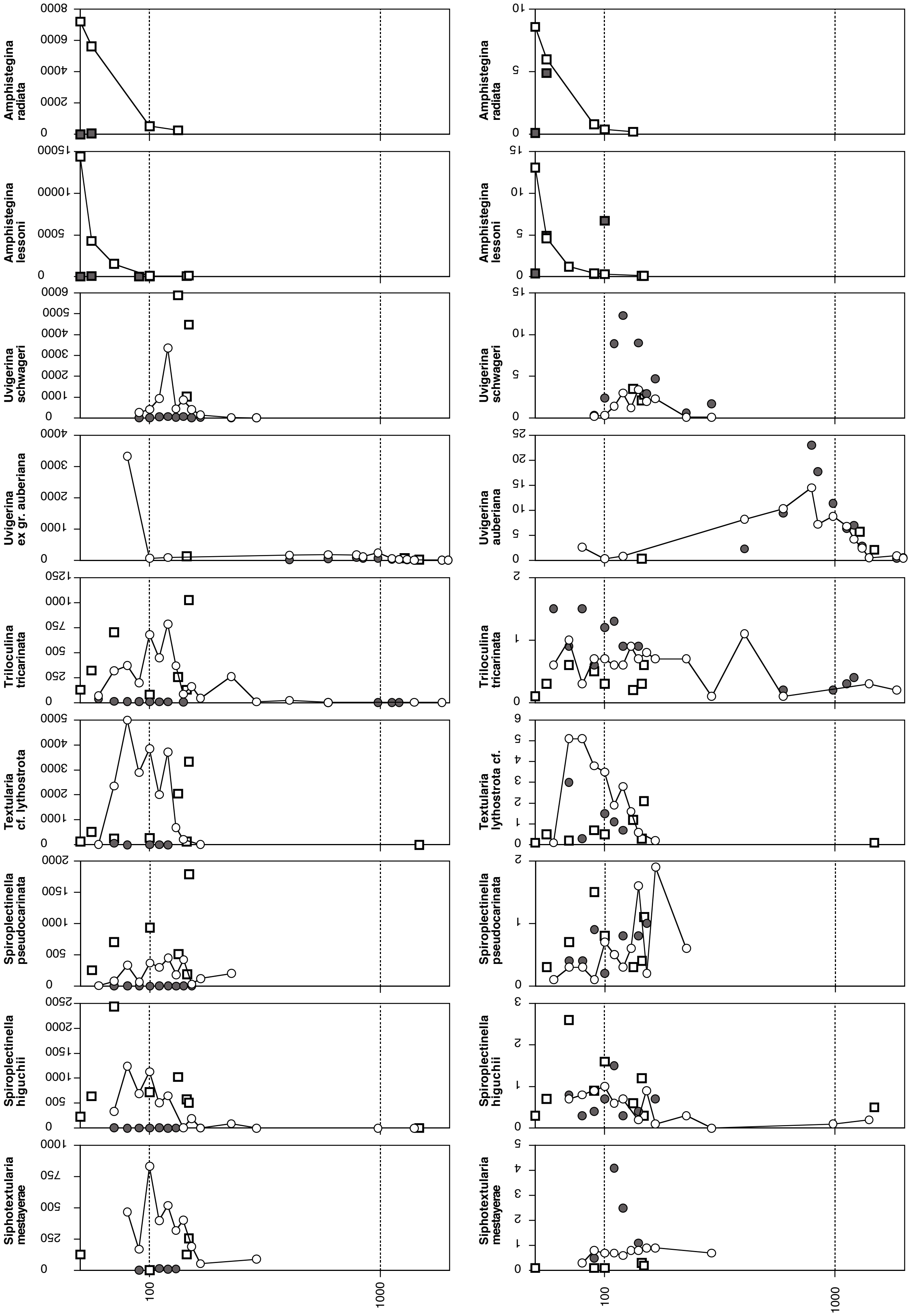

Elphidium advenum
Eggerella bradyi
Discrbinella sp. 1
Discorbinella bertheloti
Cibicidoides ex gr. pachyderma
Cibicides lobatulus
Cancris auriculus
Bulimina marginata
Bolivina spathulata
100
1000


Hyalinea balthica
Hoeglundina elegans
Heterolepa praecincta
Heterolepa aff. dutemplei
Helenina anderseni
Hanzawaia nipponica
Hanzawaia grossepunctata
Fijinonion fijiense
Facetocochlea pulchra
100
1000


Paratrochammina challengeri
Paracibicides endomica
Operculina ex gr. ammonoides
Nonion subturgidum
Nonion japonicum
Neouvigerina proboscidea
Lenticulina calcar
Lenticulina atlantica
Islandiella japonica
100
1000


Siphotextularia sp. 1
Siphonina tubulosa
Saidovina amygdalaeformis
Reussella spinulosa
Reophax scorpiurus
Quinqueloculina seminulum
Pseudorotalia indopacifica
Pseudogaudryina pacifica
Poroepistominella decoratiformis
100
1000

Appendix B.3.


Amphistegina radiata
Amphistegina lessoni
Uvigerina schwageri
Uvigerina ex gr. auberiana
Uvigerina auberiana
Triloculina tricarinata
Textularia cf. lythostrota
Textularia lythostrota cf.
Spiroplectinella pseudocarinata
Spiroplectinella higuchii
Siphotextularia mestayerae
100
1000

station no. 18-	248	249	250	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	248	249	250	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	248	249	250	254	255	256	257	258	259	260	261	262	263	264	265	266
species	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)
Adercotryma glomeratum				2.4	0.4																	1.1	0.8																													
Ammobaculites agglutinans												11.6			16.1																				0.2																	
Ammobaculites baculusalsus				2.5																		0.3	0.5																													
Ammobaculites spp.				0.5		7.1																																														
Ammoglobigerina globulosa																						0.2	0.4																													
Ammolagena clavata																				0.2			0.6																													
Astrorhiza arenaria							0.7						0.4																																							
Bigenerina nodosaria			0.1			14.4		7.2												1.1	0.6			0.1	1.1	2.4	0.9	0.5	0.7	0.3	0.5																					
Buzasina ringens				0.7	2.9																	0.3	1.2																													
Cribrobigenerina robustiformis																				1.4	0.6				0.1	0.3					0.2																					
Cribrobigenerina textularioidea																										1.2		0.1	0.2																							
Cribrobigenerina spp.																									0.2	0.7			x	x		0.2	0.9		0.2																	
Cribrostomoides nitidus				0.2	1.8																	0.3	1.7																													
Cribrostomoides scitulus				0.5	1.8					2.9												1.0	1.1																													
Cribrostomoides subglobosus				0.5																		0.1																														
Crithionina pisum				1.9	0.9																																															
Cyclammina cancellata		x		0.2	0.4	0.1																	0.4	x																												
Cyclammina trullissata				0.2	0.4																	0.8	0.1																													
Cylindroclavulina bradyi																				0.2						0.1										0.6																
Deuterammina grisea					1.6																	0.3	0.5																													
Eggerella bradyi				0.5	3.6																	3.9	1.8																													
Eratidus foliaceus					1.6																	0.3																														
Gaudryina quadrangularis																									0.4				0.6	0.1																						
Gaudryina robusta							10.3														0.1			0.3	0.6	1.3	1.1	2.6	1.7	0.4	0.7					0.1							0.4			0.2						
Glaphyrammina americana						7.1																							0.2	0.2																						
Glomospira glomerata				0.5	1.3																	1.5	2.7																													
Glomospira gordialis																						1.3	2.9																													
Haplophragmoides bradyi				2.5																	0.2	1.0														0.1																
Haplophragmoides grandiformis																					x									x																						
Haplophragmoides sphaeriloculum				0.5	0.4																	1.4	0.8																													
Hippocrepinella alba				1.7	0.4																																															
Hormosina globulifera					0.9																	0.8	3.1																													
Hormosina normanii				0.5																		0.5	0.1																													
Hormosina pilulifera				0.2																			0.5																													
Hormosinella guttifera				0.5	4.5																		0.1																													
Karreriella pupiformis					0.4																	0.4	1.2	0.3																												
Lagenammina difflugiformis				27.4	6.5																	4.7	4.8																													
Lagenammina spp.																											2.0		1.8																							
Marsipella cylindrica																							0.6												x																	
Martinottiella communis				1.2																		1.6	2.0																													
Nodosinum mortenseni																						0.3	0.1																													
Paratrochammina challengeri				1.5	4.9																	1.4	4.1																													
Paratrochammina simplissima			18.0																0.1		x																															
Paratrochammina sp. 1				0.8																		0.4	0.7																													
Pelosina cylindrica											0.1												0.3																													
Placopsilina bradyi							x					x							0.0		x					x			0.1	x		x																				
Placopsilina (?) sp. 1										2.9									0.4																																	
Pseudogaudryina pacifica	0.8												91.8						0.3	0.3				0.3	1.4	0.2		1.2	0.5			0.4	0.2		0.1	0.4					0.3											
Pseudonodosinella sp. 1				0.2	1.3																		0.1																													
Pseudonodosinella sp. 2												5.8																x																								
Recurvoides contortus		12.4		1.5	2.9																	0.6	3.5																													
Reophanus oviculus				0.2																			0.3																													
Reophax bilocularis					1.3																		0.1			1.0																										
Reophax bradyi																									x			0.1	0.1																							
Reophax dentaliniformis				7.5																		0.6	0.4																													
Reophax regularis																												x	0.1			0.1																				
Reophax scorpiurus										17.6				4.9										0.3	0.1	0.2			0.8		0.3	0.1	0.2																			
Reophax spiculifer												11.6										0.3																														
Reophax subdentaliniformis					1.6																	0.3	1.0																													
Reophax subfusiformis				0.8	2.0																																															
Reophax sp. 3				5.8	9.4																	1.0																														
Reophax spp.	13.5			0.2	1.8									4.9					0.5			0.2	0.3	0.3	0.5		0.9	0.1	0.6	0.8		0.1	0.2																			
Rhumblerella sepetibaensis	1.7																											x																								
Saccammina edita				0.2																			1.5																													
Saccammina sphaerica																						4.8	1.2																													
Sahulia barkeri																					0.1			0.5	0.2	0.3	0.2	0.6	0.1	0.2																						
Sahulia conica										2.9										0.2	0.2			0.3	0.6		0.9	0.2	0.4	0.1		0.8	0.9		1.8	1.2														0.4		
Siphotextularia curta																			0.4		0.1								0.1	0.1																						
Siphotextularia mestayerae																			0.1		0.2			0.3					0.1							0.1																
Siphotextularia rolshauseni	0.8																					0.7	0.5																													

Appendix B.4a. Counting data of empty tests (+), reworked (f) and stained (*) benthic foraminifera in samples on the Vietnam Shelf. Numbers are given in percentages of indiv./100 cc

station no. 18-	248	249	250	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	248	249	250	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	248	249	250	254	255	256	257	258	259	260	261	262	263	264	265	266
species	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)
Siphotextularia subplanoides																					0.2								0.2			0.1																				
Siphotextularia wairoana cf.																												x	0.1	0.1																						
Siphotextularia (?) sp. 1																			1.7	1.2	1.4			0.9	0.3	1.2	0.4		0.2																							
Siphotextularia sp. 2																								0.3					0.2																							
Spiroplectinella higuchii	6.7																		2.1	0.6	0.3		0.5	1.2	1.1	1.1	0.9		0.7	2.1	3.1	0.7		0.3		0.3										1.1						
Spiroplectinella kerimbaensis																										0.2						0.1	1.3	0.3	0.9	1.9																
Spiroplectinella proxispira																					0.1			1.0	0.2					0.1																						
Spiroplectinella pseudocarinata							10.3													0.3	1.1			0.4	0.8	0.9	2.0	0.9	2.3	0.6	0.9	0.3																				
Spiroplectinella wrightii	0.8																		0.2		0.5			0.5																												
Spiroplectinella spp.																				0.2							0.2					0.1																				
Spirotextularia fistulosa												11.6							0.1											0.2	0.3																					
Spirotextularia floridana											7.5								0.1	1.4	1.6			0.1	0.6	0.4	1.3	1.2		0.1		0.9	0.2			0.3						0.8	0.4							0.1		
Subreophax aduncus				0.2	0.4																																															
Subreophax spp.				0.5																		0.1																														
Textularia abbreviata aff.								14.5											0.1						0.3	0.2		0.1	0.8			0.1			0.4	0.6									0.2							
Textularia agglutinans																			0.8					0.1	0.4	1.3	0.4	0.1	0.5	0.3																						
Textularia bocki																													0.2	0.4																						
Textularia cuneata aff.																				0.2				0.1	0.2				0.1				1.8	1.3	0.4	0.2														0.3		
Textularia hauerii																								0.3		0.1		1.2				0.3			0.2	0.1																
Textularia lancea																				0.2	0.2				0.2	1.4		0.2	0.2			0.1				0.6									0.1							
Textularia lateralis							10.3												0.4	0.3	0.2			1.5	0.3						0.7	0.3	0.6		0.5	0.8		0.2			0.6									0.1		
Textularia lythostrota cf.																			0.6	1.2	2.1		0.1	0.3	0.4	0.5	0.4	1.2		0.2		0.5				0.1		0.2												0.1		
Textularia oceanica																			1.3	0.5	1.3			1.2	0.3	1.9	0.2	0.1	0.5	0.4	0.5	0.8	0.4	0.3		0.2																
Textularia pseudogramen																				0.3	0.2			0.6	0.2	0.1	0.4	x		0.1		0.2	0.7			0.2																
Textularia stricta	6.7																			0.3	0.3					0.6		0.9	0.9	0.8	0.7	0.3	0.2													0.4						
Textularia sp. 1																											0.2					0.2	0.2																			
Textularia sp. (22)																														0.2			0.2		0.4	0.3																
Textularia sp. 5																																	0.7		0.4																	
Textularia spp.	6.7																		0.2	1.7	2.2			0.4	2.0	0.3	2.8				0.7	2.9	0.2		0.7	1.3		0.2			0.9						0.3			0.1		
Thurammina compressa				0.5																		0.3																														
Thurammina papillata				1.1	0.4																																															
Tritaxis challengeri			0.1																		0.2																															
Trochammina subglobigeriniformis				0.2																		0.3	0.7																													
Trochammina spp.				0.8																0.2		0.2							0.2																							
Trochamminopsis parvus					0.9																		1.0																													
Trochamminopsis quadriloba				0.2																		0.1																														
Usbekistania charoides				0.2																		5.0	2.1																													
Veleroninoides kosterensis							10.3															0.1																														
Verneuilinulla propinqua				0.2																		0.1																														
Verneuilinulla sp. 1				1.0	0.9																	1.0	1.0																													
unidentified agglutinated forams		12.4																	0.1		0.1	1.0		0.8	0.2	2.2			0.5			0.3	0.6																			
∑ of species present in single station			36.0	4.2	3.8		10.3			2.9								38.0		0.0	0.8	5.7	4.6		0.3			1.2		0.2																						
Adelosina spp.																				0.2								0.1				0.1		0.1	0.4	0.1									0.2							
Agglutinella agglutinans																			3.1	1.1	1.8			1.7	1.4	1.3	1.7	0.3	2.0	1.6	4.5	2.7	0.7	1.5	0.8	1.4	1.3			0.4									0.2			
Agglutinella reinemunde																			0.8		0.1			0.1	0.7	0.5	0.7	0.1	0.1	1.3	0.5	0.4	0.4			0.5							0.4									
Agglutinella spp.																									0.1	0.5			0.1			2.1		0.5	0.9	0.3																
Ammomassilina alveoliniformis	0.8						3.9												0.1	0.5	1.9			1.2	0.1			x	1.1	0.8	0.7	0.5		0.1									0.7									
Ammonia beccarii																			1.5	1.4	2.5			0.9	2.8	1.7		4.0	3.1	3.3	2.8	2.3	1.7	1.1	0.7	1.2		0.6	0.1	0.3	0.9		1.5	0.6	0.5	1.0	0.7	0.1	0.4			
Ammonia parkinsoniana																				0.5					0.3				0.3									0.3		0.5		0.4	0.9		0.2	0.2						
Ammonia pauciloculata						14.2													0.2	1.4	0.3			1.3		0.2		0.6	0.6	0.6					0.2	0.1		0.3														
Amphicoryna papillosa														9.8																	6.6	7.3															1.9					
Amphicoryna scalaris																			0.4		0.1			0.8				0.1	0.1																							
Amphicoryna sublineata																				0.2	0.2				0.1			0.1																								
Amphicoryna spp.																			0.1		0.3							x																								
Amphistegina lessoni	6.7							0.3						4.9			0.4	0.4	0.4		0.1			0.1	0.1	0.4	0.2	0.6	0.5	1.2		4.6	5.0	8.4	25.3	13.7		0.2		0.1	0.1				0.2	0.1	0.2	1.0	1.3	1.0	1.4	2.0
Amphistegina papillosa								14.5		2.9				14.7			22.7	12.7	0.4	0.2	1.2			0.8	1.2	1.6	2.4	0.4	1.7	8.1	4.9	5.4	12.8	14.1	14.0	14.2			0.2		0.1					0.2		0.1			0.5	0.8
Amphistegina radiata														4.9	0.1					0.2				0.4	0.8							6.0	13.2	13.6	7.2	0.4	0.8	x			0.0	0.1						0.3		0.8	1.2	0.4
Amphistegina spp.																																		2.3	0.7	0.4												0.1	3.5	2.1		
Angulogerina bradyana																					0.2							0.6	0.3	0.8																0.2						
Anomalinoides colligerus																			0.4													0.1																				
Anomalinoides globulosus																						0.4	0.1																													
Anomalinoides welleri cf.							3.9														0.4								0.2																							
Articulina alticostata																			0.8	0.2	0.2			0.4	0.4							0.1	0.2			0.2		0.2	0.2		0.2	0.2			0.2							
Articulina mayori																														0.2									0.3													
Asterorotalia compressiuscula																								0.5		0.2			0.2																							
Asterorotalia concinna																					0.1			0.1	0.2																											
Asterorotalia gaimardii	0.8					0.2				2.9									2.2	2.8	2.2			2.7	2.7	2.1	0.2	0.6	2.1	1.8	4.2	0.3					1.7	0.3			0.2	1.6	1.7		0.2	0.6	0.3					
Asterorotalia pulchella																																0.1																0.1			0.4	
Asterorotalia sp. 1																									0.1																							0.1				
Asterorotalia spp.																				0.5						0.2																										

Appendix B.4a. Counting data of empty tests (+), reworked (f) and stained (*) benthic foraminifera in samples on the Vietnam Shelf. Numbers are given in percentages of indiv./100 cc.

station no. 18-	248	249	250	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266
species	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)
Astrononion novozealandicum				0.8														
Baggina indica										2.9								
Biloculinella labiata																		
Bolivina glutinata		24.8				14.2						11.6						
Bolivina macella											15.1							16.5
Bolivina spathulata																		
Bolivina subaenariensis v. mexicana																		
Bolivina subreticulata	0.8																	
Bolivina spp.																		
Bulimina aculeata				0.5														
Bulimina affinis				0.2														
Bulimina marginata				2.5	3.1													
Bulimina mexicana																		
Bulimina striata				0.2	0.9													
Calcarina hispida																	7.6	
Calcarina spengleri																		
Cancris auriculus								14.5										
Cancris carinatus																		
Carpenteria proteiformis																		
Cassidelina subcapitata																		
Cassidulina carinata																		
Cassidulina crassa																		
Cellanthus craticulatus																		
Ceratobulimina jonesiana				1.2	2.7													
Cibicides deprimus																		
Cibicides kullenbergi															16.1			
Cibicides lobatulus	6.7									2.9								12.4
Cibicides reflugens=Heterolepa sp. 4	0.8						3.9											
Cibicides sp. 1																		
Cibicidoides cicatricosus																		
Cibicidoides pachyderma ex gr.	2.5							14.5										
Cibicidoides robertsonianus				0.5	0.9									9.8				
Cibicidoides sp. 1	6.7									2.9								
Cibicidoides spp.							3.9											
Cymbaloporetta squammosa																		
Dentalina mutsui												x						
Discorbinella araucana																		
Discorbinella bertheloti																		
Discorbinella bodjongensis																		
Discrbinella sp. 1											15.1			14.7	16.1		7.6	
Edentostomina cultrata										2.9								
Edentostomina milletti																		
Edentostomina rupertiana																		
Elphidiella arctica																		
Elphidium advenum						14.2												
Elphidium crispum																		
Elphidium incertum	1.7																	
Elphidium jenseni																		
Elphidium macellum																		
Elphidium singaporense																		
Elphidium spp.																		
Eponides cribrorepandus																31.6		
Eponides repandus																		
Eusphaeroidina inflata	0.8			0.7	0.4													
Evolvocassidulina orientalis				0.2	0.4													
Facetocochlea pulchra																		
Fijinonion fijiense											15.1							
Fissurina spp.																		
Floresina philippinensis																		
Fontbotia wuellerstorfi				1.1	1.6													
Fursenkoina schreibersiana																		
Gavelinopsis praegeri																		
Gavelinopsis translucens																		
Globobulimina pacifica						##												
Globocassidulina subglobosa				0.2														
Globulina gibba							3.9											
Globulina regina																		
Gyroidina altiformis	1.7																	
Gyroidina broeckhiana				0.2														
Gyroidina lamarckiana	0.8				0.4													

station no. 18-	248	249	250	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266
species	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)
Astrononion novozealandicum				0.3	5.3													
Baggina indica							0.2	0.7		x		0.3		0.1				
Biloculinella labiata	0.1	0.2																
Bolivina glutinata	2.4	2.8	4.2			2.3	0.3	0.2	0.9	1.2	3.5	5.5		0.1			0.1	0.2
Bolivina macella										0.6		0.4	0.7				0.5	0.8
Bolivina spathulata	0.1	0.8	0.3			0.3	0.9			6.9	4.6	4.0	0.7	0.1				
Bolivina subaenariensis v. mexicana		0.6	0.4			0.6				0.6	0.2	0.1		0.3				
Bolivina subreticulata	0.1	1.4	1.8			1.0		0.2		1.2	0.2	0.2	0.3					
Bolivina spp.																		0.1
Bulimina aculeata				3.9	0.6													
Bulimina affinis				0.2	0.1	0.1												
Bulimina marginata	0.1	0.5	0.3		5.1	0.8			0.4		0.2	0.8						
Bulimina mexicana				2.0	0.3													
Bulimina striata				0.1														
Calcarina hispida			0.2			0.1												
Calcarina spengleri			x			0.1		x										
Cancris auriculus	0.1	0.3	0.3			0.3	0.1	0.2		1.3	0.7		0.2	0.1	0.7	0.4	0.3	0.1
Cancris carinatus																	0.5	0.2
Carpenteria proteiformis		x					x	x										
Cassidelina subcapitata						0.8					0.6			0.1			0.3	
Cassidulina carinata		0.3		3.0	2.6													
Cassidulina crassa											0.2	0.4						
Cellanthus craticulatus		x	x				x	0.3				0.1		0.6	1.1	1.8		
Ceratobulimina jonesiana				0.4	2.6													
Cibicides deprimus	0.9	0.2				0.3	0.3		0.4			1.1		0.3	0.6	0.3	1.0	0.3
Cibicides kullenbergi													3.1	0.3	0.2	0.5	0.1	1.6
Cibicides lobatulus	0.4	0.5				0.5	0.5	0.2	1.1	0.9	1.5	1.0	0.7	1.0	0.7		0.8	1.0
Cibicides reflugens=Heterolepa sp. 4	0.8		2.6			0.3	0.4	2.1	0.7	2.3	3.3	5.5	3.8	4.5	1.3	0.4	0.4	1.0
Cibicides sp. 1		0.5	1.1			0.3							0.3	0.1				
Cibicidoides cicatricosus											0.5	0.5						
Cibicidoides pachyderma ex gr.	3.4	2.3	4.1	0.7	1.0	3.4	8.2	6.1	4.1	2.5	7.9	2.2	1.9	0.5	2.6	2.5	1.1	2.0
Cibicidoides robertsonianus				0.4	1.0													
Cibicidoides sp. 1								0.4		1.9	0.3			0.1			0.2	
Cibicidoides spp.		0.2				0.4		0.2			0.2		0.3	0.4		0.8	0.2	
Cymbaloporetta squammosa														0.1				0.1
Dentalina mutsui		x						0.1						0.1				0.1
Discorbinella araucana		0.6	0.2			0.3												
Discorbinella bertheloti		0.3	0.6			0.4		0.2				0.4	0.3	0.2	0.6			0.3
Discorbinella bodjongensis										0.2	0.2	0.3	0.7	0.1	0.4	0.3	0.4	0.4
Discrbinella sp. 1											0.5	0.4		0.2	0.6	0.3	0.5	0.3
Edentostomina cultrata							0.1											
Edentostomina milletti								0.1					0.2					
Edentostomina rupertiana											x						0.2	0.1
Elphidiella arctica						0.8	0.4							0.1				
Elphidium advenum		2.3	1.3			2.1	1.7	1.6	0.4	1.7	1.1	1.4	1.4	0.3	0.4			
Elphidium crispum	0.8	0.2	0.2			0.9	0.6	0.3	0.4	0.1	0.2	0.5	0.3	0.8	0.9	0.4	1.7	3.1
Elphidium incertum	0.4	0.2	0.4								0.6		1.4			0.1	0.1	
Elphidium jenseni			0.8			0.5				1.2		0.7	0.3					
Elphidium macellum						0.4					0.2	0.2	0.9	2.5	0.2	2.4	1.0	1.2
Elphidium singaporense	0.1	0.8	0.9			0.9	0.3	1.3	0.7	0.6	0.4	0.2						
Elphidium spp.	0.9		0.2				0.7			1.2	0.2	0.1			0.6	0.4		
Eponides cribrorepandus									0.4	x				0.1	0.2	0.5	0.3	
Eponides repandus	0.4						0.4	0.3		0.1		0.5	0.9	0.7	1.1	0.8	0.9	0.4
Eusphaeroidina inflata				0.1	0.4													
Evolvocassidulina orientalis																		
Facetocochlea pulchra												0.2		0.1				
Fijinonion fijiense	0.1	0.3				0.5		0.8			0.3	0.6	1.0				0.2	0.1
Fissurina spp.				1.0													0.1	
Floresina philippinensis							0.3									0.1	0.1	
Fontbotia wuellerstorfi				2.8	1.4													
Fursenkoina schreibersiana			0.2									0.2						
Gavelinopsis praegeri		0.3	0.3															
Gavelinopsis translucens				0.7	0.5													
Globobulimina pacifica								0.1										
Globocassidulina subglobosa	0.1	0.9	0.8	0.1		2.6	1.2	0.2	0.4	1.2	0.8	0.4						
Globulina gibba							0.2	0.1	0.2	x	0.1							
Globulina regina							0.2	0.4		x				0.2			0.2	
Gyroidina altiformis	0.6	0.6	0.5		0.5	0.1		0.8	0.9	2.3	1.6	0.6	2.1				0.1	
Gyroidina broeckhiana					0.1													
Gyroidina lamarckiana												0.2						

station no. 18-	248	249	250	254	255	256	257	258	259	260	261	262	263	264	265	266
species	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)
Astrononion novozealandicum																
Baggina indica																
Biloculinella labiata																
Bolivina glutinata	0.1	0.3	0.8	1.3	4.6	0.6	1.3	2.9	1.4	0.6	0.3					
Bolivina macella									0.2		0.3					
Bolivina spathulata					0.3						0.3					
Bolivina subaenariensis v. mexicana		0.2		0.3												
Bolivina subreticulata				1.0												
Bolivina spp.		0.2					0.4	0.6								
Bulimina aculeata																
Bulimina affinis																
Bulimina marginata		0.3	0.2	0.3	0.3			2.3	0.2							
Bulimina mexicana																
Bulimina striata																
Calcarina hispida																
Calcarina spengleri			x			x										
Cancris auriculus																
Cancris carinatus																
Carpenteria proteiformis						x										
Cassidelina subcapitata				0.3												
Cassidulina carinata																
Cassidulina crassa																
Cellanthus craticulatus						0.2						0.1	0.6		x	
Ceratobulimina jonesiana																
Cibicides deprimus																
Cibicides kullenbergi																
Cibicides lobatulus					0.1							0.1				
Cibicides reflugens=Heterolepa sp. 4				0.3	0.1		0.4		0.7	0.8	0.2		0.4			
Cibicides sp. 1		0.5														
Cibicidoides cicatricosus																
Cibicidoides pachyderma ex gr.	0.1			1.3	0.3	0.1	0.9		1.1							
Cibicidoides robertsonianus																
Cibicidoides sp. 1																
Cibicidoides spp.																
Cymbaloporetta squammosa																
Dentalina mutsui						0.1										
Discorbinella araucana																
Discorbinella bertheloti																
Discorbinella bodjongensis																
Discrbinella sp. 1											0.3	0.1		0.3		
Edentostomina cultrata																
Edentostomina milletti																
Edentostomina rupertiana																
Elphidiella arctica						0.1										
Elphidium advenum		0.8	0.3	0.8		0.4	0.4		0.8		0.3	0.1				
Elphidium crispum						0.1			0.1			0.2		0.3	0.2	0.2
Elphidium incertum	0.1	0.5							0.2							
Elphidium jenseni			0.2							0.6						
Elphidium macellum											1.4			0.1		
Elphidium singaporense					0.1						0.2					
Elphidium spp.	2.9	0.2			0.9									0.4		
Eponides cribrorepandus																
Eponides repandus							0.4									
Eusphaeroidina inflata																
Evolvocassidulina orientalis																
Facetocochlea pulchra										0.2						
Fijinonion fijiense								0.6								
Fissurina spp.																
Floresina philippinensis																
Fontbotia wuellerstorfi																
Fursenkoina schreibersiana																
Gavelinopsis praegeri		0.2														
Gavelinopsis translucens																
Globobulimina pacifica																
Globocassidulina subglobosa		0.2			0.3					0.2						
Globulina gibba																
Globulina regina																
Gyroidina altiformis				0.3												
Gyroidina broeckhiana																
Gyroidina lamarckiana																

Appendix B.4a. Counting data of empty tests (+), reworked (f) and stained (*) benthic foraminifera in samples on the Vietnam Shelf. Numbers are given in percentages of indiv./100 cc.

station no. 18- / species	248 (*)	249 (*)	250 (*)	252 (*)	253 (*)	254 (*)	255 (*)	256 (*)	257 (*)	258 (*)	259 (*)	260 (*)	261 (*)	262 (*)	263 (*)	264 (*)	265 (*)	266 (*)	248 (+)	249 (+)	250 (+)	252 (+)	253 (+)	254 (+)	255 (+)	256 (+)	257 (+)	258 (+)	259 (+)	260 (+)	261 (+)	262 (+)	263 (+)	264 (+)	265 (+)	266 (+)	248 (f)	249 (f)	250 (f)	254 (f)	255 (f)	256 (f)	257 (f)	258 (f)	259 (f)	260 (f)	261 (f)	262 (f)	263 (f)	264 (f)	265 (f)	266 (f)
Gyroidina neosoldanii				0.2																			0.1																													
Gyroidina orbicularis																				0.2		0.4	0.1	0.5	1.4			0.6	0.2	0.4											0.3											
Gyroidina spp.																						0.3	0.1						0.2																					0.1		
Gyroidinoides soldanii				1.0	0.4																																															
Hanzawaia boueana																				0.8					0.4	0.8			0.1							0.3		0.5			0.1											
Hanzawaia grossepunctata																	15.1	12.4		0.6	0.5				0.5			0.1	0.1	0.6	1.7	0.1	0.4	0.1	0.8	1.0											0.7		0.2			
Hanzawaia nipponica	0.8		18.0														7.6		0.4	0.5	2.4			0.8	0.1				1.4	1.4		1.4		0.3	0.3	0.2			1.4				2.2	1.7	0.8			0.1		0.1	0.1	
Hauerina fragilissima																																0.1	0.6																			
Helenina anderseni																								0.3	0.1	0.2	0.4	0.1		0.6	0.3	0.1		0.1	0.4	0.3											0.3					
Heterolepa dutemplei aff.	2.5						3.9			5.9									3.8	8.6	1.1			2.2	6.7	6.6	10.5	4.3	2.4	2.9	6.4	3.0		1.5		1.5		0.3		1.0	0.1	0.6	3.1	1.8	0.2	0.2	0.9	0.1			0.4	0.2
Heterolepa margaritifera		x																		0.5	0.1			0.3	x			0.1	x																							
Heterolepa praecincta										5.9									1.8	2.3	0.4			1.9	0.2	1.8	0.2	0.2	0.4	0.4	0.5	0.3	0.6				0.1			0.1		0.4	0.2						0.4			
Heterolepa subhaidingerii																			3.8		0.6			0.3	0.6	0.6	1.7	0.4	0.3	0.1	0.5	0.1	0.2	0.3	0.9	0.2																
Heterostegina depressa																				x							0.2		x	x																						
Hoeglundina elegans			18.0	0.5	1.6					8.8									1.4	0.5	2.3	1.0	1.1	1.3	0.5	1.0		0.2	0.2	0.2	x																					
Hoeglundina elegans type 3																			0.8	0.5	0.3			0.3	0.7		0.2	0.6		0.2																						
Hyalinea balthica																				0.5	0.2																															
Islandiella japonica											15.1								0.1	1.1	0.8			0.5	0.3	0.2	0.4	4.0	0.9	0.4	1.0								0.2		0.3	0.2										
Lachlanella compressiostoma																			0.5					0.1		0.4			0.4	0.2											0.2											
Laevidentalina bradyensis					0.4														0.4			0.3																														
Laevidentalina subemaciata				0.2															0.4			0.1																														
Laevidentalina spp.				1.1																						0.1			x																							
Lagena spp.																						0.4	0.3													0.1																
Lamarckina scabra																			0.4		0.1			0.4	0.1				0.3	0.1																						
Lenticulina anaglypta	6.7																				x				x																											
Lenticulina atlantica			9.0													31.6			3.9	2.3	1.0			2.2	1.4	1.2	1.7	0.8	0.8	0.1	0.2	0.5						0.2			0.1			x		x						
Lenticulina calcar	8.4							7.2											0.5	0.2	0.6			0.5	0.3	0.7	0.4	0.1	0.2	0.2									0.1			0.4										
Lenticulina echinata			0.1			0.1														x	0.2			x				x	0.2	x	x																					
Lenticulina gibba				0.2																		0.4			0.3		0.4																0.4									
Lenticulina melvilli																								0.1				x																								
Lenticulina orbicularis			0.1																	x	x																															
Lenticulina submamilligera			0.1					7.2			0.1								0.9	0.2	0.4			0.5		0.7	x		0.2	0.1	0.2			x											x	x						x
Lenticulina suborbicularis																					0.5						0.9					0.1																				
Lenticulina thalmanni				0.5	0.4					5.9		x							0.4	0.5	1.1			0.6	0.1	0.3	x			0.4	0.5	0.4							0.1		x	0.1					0.2					
Lenticulina vortex																				0.2	0.1					0.2				0.1																						
Lenticulina spp.							3.9												0.4	x	0.2		0.5			0.4	x	x	0.9																				0.2			
Loxostomina mayori																																	0.7	0.3																		
Melonis affinis				0.8	4.9															0.2		1.0	5.3																													
Miliolinella suborbicularis																					x			x									0.2			0.1																
Miliolinella spp.																					0.6					0.1						0.1											0.7									
Monalysidum politum																				0.2	0.1			0.4	0.1	0.2																										0.2
Neocassidulina abbreviata																				0.3	0.2						0.4	0.6	0.2	0.6									0.2		0.3											
Neoconorbina marginata																					0.8				0.3	0.4	0.2	0.6				0.1	0.7	0.4	0.1	1.1			0.1		0.7	0.2							0.6			
Neoconorbina terquemi																																			0.1	0.1																
Neoeponides auberii																				0.6	0.2			0.3	0.3			1.2	0.8	1.0	0.3	1.0	0.4	0.3	0.5	1.0		0.2		0.3		0.6							0.2			
Neoeponides bradyi								14.5	6.7			5.8							0.4		0.1			0.1	0.1	1.2	0.9	0.5	0.1	0.4				0.3	0.2								0.4									
Neolenticulina peregrina																			0.5		0.2																															
Neouvigerina proboscidea																			0.5	0.2	0.2			0.3	0.3															0.3												
Nonion japonicum	0.8											5.8							1.8	1.9	1.5			1.8	1.0	0.5		1.7	1.1	1.8		0.1	0.4		0.3	0.3		0.2	0.5	0.3		0.8	1.5			0.6						
Nonion subturgidum																				0.3				0.1		0.3	0.4	1.3	0.2		1.4	0.1	0.2												0.1		0.3					
Nubeculina advena																			1.3						1.1	0.7	2.6	0.5	0.5	0.2		0.7	2.8		0.4																	
Nummulites venosus														1.1	2.4	36.8	0.9	2.1	x		x											0.4	0.8	3.2	0.6	2.5					x		x		x	x	x	0.1	0.5	1.1	1.4	0.8
Nummulopyrgo globulus					2.0																				0.1										0.1				0.3													
Operculina ammonoides ex gr.							0.1	1.3		2.9	16.0	0.1	2.5	15.9	17.1		0.1	18.8	0.4	0.4	0.3			0.3	0.4	2.2	1.5	0.2	2.4	1.3	8.8	11.2	10.5	12.8	7.2	8.6		0.3	x	0.1	x	0.2	0.9		x	x	0.8	3.6	4.7	6.4	3.9	3.7
Operculina bartschi							0.2	1.7	60.0	0.6	0.4	0.4					0.2		x	x	x				0.1	x	x	x	x	x	x			x	x						x	x			x	x						
Operculina sp. 2												0.7	2.5									0.1					x	0.1		1.7																						
Operculina spp.	0.2																		x						0.4			x				x	x	x																	x	
Oridolsalis umbonatus				0.2	2.0																0.2	5.0	2.1	0.5	0.3																											
Osangularia culter				0.5	2.0																	2.1																														
Paracibicides endomica																					0.2								1.2			0.3			0.3																	
Parafissurina lata					0.4																	0.1																														
Pararotalia calcariformata																			0.2	0.3				0.4	1.1			x				0.1					1.3	0.8		0.6	0.4		0.9			0.2						
Pararotalia stellata																					0.6			0.4		0.9			0.5								0.4					0.2			0.3							
Parrellina hispidula																					0.2			0.3																												
Parrelloides bradyi				2.6	9.9																	4.7	4.4																													
Peneroplis carinatus																					0.2			0.1																												
Peneroplis pertusus							3.9												0.9		0.2			0.1	0.6	0.1	0.2	x	0.2	0.2		0.1					0.4	0.6	0.2	0.3	0.5	0.2	0.4			0.2		0.1			0.1	0.2
Peneroplis planatus																			0.1		0.2			0.1	x	0.2		0.1	0.2			0.1								0.1												
Planispirinella exigua																				0.6	0.2				0.1				0.4	0.2		0.4			0.2						0.1		0.2									
Planorbulina distoma																			0.4	x				0.1																												

Appendix B.4a. Counting data of empty tests (+), reworked (f) and stained (*) benthic foraminifera in samples on the Vietnam Shelf. Numbers are given in percentages of indiv./100 cc.

station no. 18-	248	249	250	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	248	249	250	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	248	249	250	254	255	256	257	258	259	260	261	262	263	264	265	266
species	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)	(f)
Planorbulinella larvata							3.9	0.3	6.7																x	0.6		x	x	0.1	x	0.1	0.2	x																		0.2
Planularia californica																				0.2	0.3			0.3																												
Planularia gemmata																			x		0.1																		0.1													
Planularia perculta	0.2							0.6	26.7	0.4									x	0.2	x			x	x	0.2	x	0.2	x	x	x							x														
Planulina floridana																			2.1						0.2																											
Planulina retia																				0.3	0.9		0.5	0.6		0.1		1.2	0.2			0.1																				
Poroepistominella decoratiformis						7.1													0.4	0.6	0.9			0.4	0.5	0.1	0.4	x	0.2	0.4	0.2	0.3						0.3														
Praeglobobulimina ovata											7.5											0.2						x		0.2																						
Pseudoflintina laculata																				x	x				0.2																											
Pseudohauerina orientalis																				0.3	0.2			0.1	0.1			x		0.2	0.2	0.1	0.2				0.4	0.3	0.1		0.1				0.2							
Pseudononion granuloumbilicatum				0.8																		0.3																														
Pseudorotalia indopacifica	0.2	0.6	0.6			0.1	0.6	1.8		2.0	0.5		2.2							0.6	0.3			x	0.4	0.3		x	x	0.1	0.2							x	x		x	0.4	x									
Pseudorotalia indopacifica (juv.)																				0.6	0.3				0.3	0.5												0.2														
Pseudorotalia schroeteriana										2.9			0.7								x			x					x		x							0.2		x												
Pullenia bulloides				1.3																		1.4	0.8																													
Pullenia quadriloba																				0.2		2.4																														
Pullenia quinqueloba										2.9									0.4				0.3																													
Pullenia salisburyi																						0.3	0.5																													
Pyramidulina catesbyi												11.6						12.4		0.2										0.4																						
Pyramidulina luzonensis																			0.5		0.1			0.3	0.1		0.2	0.6	0.1																							
Pyrgo depressa						7.1														0.2	0.1			0.4				x																								
Pyrgo sarsi												5.8								0.2	0.2							0.1	0.6	0.1	0.2																					
Pyrgo serrata				0.2																		0.4																														
Pyrgo sp. 1																								0.3						0.2																						
Pyrgo spp.																					0.6	0.1								0.2				0.3																		
Pyrgoella tenuiaperta																			0.4		0.2				0.1			x																								
Quinqueloculina auberiana										5.9									0.8	1.1	0.7			0.5	0.4	0.2		x	1.1	0.1		0.1							0.1				1.7		0.3							
Quinqueloculina bicarinata																										0.7	0.7	x	0.2		0.2		0.2	0.3	0.5	0.5					0.1											
Quinqueloculina collumnosa														9.8														x	0.1	0.1	0.3		0.2		0.5	0.4																
Quinqueloculina fichteliana																									x	0.1								0.1							x											
Quinqueloculina laevigata																			0.1	0.2				1.0	1.4		0.4	0.6		1.1								0.9		0.5		0.8				0.4		0.1				
Quinqueloculina lamarckiana																			0.5		0.2			0.4								0.1																				
Q. philippinensis ex gr.																									0.6	0.7		0.1	0.2	0.1	0.9	0.5	0.4	0.5		1.2					1.4							0.6				
Quinqueloculina pseudoreticulata												5.8								x	x				0.1	0.6		0.1	0.2	0.1	0.3	0.6	1.1	0.8		0.2		0.2			x							0.1	0.4			
Quinqueloculina pygmaea																														0.2												0.4										
Quinqueloculina sagamiensis																				x	x			x	x																x											
Quinqueloculina seminulum	1.7										7.5				32.2				3.8	3.1	1.8		0.5	2.6	3.2	2.5	0.2	6.4	2.4	2.5	3.8	1.5	1.5	0.6	1.8	3.1	0.3	0.3	2.6	3.6	5.0	2.4	6.8		0.8	1.0	1.4	x			0.2	0.2
Quinqueloculina subcurta																				x	x								x																							
Quinqueloculina tropicalis																						0.3								0.2					0.3			0.2														
Quinqueloculina spp.																			1.8	1.2	2.7			2.6	0.7	1.4	0.9	0.6	1.5	3.9	1.4	2.1	3.7	3.4	1.7	3.8	14.5	5.7	2.7	3.5	0.8	0.4	1.5		0.3	0.4	0.3	5.6	1.7	2.3	1.8	1.9
Reussella pulchra																				0.2						0.2		1.2		0.2												0.3										
Reussella spinulosa																		12.4	0.5	0.3	0.7			0.5	0.3	0.6	0.7	1.2	1.0		0.7	1.3	1.3	0.5	0.7	2.2																
Robertina subcylindrica				0.2	1.6																																															
Rosalina globularis																			0.1		0.3																															
Rupertina stabilis																				x					x																											
Sagrina jugosa																								0.3						0.2										0.3												
Sagrina zanzibarica																					0.2								0.2																							
Saidovina amygdalaeformis																			1.3	0.3	0.2			0.5	0.3	0.3	0.2	0.6	0.5	0.1	0.3																					
Saintclairoides toreutus																								0.3						0.2																						
Saracenaria italica																				x						0.1																										
Schlumbergerina alveoliniformis																												0.6				0.3	1.1																		0.3	
Sigmoidella elegantissima	6.7													4.9					0.8	0.3				0.4	0.1	0.8	0.7	0.1	0.3	0.5		0.4									0.3							0.1				
Sigmoihauerina bradyi																								0.1	0.7	0.2			0.2						0.6	1.0		0.1			0.1	0.2			0.1							
Sigmoilinita asperula																			0.3					0.1	1.2	0.2			0.2	0.2		0.1													0.2			0.1				
Sigmoilopsis carinata																					0.5			0.1																												
Sigmoilopsis schlumbergeri																						1.9	1.3	0.3			0.2										0.1												0.7	1.0		
Siphogenerina raphana																					0.5			0.8																												
Siphogenerina striatula	0.8																		0.1	0.6	1.3			1.3	0.5	1.4	0.4	1.2	0.6	0.2								0.2			0.8	0.1	0.4		0.3							
Siphonaperta spp.																				0.2					0.1	0.1			0.1																							
Siphonina tubulosa																				0.2	0.2																									0.2						
Sorites marginalis																			x	x	0.1									0.2					x				x			0.1									x	
Sphaeroidina bulloides					0.4														0.5		0.2		1.5	0.4	0.1	0.1		x	0.2	0.4																						
Spirolina acicularis																			0.4	0.2	0.4				1.4	0.5	1.3		0.3	0.8		0.1						1.2		0.5	0.6	0.2	0.9	1.2	0.5							
Spiroloculina communis							3.9												0.4					0.3	0.2	0.4		0.2	0.6		0.5										0.2		0.2									
Spiroloculina excisa		12.4																	0.8	0.2	0.5					0.2		0.1				0.1			0.4							0.3						0.1		0.3		
Spiroloculina eximia																			0.1	0.2									0.4			0.3	0.2	0.1		0.3		0.2		0.3												
Spiroloculina manifesta												5.8								0.2	0.2					0.4		0.3	0.6	0.4		0.2			0.3	0.8												0.1				
Spiroloculina regularis cf.																										0.2			0.2																							
Spiroloculina scrobiculata																												x	0.1																							
Spiroloculina spp.																														0.2													0.4									
Stomatorbina concentrica							3.9																					x								0.1																

Appendix B.4a. Counting data of empty tests (+), reworked (f) and stained (*) benthic foraminifera in samples on the Vietnam Shelf. Numbers are given in percentages of indiv./100 cc.

station no. 18-	248	249	250	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266
species	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)
Triloculina affinis																		
Triloculina elliptica				0.2														
Triloculina marshallana																		
Triloculina tricarinata	0.8						3.9											
Triloculina trigonula																		
Triloculinella californica		12.4																
Triloculinella parisa																		
Triloculinella pilasensis																		
Triloculinella pseudooblonga cf.																		
Triloculinella robusta										2.9								
Triloculinella spp.																		
Uvigerina auberiana ex gr.				2.5														
Uvigerina canariensis cf.																		
Uvigerina peregrina				4.3														
Uvigerina schwageri type 1 & 2		12.4																
Vertebralina striata																		
miscellaneous Miliolids																		
unidentified calcareous forams					0.4													
∑ of species present in single station	0.8	12.4		1.0	0.9					5.9		5.8						
∑ - of tests in 100cc	475.0	2062.0	1423.0	481.1	254.9	903.0	3299.7	885.3	15.0	544.0	1698.0	2205.0	279.0	1310.3	796.0	515.6	1695.0	1035.3

station no. 18-	248	249	250	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266
species	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)
Triloculina affinis																	0.4	0.1
Triloculina elliptica									0.4									0.1
Triloculina marshallana				0.2			0.6					0.2			0.2			
Triloculina tricarinata	0.4	0.2	0.6			0.3	0.1	0.2	0.2	0.8	0.9	0.9	0.3	0.3	0.2		0.1	0.1
Triloculina trigonula	0.1	0.5	0.3			0.3		0.2						0.1			0.1	
Triloculinella californica						0.3												
Triloculinella parisa	0.9		0.6															
Triloculinella pilasensis						0.8	0.1	0.2					0.3					0.1
Triloculinella pseudooblonga cf.		0.2			0.1						0.2		0.3					
Triloculinella robusta		0.2						0.1			0.2		0.7		0.2			
Triloculinella spp.			0.2							0.6	0.2				0.2	0.1		
Uvigerina auberiana ex gr.				5.7	2.1	0.3												
Uvigerina canariensis cf.		0.3								1.2	0.9	0.4		0.1				
Uvigerina peregrina				2.0	0.7													
Uvigerina schwageri type 1 & 2		3.5	2.8			2.1												
Vertebralina striata						0.1		0.2		0.0				0.2			0.2	0.1
miscellaneous Miliolids																		0.4
unidentified calcareous forams		0.3	0.7					0.4	0.9	0.6		0.2		0.1		0.9		0.7
∑ of species present in single station	0.1	2.0	1.9	6.6	2.6	0.6	1.3	0.1	0.7	3.7	1.3	0.6	0.7		0.2		1.6	0.3
∑ - of tests in 100cc	7648.0	165908.0	160295.0	1201.9	777.3	49629.0	118630.3	62955.0	58690.0	88957.0	167530.0	124598.0	73777.0	93438.3	69792.0	64655.6	145411.0	87063.3

station no. 18-	248	249	250	254	255	256	257	258	259	260	261	262	263	264	265	266
species	(ϕ)	(ϕ)	(ϕ)	(ϕ)	(ϕ)	(ϕ)	(ϕ)	(ϕ)	(ϕ)	(ϕ)	(ϕ)	(ϕ)	(ϕ)	(ϕ)	(ϕ)	(ϕ)
Triloculina affinis																
Triloculina elliptica																
Triloculina marshallana																
Triloculina tricarinata	0.1	0.3	0.2			0.6	0.2		0.3	0.2		0.2				
Triloculina trigonula	0.4		0.1	0.3			0.9					0.2				
Triloculinella californica																
Triloculinella parisa		0.2	0.3													
Triloculinella pilasensis																
Triloculinella pseudooblonga cf.																
Triloculinella robusta									0.2							
Triloculinella spp.																
Uvigerina auberiana ex gr.																
Uvigerina canariensis cf.								0.6								
Uvigerina peregrina																
Uvigerina schwageri type 1 & 2		0.2														
Vertebralina striata							0.4									
miscellaneous Miliolids		0.6														
unidentified calcareous forams		0.3					1.3									
∑ of species present in single station		0.3			0.4		0.4									

Appendix B.4a. Counting data of empty tests (+), reworked (f) and stained (*) benthic foraminifera in samples on the Vietnam Shelf. Numbers are given in percentages of indiv./100 cc.

(*) species / station no. 18-	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323
Adercotryma glomeratum	1.6	5.3																			1.1	2.8	0.5	3.1	0.3	0.5																															
Ammobaculites agglutinans			0.5		0.3	0.7	0.5	1.5		0.4		0.2	3.0		2.0	1.4						0.4	0.2	0.5			0.5	0.4	1.3	1.0		0.7	0.7	0.3		0.2		0.6	0.5	0.9	0.4		0.5			0.4			1.6	4.8	1.2	1.5	3.4	3.3		3.1	0.3
Ammobaculites baculusalsus	0.9																					0.5	0.5	0.4	0.7		0.3																													
Ammobaculites filiformis																								0.8	0.4																																
Ammobaculites sp. 1				0.7						0.4																			0.4																												
Ammobaculites spp.								0.5						2.1																							0.2					1.7		1.6						0.6		1.8	2.9					
Ammodiscoides sp.	0.2																				1.7		0.7	0.5																																
Ammodiscus anguillae																					0.7	0.7					0.5																														
Ammodiscus catinus			1.0	0.2	0.3		1.3					2.3	2.3		1.7	1.0	0.7			1.2	1.0		0.2	0.5	0.4		1.9		0.6	1.4	1.2	0.7		1.3	0.9	1.1		1.8	1.0	0.5	1.1			1.2	0.3	0.4				0.2	1.2				0.4		0.9
Ammodiscus planorbis				0.5	1.0	0.7	2.3				1.3	0.6	0.9		1.7	1.9				0.3		0.4	0.7							2.1	2.1	0.7	2.0	0.7	0.2	1.3		2.4	1.6	5.6	3.5	1.7	3.5	1.2		1.1	0.6		3.8	0.6	1.5		0.3	1.0	0.5	1.7	2.3
Ammodiscus sp. 1										0.4									0.4						0.4																															
Ammodiscus tenuis		0.3										0.2	0.2		0.2				0.9	0.3			1.2					0.4																												
Ammoglobigerina globulosa																						0.4	0.9	0.8	0.4																																
Ammolagena clavata				0.7	0.5		0.5		0.1		3.3	1.2	1.2	3.7	2.0		1.5			0.3	0.2							0.4	1.3	2.4	0.8	1.4	0.7	0.7	0.2	1.0		0.3	2.1	0.9	0.7	0.3		0.6		0.7												
Ammomarginulina rostrata aff.						0.7	1.1														0.3					0.4			0.6							0.4				0.3																		
Ammoscalaria compressa														1.1	0.2			3.0	1.7																																						
Ammoscalaria pseudospiralis																																																		1.5	1.5	2.5	2.9		2.7	0.4	1.1
Ammoscalaria sp. 1																																					3.8		0.5	1.4					0.3			4.0	1.9			1.1		0.5	1.1	3.7	
Ammoscalaria spp.																																									0.7	1.4	2.2	4.9		0.2										
Ammoscalaria tenuimargo			0.3				0.3								0.2			3.0	0.4										0.7	0.8								0.3		0.2															
Ammosphaeroidina sphaeroidiniformis																					0.2																								0.2										
Astrorhiza crassatina												0.6					1.5													2.1	0.4	0.7			0.2				1.0	0.5	1.5	1.2		0.6		4.4										1.0
Astrorhiza sp. 1																																																		0.2					0.4	0.2	
Bigenerina nodosaria			0.5	1.2	2.0		3.1	3.9					0.2																			1.3	3.0	1.8	1.0				0.5		0.7		0.3	0.8	1.7	1.8		0.6	0.4	0.2			0.5	0.4	1.3	0.6
Bigenerina sp. 1																															3.7	6.2	13.1	3.0		1.9		5.3	1.0	5.2	2.2	1.0	5.5	5.8		0.9	0.9	1.0	0.3	3.2	0.6	0.7	1.7	3.6	0.5	1.7	2.3
Buzasina ringens	3.1	2.0																	0.4				0.9		0.4	1.0	1.5	0.3																													
Clavulina humilis													0.5				0.7																																							
Cribrobigenerina (?) sp. 1																															0.8			0.7	1.1																							
Cribrobigenerina robustiformis							0.3		0.6	0.4		0.4					0.4			0.3									0.4										0.9			0.2	1.4		0.6	0.2	0.7				0.7	0.9	2.5	0.9	1.0	0.7	1.4	0.1
Cribrobigenerina textularioidea																																								0.2	0.2													0.3			
Cribrostomoides nitidus	0.9	0.3																			0.2		0.7	0.3	0.8	0.3																														
Cribrostomoides scitulus		1.0			0.5		0.4					0.4	0.2	0.5		4.8	1.5				0.5		0.5	0.3		1.7			0.9		0.4	0.7	3.3	1.0					0.5	0.2	0.2	0.3	1.1	2.1		0.2	1.2											
Cribrostomoides subglobosus	0.7	1.8												2.1	5.9	2.3	6.3				0.6	1.0	1.1	0.2		0.8	1.0									0.9	0.2		0.6			0.9															
Crithionina hispida	0.4	1.3																		0.3			0.2	0.5				0.4												0.3	0.5		0.3				0.2				0.4								
Crithionina mamilla						3.3																												0.3	0.2	0.4		0.3	0.7	0.7	0.2	0.7		0.3	2.6	0.4	0.6		0.3	2.3	3.6	2.5		1.5	0.1	1.0	1.0
Crithionina pisum	1.6	0.5		1.0	1.2		0.6	1.0			0.7	0.6	1.4	0.5	1.2					0.3	1.2	0.4	0.9	1.3				1.7												1.4									1.9	0.7	0.3			1.5		0.4	
Cyclammina cancellata		0.3																			0.5		0.2		0.4	0.3	0.5																														
Cyclammina subtrullissata		0.3					0.1																					0.7															0.3		0.7	0.4				0.5				0.3		0.8			0.8	0.1		0.1
Cyclammina trullissata	0.7	0.8																					1.2	0.8		0.3	0.5																					0.9										
Cylindroclavulina bradyi						0.3	0.1					0.2				0.5															0.7										0.5						0.2						0.4					
Cystammina pauciloculata																				0.3	0.5		0.2					0.3																												
Deuterammina grisea																							0.5		2.0		0.5	0.3																												
Deuterammina montagui																			0.4			0.4	0.7	0.5				0.3																												
Discammina compressa																					1.7	0.4																																		
Dorothia (?) sp. 1	0.2												2.3						0.9	0.6	0.7	0.4																											1.0										
Dorothia rotunda																							0.2					0.3																												
Dorothia scabra				0.2	0.2		0.2			0.4	2.0		0.9	0.5	0.3	0.5				1.7	0.2							0.6		0.3			0.7			0.2		0.3	0.3	0.2	0.2	0.3	0.5			0.2											0.1
Earlandammina drakensis cf.	1.1	0.8																									1.0																													
Eggerella bradyi	2.2	3.0																		0.3	0.7	1.1	0.7	3.2	2.7	0.3	2.9	0.4																												
Eratidus foliaceus				0.5																					0.5	0.5		0.3																														
Eratidus recurvus	1.3																				0.7	0.4	0.9	0.5	3.1	1.4	0.5	0.3																												
Gaudryina flintii														0.5		0.5					0.5					0.7	0.5																													
Gaudryina quadrangularis										0.4																																											0.3			
Gaudryina robusta									0.6																											0.2			0.3			0.3				0.4										0.1
Glaphyrammina americana							0.4										1.2		0.6	0.9	3.2	0.5								0.4	0.3		0.7		1.0		1.7		1.8	1.0																	0.2	
Glomospira glomerata	2.2	0.8																0.6	0.9	1.7					1.2																															
Glomospira gordialis	1.6	0.3																					0.7	0.5	1.3	0.4	2.1	1.5																													
Haplophragmoides bradyi		0.3															0.7			0.3	0.2	0.7	0.5		0.4	1.0						1.4																				0.3								0.6
Haplophragmoides grandiformis				0.5			0.2	0.5	1.2																								0.7	0.7		0.3			3.3			0.7	0.5				0.6			0.2	0.5	0.0	0.6				0.1
Haplophragmoides sp. 1																				0.3	0.2			2.4																0.3								3.6													
Haplophragmoides sp. 2																				0.3	0.2																																				
Haplophragmoides sphaeriloculum		0.5		0.2	1.5	0.7								0.5							0.3	0.5	0.4		0.5		1.4	2.9		0.4										1.2		0.9																		
Haplophragmoides spp.															0.5				0.4							0.5	0.5										1.9																						
Hippocrepinella alba	0.2																			0.3		0.4		0.8		0.3	0.5																													
Hippocrepinella crassa																													0.4												0.4				0.3	0.4			0.3		1.2	0.7			0.7		
Hormosina globulifera	0.2	1.0																					0.2	0.3		0.7		0.4																												
Hormosina normanii																					1.2		0.9																																		
Hormosina pilulifera	1.3	2.8															0.7			1.7	1.5	1.8	0.9	4.0	0.8	0.3	0.5	1.4																												
Hormosina sp. 1																																																		8.5			5.7	0.5		0.6	1.7
Hormosina sp. 2															0.7	5.8			0.4	0.3	2.7																																			
Hormosinella distans	5.6	1.3																			2.5																																			
Hormosinella distans type 1		0.5																																																	0.9					
Hormosinella guttifera	1.8	3.3													0.2		0.4				1.0	1.1				0.7	0.5																													
Hormosinella guttifera type 1																						0.4				0.3		0.7																												
Hormosinella guttifera type 2																				0.6	0.2		0.5		0.4																														
Jaculella acuta cf.																																													0.3	0.2				0.6	2.0	1.5		0.3	0.3	0.1	
Karreriella bradyi																			0.4		0.5	0.7	0.7	0.3		0.3		0.4																												
Karreriella novangliae																							0.2	0.3																																
Karreriella pupiformis		0.3		2.7	5.0	4.0	4.5	0.5			1.3		4.2	7.4			13.1	1.2	0.4	2.3	1.0	0.4	5.4	1.3	1.2	1.0		0.4	1.5		4.1	2.1					3.8	1.8								0.4	4.3									
Karreriella cf. siphonella				0.5	0.2	0.3																0.2		0.7													0.2	0.8			2.1	0.5		0.3				0.2										0.4

Appendix B.4b. Counting data of stained (*) benthic foraminifera in surface samples on the Sunda Shelf. Numbers are given in percentages of indiv./100 cc.

(*) species / station no. 18-	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323
Karrerulina apicularis	5.4	5.3							1.2	9.9	0.7	1.2			3.0		0.7		6.1		2.0	6.8	2.6	1.9	0.4	0.3	0.5	3.4																													
Karrerulina erigona			1.0													1.9					1.0											0.7	0.7				7.6																				
Lagenammina arenulata	6.5	0.3		0.2		2.3	5.9	1.0			3.9	0.2	1.2		2.0		6.5	7.2	0.9	1.7	3.4	4.3			3.1		4.4	3.3	4.3	2.1			2.6		3.3	4.0			2.9	3.8	##	1.0			0.3		0.9			1.5	3.3	8.7	1.7	3.1			7.3
Lagenammina difflugiformis	5.2	5.8			0.3						0.7	1.2							0.4	0.3	2.5	2.5	4.0	12.3	12.9	9.4	12.6	0.3																					0.3								
Lagenammina spp.		0.5			1.7										1.5	4.8		1.2		1.2			0.5			0.7	1.5																												2.7	2.7	
Lagenammina tubulata	1.6																			0.3	0.2			1.1		0.3																															
Liebusella improcera																			0.4					1.1		0.3		0.3																													
Lituola lituilinoidea																				0.6	0.5		0.2	0.5		0.7																															
Marsipella cylindrica																																				0.4					0.2				1.3												
Martinottiella communis																			0.4		0.5	1.1	2.1	1.9	1.2	1.7	1.0																														
Martinottiella milletti	0.4	0.8																										0.7																													
Nodosinum gaussicum		0.3																				0.4																																			
Nouria harrisii					0.3		0.4												0.4	0.9	0.7							0.6	0.2		0.8	0.7		0.3						1.2	0.4	0.3		4.0	1.3	0.4			0.3					0.5		0.2	
Nouria polymorphinoides							0.4	1.5					0.2					0.6													0.8							0.9		1.9	0.9	0.7	0.5	2.8	1.1						0.3	0.7	0.6			0.4	
Paratrochammina challengeri	3.6	5.1													0.2			0.6		0.6	1.7	1.1	4.2	1.3	3.9	3.1	7.3	3.8							0.4				0.5							0.4			1.0								
Paratrochammina simplissima			0.5	0.5	0.5	2.3	0.2						0.5		0.3																0.4				0.4				1.3						0.2	1.1				1.3	1.2	0.4		0.8	1.4	0.5	0.1
Paratrochammina sp. 1	0.4	1.0																																				0.6																			
Paratrochammina sp. 2																												0.6																													0.6
Parvigenerina sinensis																				1.7	0.2																																				
Pelosina cylindrica																																0.2	0.3																								
Pelosina spp.																																														0.1				0.9							
Placopsilina bradyi			0.3				0.1						0.2						0.4															0.3	0.2			0.3	0.3	0.2	0.2	0.3			1.3	0.2	1.2		0.3	1.1	0.2		0.9	0.5		0.2	0.3
Placopsilina confusa																	0.7			0.3										0.3																											
Polystomammina elongata					0.3	0.3	0.8												0.4					0.3																																	0.6
Psammosphaera fusca																		0.6		0.3						1.4	1.5	0.8																													
Pseudobolivina nasostoma			0.5	0.2			0.8						0.9	1.1		1.0														2.1	0.8	0.7	2.6				3.8		0.3	0.5	0.4		1.5	1.2				1.0		1.5					1.6		
Pseudoclavulina serventyi					0.2							0.2			0.3				0.4																																						
Pseudogaudryina pacifica			1.0	0.2			1.1									0.5													0.2	0.7		1.4		1.3	0.4	0.4			0.5		1.3	0.3		1.2					0.6	0.9	0.3			1.5		0.2	
Pseudonodosinella bacillaris																				0.3	1.5		0.2	0.3																																	
Pseudonodosinella sp. 1	0.4																		1.3	0.9	0.5				0.4	0.7	1.0	0.4																													
Pseudonodosinella sp. 2																																				0.8									0.2												0.1
Pseudotrochammina atlantica	0.2																							0.5	0.4	0.3	0.5	0.3																													
Pseudotrochammina dehiscens	0.2	0.5									1.3	1.2											0.2	0.3					0.2	0.7	0.4				0.4	0.4							1.1	0.3													
Pseudotrochammina sp. 1	0.7	2.0																					0.5			0.3	0.5													1.6																	
Pseudotrochammina sp. 2	1.1	0.3																																																							
Recurvoides contortus	1.8	2.0								0.8										4.4	0.7	1.8	3.5	1.1	0.8	1.7	1.0	3.1			0.8					0.8		1.2		0.9							0.9	1.0					0.3				
Recurvoides spp.	1.3	3.0	3.0																0.9	3.5	0.2	0.7		0.8	2.7							0.7							0.8												0.2			0.3			
Reophanus oviculus		0.3																					1.3	1.6		0.3	0.5	0.4																													
Reophax bilocularis	2.0	1.3										0.6	1.2	2.1	1.2	2.4			0.4	2.6		3.2	0.7		1.2	7.3	4.9	0.3			0.8			3.3	0.7	1.5		0.6		3.5					0.5											3.4	1.0
Reophax bradyi			0.5												2.2	8.2				2.0	0.2														0.2			0.6	4.2	0.9			1.1	4.3	1.3	4.6			1.0	1.9			0.6	2.3	3.1	0.9	0.1
Reophax dentaliniformis	1.1	1.0		1.0			1.1	4.4				1.2			0.5	1.9	2.2	1.2	0.4	2.0	3.7	0.7	0.2	0.8		1.7		0.3							0.4				1.3	0.2						0.4		1.0				1.5		1.0			
Reophax longicollaris																					1.7																					0.7															
Reophax micaceus																							1.2		0.4	0.3	1.9													0.5																	
Reophax pesciculus																																							0.3	0.5	1.7																
Reophax regularis			0.8										1.9	2.7		1.0		0.6	0.9	0.3									0.4	2.1		1.4		1.7	0.2	3.0						1.4			0.2	1.2				0.4			0.6	0.5		0.2	0.9
Reophax scorpiurus			1.6	0.2		1.7		0.5	1.2		4.6	1.5	3.7		10.8	0.5	9.1	8.4	1.7	0.9		0.4							7.3	0.7	4.1				1.8	1.5	3.8		0.5				2.2	1.8				1.0	3.2	1.9	0.2	2.9	6.6	0.8	0.1		0.4
Reophax sp. 1		0.8																				0.4				0.3																															
Reophax sp. 3	2.0	7.1			0.3													0.6		0.6	3.2	2.9	0.7	1.1	3.1	4.5	3.9	2.0																		0.4											
Reophax spiculifer	0.2																1.5							0.8																																	
Reophax spp.	1.1	0.3	1.6	1.2	1.2	3.3	1.0	1.5	2.3	1.2	1.3	0.2				1.0		1.8	0.9	1.5	2.0	0.7	1.6		0.4	2.4	2.4	2.8	5.8	3.8	0.4	2.1	2.6	5.6	3.8	0.4	1.9	0.3	4.4	9.4	1.1	5.6	3.5	5.2	5.7	8.5	1.8	4.0	3.5	1.1	3.9	2.2		0.3	0.1	2.2	3.9
Reophax subdentaliniformis	0.2	0.8			0.7	3.3	1.3				0.7						0.7			1.0				1.1					1.5	0.3	1.2	0.7		1.0	0.4			1.8	6.0	0.5	0.9					0.4							0.3		1.6	0.2	1.7
Reophax subfusiformis	0.9						0.4						0.9	1.1	1.1										2.0	1.7	4.9												0.3																		
Reophax tubulus	1.3														0.5		1.5						0.5			0.7	1.0																		0.3												
Rhumblerella sepetibaensis			0.3									2.3									0.5	0.7						0.8																													
Saccammina sphaerica	1.1	0.3																		0.6				0.8	0.4	1.0		0.3																													
Sahulia barkeri			0.3	0.2								0.4																																													
Sahulia conica																																		0.3	0.4	0.6						1.0					0.9	1.0		0.2	0.5	0.4	0.3	0.5			0.9
Siphotextularia (?) sp. 1				0.2	0.3	0.7	0.5		1.2				0.2		0.3																	0.7		1.3	0.4	0.6		0.9	0.5	0.5		0.7			0.3						0.5				0.3	0.6	
Siphotextularia flintii	0.2																					0.4			0.4																																
Siphotextularia foliosa																		25.8	3.0		0.2																																				
Siphotextularia mestayerae			2.1		1.0		1.1	3.9	5.9																						0.8						7.6			0.5																	
Siphotextularia subplanoides				1.0	0.2									1.1	1.2																				0.4												0.6				0.3		1.1		0.1	0.2	0.6
Siphotextularia wairoana cf.																														0.7				0.3		0.2		1.2	0.3				0.5							0.2						0.2	
Sorosphaera consociata																		10.8						1.6			0.5			2.8																											
Spiroplectinella higuchii				1.5	0.3		0.4										0.7																		0.4			0.6				0.3					1.2		0.6	0.9	0.3			0.3			
Spiroplectinella kerimbaensis				0.2	0.2																																												0.5	0.7			0.3			0.2	
Spiroplectinella pseudocarinata				0.5	0.2	2.0					0.7	0.4	0.5	1.6		1.0													0.2							0.4				0.9			0.5			0.2			0.3		0.2			0.3		0.5	
Spiroplectinella spp.																																																		0.4		0.7		0.5		0.2	
Spiroplectinella wrightii																		0.6																											0.3												
Spirotextularia fistulosa			0.5	0.5	0.7		1.1								0.2														0.6		0.8									0.5							0.9				0.3				9.3		
Spirotextularia floridana			1.0		0.3		0.9							1.1															0.9	0.7				6.0	3.5	0.8		3.5	0.3	0.2				0.3		0.4	1.2		0.3	0.2		0.7		1.0		0.6	2.9
Subreophax aduncus	0.9	1.0																			0.7		1.2	0.8	2.3	0.3																															
Technitella legumen				0.2			0.1										0.4										0.5				0.8				0.4		1.9								0.7						0.9			0.5			1.4
Technitella melo															1.3																			0.3																						0.4	
Textularia abbreviata aff.																																						0.3															0.3				
Textularia agglutinans					0.2				0.6	3.3					0.3															0.3				0.7		0.6				0.7	0.4									0.2	1.1	1.5					0.4
Textularia bocki			3.6	2.7	4.7	0.7	4.5		1.8				2.8	0.5	3.5	2.9	1.5			0.6	0.2								0.2	2.1	0.8	2.1		5.6	4.4	2.7		7.7	4.2	1.2	0.9	1.4	1.3			3.7	5.8	6.0	0.6	1.1	0.9	0.7	2.0	1.0	7.1	3.7	1.7
Textularia cuneata aff.																																													0.5												
Textularia foliacea																																								0.2					0.7			1.0	1.0	0.4				0.8			0.1
Textularia hauerii																																													0.2						0.2				0.3	0.4	0.1

Appendix B.4b. Counting data of stained (*) benthic foraminifera in surface samples on the Sunda Shelf. Numbers are given in percentages of indiv./100 cc.

(*) species / station no. 18-	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285
Textularia lancea				0.2			0.1												
Textularia lateralis													0.2						
Textularia lythostrota cf.			0.5		0.7														
Textularia milletti cf.																			
Textularia parvula																			
Textularia porrecta																			
Textularia pseudogramen							0.1					0.6	0.2	2.1		1.0			
Textularia sp. 3																			
Textularia sp. 5					0.5														
Textularia spp.			0.3	0.7			0.1	3.9					0.9	0.5					
Textularia stricta					0.2	0.3	0.2								0.2				
Thurammina papillata											0.7								
Tritaxilina atlantica			0.3																
Tritaxis challengeri			0.3		0.3	1.7	0.1					0.2		1.1					
Tritaxis fusca					0.2														
Tritaxis primitiva							0.2	0.5	2.2	0.4									
Trochammina inflata	0.7	0.3																	
Trochammina nana		0.3																	
Trochammina spp.	0.2			0.2							1.3		0.7				0.4		0.4
Trochammina subglobigeriniformis	1.1																		0.4
Trochammina tasmanica	0.2																		
Trochamminopsis quadriloba	0.2	0.5																	
Usbekistania charoides	2.2	3.3																	0.4
Vanhoeffenella (?) sp.												5.8	3.7						
Veleroninoides jeffreysii	0.4			0.1			0.4										0.7		
Veleroninoides kosterensis	0.2								1.2										
Veleroninoides wiesneri		0.3						0.5			1.3								
Verneuilinulla propinqua																			
Verneuilinulla sp. 1																			
Verneuilinulla superba																			
∑ of species present in single station	4.5	0.3	0.3													0.5			1.7
unidentified agglutinated specimens	3.4	1.3	3.4	0.7	2.2	3.3		1.0	3.5	2.1	5.2	2.5	0.5	1.1	2.5	1.4	7.6		2.6
Adelosina laevigata																			
Adelosina litoralis																			
Agglutinella agglutinans																			
Agglutinella arenata																			
Ammomassilina alveoliniformis					0.7		0.8		0.6			0.2		0.5	1.0		3.3		1.3
Ammonia beccarii			0.5	0.7			0.8		1.2	3.3		0.2	0.5		0.5	1.0			1.7
Ammonia pauciloculata					0.3										0.5		2.9		
Amphicoryna hirsuta			0.8	1.0	0.7	0.7	0.4	0.5			0.7	3.3	2.3	5.3	2.3	0.5	0.4	1.2	0.4
Amphicoryna papillosa			0.3	1.2								0.2	0.9		0.3				
Amphicoryna scalaris					0.3		0.1	0.5			2.6		0.5		0.7				
Amphicoryna separans			0.8	0.2															
Amphicoryna spp.					0.3														0.4
Amphicoryna sublineata			0.3			0.3	0.1										1.8		0.4
Amphistegina papillosa				0.2						0.4									
Anomalinoides colligerus							2.7								0.2			0.6	
Anomalinoides globulosus															1.0				0.4
Anomalinoides welleri cf.												0.2	1.2				0.4		
Asterorotalia ? sp.																			
Asterorotalia compressiuscula													3.3	1.6					
Asterorotalia concinna																			
Asterorotalia gaimardii			4.9	2.2	2.0	2.6	0.6	5.9	5.3	0.8	1.3	3.1	0.2	2.7	1.7	1.4	0.7		
Asterorotalia milletti																			
Asterorotalia pulchella																0.5		1.2	
Astrononion novozealandicum	1.1	2.0			0.3														
Astrononion spp.																			
Astrononion stelligerum		0.3					0.4												
Baggina indica									1.2										
Biloculinella inflata																			
Biloculinella labiata			0.3	0.2	0.7		0.8				2.6			1.1	0.5				
Bolivina earlandi							0.4												
Bolivina glutinata				0.2				3.9				1.2	0.5		0.5	1.0			
Bolivina macella																			
Bolivina robusta																	0.7		
Bolivina spathulata				0.5	0.3		1.1								0.5				0.9
Bolivina spp.																			0.4
Bolivina subreticulata			0.5	0.7	0.7		0.4			3.3		1.2		2.1					
Bombulina echinata			0.8	0.7	0.5	1.7		2.9	0.6	1.7		0.2							
Bulimina aculeata		0.3																	
Bulimina affinis																			
Bulimina marginata			1.6	2.0	1.0							1.2						0.6	3.0
Bulimina mexicana		0.3																	
Bulimina striata	0.2																		
Cancris auriculus			0.8	0.2	0.8	1.7	1.3			3.7					0.3				0.4
Cancris carinatus																			
Cancris oblongus													0.2				0.7		
Caribeanella philippinensis							0.1												
Cassidelina subcapitata				0.7	1.7		0.8							1.1	0.5	1.9			
Cassidulina carinata	0.2	0.3																	0.4
Ceratobulimina jonesiana	0.7	1.0																	

(*) species / station no. 18-	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304
Textularia lancea														1.3					
Textularia lateralis				0.2											0.3	3.5	0.4		
Textularia lythostrota cf.														2.6					0.6
Textularia milletti cf.			0.4	0.5		0.8													
Textularia parvula		0.5					0.3												
Textularia porrecta		1.2	1.1	1.2			1.0	1.9	0.6										
Textularia pseudogramen										0.2			0.7		0.3		1.0		
Textularia sp. 3																	1.1		
Textularia sp. 5															0.3	2.4	0.4		0.3
Textularia spp.					0.3					0.4					0.7				1.2
Textularia stricta											0.3					0.4	0.4		
Thurammina papillata					0.5		0.3												
Tritaxilina atlantica																			0.3
Tritaxis challengeri											0.3		0.7						
Tritaxis fusca														0.7					
Tritaxis primitiva										0.4	0.7					0.4			
Trochammina inflata				0.5	1.3														
Trochammina nana							0.7	0.5											
Trochammina spp.	0.3															0.4	0.4		
Trochammina subglobigeriniformis	1.5	1.0				0.8	1.4												
Trochammina tasmanica																	0.2		1.2
Trochamminopsis quadriloba							0.7												
Usbekistania charoides			0.4	0.5	0.8		0.3	1.0	3.0										
Vanhoeffenella (?) sp.											8.3								
Veleroninoides jeffreysii		0.2		0.2															
Veleroninoides kosterensis			0.4		0.3		0.3		0.4										
Veleroninoides wiesneri																		3.8	
Verneuilinulla propinqua		0.2	0.4	0.5	0.5	0.8	0.3												
Verneuilinulla sp. 1	0.6		0.4				0.7												
Verneuilinulla superba		0.2							0.4										
∑ of species present in single station	0.6	0.5	0.4	2.3		0.4		0.5	1.8	0.6							0.4		0.1
unidentified agglutinated specimens	3.2	3.9		0.7	0.8	0.4	0.3	1.5	0.9	5.6	7.3	0.8	1.4	0.7	2.0	3.1	1.9		0.6
Adelosina laevigata					0.3														
Adelosina litoralis											0.7				0.3				
Agglutinella agglutinans														1.3	0.3		0.2		
Agglutinella arenata																			
Ammomassilina alveoliniformis										0.6	0.7		0.7		1.3		2.3		1.2
Ammonia beccarii	2.9	0.5	0.7							1.1		4.9	0.7		0.7	0.4	1.7		
Ammonia pauciloculata																	0.4		
Amphicoryna hirsuta													0.7		0.3				0.6
Amphicoryna papillosa										0.2									
Amphicoryna scalaris	3.5	0.2								0.4									
Amphicoryna separans																			
Amphicoryna spp.		0.2															0.4		
Amphicoryna sublineata										0.4		0.4				0.2			
Amphistegina papillosa															0.3		0.2		
Anomalinoides colligerus																			
Anomalinoides globulosus								0.5							0.3	0.4			
Anomalinoides welleri cf.																			
Asterorotalia ? sp.																0.4	0.4		
Asterorotalia compressiuscula																0.2	0.8		
Asterorotalia concinna																			
Asterorotalia gaimardii										3.7	1.4	4.1	3.5	5.2	1.7	1.3	1.1	1.9	1.5
Asterorotalia milletti																			
Asterorotalia pulchella															0.3				
Astrononion novozealandicum								0.5											
Astrononion spp.	0.6																		
Astrononion stelligerum					0.3														
Baggina indica													0.7	1.3					
Biloculinella inflata										0.2					0.7				
Biloculinella labiata										0.2					0.3	0.4	0.8		0.3
Bolivina earlandi										0.2									
Bolivina glutinata										0.2									
Bolivina macella																			
Bolivina robusta		0.2	2.9	2.1	1.1				0.8										
Bolivina spathulata		0.2										0.8							
Bolivina spp.																			
Bolivina subreticulata										0.4									
Bombulina echinata										1.1	1.0		0.7		0.7		0.8	1.9	0.6
Bulimina aculeata				0.2	0.5	0.8	0.7												
Bulimina affinis	1.7						0.7												
Bulimina marginata	1.2									1.1	1.4	2.5	2.1		2.0	4.9	3.0		0.6
Bulimina mexicana		0.5	0.4	0.2		0.8	0.7												
Bulimina striata	1.7		0.4	0.2															
Cancris auriculus														2.0	0.3	1.1	0.4	1.9	3.8
Cancris carinatus																	0.2		
Cancris oblongus	0.6																		
Caribeanella philippinensis																	0.6		
Cassidelina subcapitata										0.4									
Cassidulina carinata					0.5		1.4	1.0											
Ceratobulimina jonesiana			5.4	2.6	0.8	0.4	0.7	1.5	2.6										

(*) species / station no. 18-	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323
Textularia lancea				0.3					1.2	1.0		0.9				1.8			
Textularia lateralis	0.3																		
Textularia lythostrota cf.								1.3	2.4			3.0	0.6			0.3	1.6		
Textularia milletti cf.																			
Textularia parvula																			
Textularia porrecta																			
Textularia pseudogramen				0.7			0.3					0.7	0.3		0.3		0.3	0.3	0.1
Textularia sp. 3						1.2				1.0				1.1					
Textularia sp. 5		2.3	2.0	1.7	1.3		4.3	0.2	0.6		1.9	1.5	0.9		0.9	1.0	1.1	1.1	0.4
Textularia spp.	0.3		1.3				0.7	1.1	0.6	1.0	0.6		1.2		1.7	0.5	0.1	1.7	
Textularia stricta	0.5		0.4				0.7	0.2						0.4	0.6	0.3		0.3	0.1
Thurammina papillata																			
Tritaxilina atlantica																			
Tritaxis challengeri			0.2	2.4										0.7					
Tritaxis fusca																			
Tritaxis primitiva											0.3								
Trochammina inflata																			
Trochammina nana																			
Trochammina spp.																			
Trochammina subglobigeriniformis																			
Trochammina tasmanica																			
Trochamminopsis quadriloba																			
Usbekistania charoides																			
Vanhoeffenella (?) sp.																			
Veleroninoides jeffreysii	0.5															0.5	0.1		
Veleroninoides kosterensis				0.3		1.2					0.6								
Veleroninoides wiesneri																			
Verneuilinulla propinqua																			
Verneuilinulla sp. 1																			
Verneuilinulla superba																			
∑ of species present in single station	0.5						0.8				0.6	0.2		0.7	0.6				
unidentified agglutinated specimens	1.8	1.4	1.3	2.4	1.5	1.2	2.9	0.9	0.9		1.3	0.4	1.2	0.4	3.4	1.3	0.5	0.4	0.6
Adelosina laevigata																		0.2	
Adelosina litoralis																			
Agglutinella agglutinans			0.4					1.7	0.6				0.9			0.3		0.5	0.1
Agglutinella arenata			0.4				0.3				0.3				0.6				0.6
Ammomassilina alveoliniformis	1.3	1.4	3.7	0.3	0.7	1.2	0.3	0.9	0.9	1.0	0.6		1.7	1.5		0.5		0.2	0.6
Ammonia beccarii	0.5	1.9	1.3	0.3	0.7	1.2		1.3	0.9		1.0	1.1	2.1	2.9	3.4	1.0	2.3	0.6	2.3
Ammonia pauciloculata		0.5										0.4							
Amphicoryna hirsuta	0.3				0.7														
Amphicoryna papillosa													0.5						
Amphicoryna scalaris																			
Amphicoryna separans																			
Amphicoryna spp.			0.4																0.6
Amphicoryna sublineata				0.3			0.3		0.6	1.0			0.2		0.6				
Amphistegina papillosa				0.7								0.4							
Anomalinoides colligerus																			
Anomalinoides globulosus									0.9				0.3				1.1		1.1
Anomalinoides welleri cf.																			
Asterorotalia ? sp.												0.2		0.7			1.1	0.2	
Asterorotalia compressiuscula							2.3					1.1	2.3			1.0		0.6	
Asterorotalia concinna													1.7	0.7	2.0			0.3	
Asterorotalia gaimardii	1.0	1.9	0.9	2.8	6.9		1.3	3.7	7.2	5.0	4.2	1.3	1.7	4.7	4.9	4.3	2.9	4.9	5.9
Asterorotalia milletti				0.3			2.0				0.6								
Asterorotalia pulchella		0.5		0.3		1.2			1.5		0.6	0.2					0.5		0.4
Astrononion novozealandicum													0.3						
Astrononion spp.								0.4											
Astrononion stelligerum																	0.5		
Baggina indica								0.2	1.2										
Biloculinella inflata	0.3																		
Biloculinella labiata			0.2								0.3		0.6					0.2	
Bolivina earlandi																			
Bolivina glutinata					1.5							0.4					0.5		
Bolivina macella		0.5	0.4	1.0	1.3		0.2					0.4							
Bolivina robusta																			
Bolivina spathulata	0.3		1.7			1.2		1.7											
Bolivina spp.						1.2													
Bolivina subreticulata																			
Bombulina echinata	0.8	1.2		0.3		1.5		0.2	0.6	1.0	1.9	0.2	0.5			1.3	1.6	0.9	
Bulimina aculeata																			
Bulimina affinis																			
Bulimina marginata	0.3	1.9	1.3	1.0	2.2			0.4		2.0	0.3	0.7	1.8	0.7	4.0	1.0	1.2	0.2	3.4
Bulimina mexicana																			
Bulimina striata																			
Cancris auriculus	0.5	3.5	1.3	3.5	3.1	5.8	2.3			1.0	1.9	0.2	1.2	0.4		3.8	0.5	1.6	0.6
Cancris carinatus		0.2	0.2	0.7	0.5	1.2	0.5				2.9		0.6			1.0	0.8	1.4	0.1
Cancris oblongus																			
Caribeanella philippinensis								0.4											
Cassidelina subcapitata															0.6		1.1	0.2	
Cassidulina carinata					0.7														
Ceratobulimina jonesiana																			

Appendix B.4b. Counting data of stained (*) benthic foraminifera in surface samples on the Sunda Shelf. Numbers are given in percentages of indiv./100 cc.

(*) species / station no. 18-	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323
Chilostomella cushmani																					0.5		0.2	0.3																																			
Chilostomella oolina																				0.6	0.5																																					
Chilostomella ovoidea		0.3										0.5			1.0	0.7																																								
Cibicides deprimus			3.9	1.0			0.3		1.5	3.3			0.2							0.6														0.7					0.5														0.7				1.1	
Cibicides kullenbergi														1.1							0.5	2.9	0.2	0.8		0.3		2.5															0.3							0.3							0.2	
Cibicides lobatulus			0.5	0.2			0.1		2.9		2.6	1.2	1.6	1.6															0.6		0.7		2.8	1.3	0.3		0.4		4.1	3.7	0.2	0.4			0.6		1.3					0.2					0.2	
Cibicides sp. 1				1.2	1.8	0.7																							2.2	3.5	1.6	2.1	3.3	1.0	1.3	1.7		3.5	3.7		0.7			2.4		2.6	1.8		0.3		0.6		0.6				0.1
Cibicidoides cicatricosus		0.5													0.3						0.4	0.5					0.4																													
Cibicidoides pachyderma ex gr.	0.7		0.5	1.7				3.9	1.2	0.8					0.3						0.7		1.6	1.3	3.9	0.3	1.0			0.3					0.9								1.7	0.5			0.9		1.0	1.0	0.7	3.9	0.7	1.1	3.6			
Cibicidoides robertsonianus	0.4	0.5																	1.8	7.8	2.9	0.5	0.7						1.7																												
Cibicidoides sp. 1																																								0.2	0.3																
Cibicidoides spp.							0.8				1.3										0.4		0.3																1.0			1.7			0.7						0.2		0.6	1.0		0.4	0.6
Cornuspira foliacea			0.3						0.6					0.1															0.3																										
Cornuspira involvens												24.4											0.3																																
Cornuspira planorbis			0.5																	0.4										0.2						0.4			0.6												0.3							
Coronatoplanulina okinawaensis	0.2	0.5																																																						
Dentalina albatrossi				0.2																										0.4	0.7							0.5			0.3														
Dentalina mutsui							0.1		0.7				0.5																																										
Dentalina ruidarostrata																															0.4							0.3	0.3																	
Discorbia candeiana																																1.4			2.0				0.5						0.3		0.9		1.0			0.7			0.5		
Discorbinella araucana																				1.7										0.4																												
Discorbinella bertheloti				0.7	1.3	0.3	0.4								1.1	0.5	0.5								0.3					0.2		0.4	0.7	5.2	0.3	0.9	2.5			0.3	0.2	1.7	0.3	1.1	0.3		1.7	0.6	2.0		0.2			0.6	0.5			0.9
Discorbinella bodjongensis																																				0.9	0.4							0.3			0.5	0.4										
Discorbinella montereyensis				0.1																																																			0.2	
Discorbinella spp.														1.4		0.2															0.3																											
Discorbinella sp. 1																																		0.7		0.4	3.8			0.5		0.3			1.3	0.4		1.0			0.2						
Edentostomina cultrata							0.1		0.6									0.4																	0.7			0.2					0.5					0.2				1.0	0.6	0.2	0.7	0.3	0.8	0.3	1.1	
Ehrenbergina undulata																					2.0	0.4																																				
Elphidium advenum			0.5	0.2								0.5			0.5															0.6						0.4	1.1						0.7	2.2		0.2				3.8	0.4	1.8	2.2	1.7	1.5	0.5	1.0	
Elphidium jenseni																																					0.8									0.3												
Eponides repandus									0.6																				0.2							0.6							0.5						0.6	1.1	0.9					0.2	
Eusphaeroidina inflata																						0.4						1.1																														
Facetocochlea pulchra			3.1	1.7	3.5	3.3	5.7	3.9	1.2	6.6		7.0		4.3	5.0	2.9	1.5													1.9	1.4	6.6	2.8		1.7	0.9	1.9	3.8	2.9	0.5	1.9	5.7	2.8	2.0	7.3		3.5	1.8		3.5	1.5	3.0	0.7	1.7	5.1	2.2	1.3	2.3
Fijinonion fijiense														1.1						0.6														0.7	0.4	0.4			0.5		1.3	2.1				0.4					0.3	0.7	0.6				1.1
Fissurina bradyiformata	0.4																																																	0.3						
Fissurina formosa																									0.3			0.5																														
Fissurina spp.																					0.5			0.3	0.4		1.5																														
Fontbotia wuellerstorfi	0.2	0.3																			0.2	0.4	1.2	0.3	0.8	0.7	0.5																													
Gavelinopsis lobatulus	0.2																			0.9			0.4		0.5				1.1																												
Gavelinopsis translucens																					0.2	0.7	0.5	1.6	2.7		0.5																													
Glandulina laevigata				0.7	0.2		0.1		0.6				0.5			1.9																		0.3	0.4					0.5	0.2		1.6		1.3										0.3			
Glandulina torrida				0.5						3.3					0.3																			0.3				0.6										1.0			0.3	0.4	0.3				
Globobulimina pacifica											1.3														0.8																0.2																	
Globocassidulina gemma																					0.5	0.4			0.4																															
Globocassidulina subglobosa	0.9																		0.4	2.3	1.7	0.7	0.2	0.3	0.8	0.3		1.1																							0.4								
Gordiospira elongata																								0.3																										0.4							
Gyroidina altiformis		0.3			0.3														0.6					0.8		1.0																													
Gyroidina broeckhiana	0.9																		0.6	0.7	0.4	0.5	0.3	2.0	0.3		1.0																												
Gyroidina lamarckiana		2.0										0.5		1.0		0.7											1.0	0.3																												
Gyroidina orbicularis	0.7	0.3					0.4														0.5		0.2																																		
Gyroidinoides nipponicus	0.4																					0.2																																		
Hanzawaia boueana																																								0.5		0.3				0.2										
Hanzawaia concentrica																	0.6	2.2															1.0	0.4																					
Hanzawaia grossepunctata				0.7	0.7						2.3	1.9	0.5	0.5	1.0	1.5		0.4										0.4		1.2			2.0	1.8	0.8		0.6	1.3	0.7	1.3	1.7	2.2	0.3	2.3				1.6	3.5	4.8	2.9	2.3	1.8	1.1	1.6	3.7
Hanzawaia nipponica																																														0.9		0.3					1.1		4.4		
Helenina anderseni			0.5	0.2	0.2		0.8									0.7	2.4													0.4		0.8				0.2	1.1		0.6		0.5	0.2		1.5	1.2	0.5		0.6		5.4	0.9	0.3	1.5	1.1		1.1	0.2	1.1
Heterolepa dutemplei aff.			3.4	2.0	2.7	2.6	2.5		4.7			0.2			0.2															2.6	2.8	2.1	2.1	8.5	3.3	3.5	2.7		6.2	2.1	1.6	3.9	5.6	2.4	3.1	2.0	4.6	2.8	4.0	6.1	4.5	7.1	6.9	7.7	6.1	10.2	8.6	8.7
Heterolepa margaritifera				2.0	0.8		0.5	2.5	4.8	1.7	1.3		0.1	0.5	1.2	1.4															1.1			2.4	0.7	1.7	1.3		1.9	0.6	1.0	0.2						0.8	0.6										
Heterolepa margaritifera type 1													0.9	0.5	0.5																		2.9																									
Heterolepa margaritifera type 2			0.8	1.0	1.3		0.4	1.5				1.3	6.9	7.0		0.2																		1.6																									
Heterolepa praecincta											1.3	0.8	0.9	0.5	0.5	0.5															0.4			1.4	0.7	1.0	1.5	0.1						0.3				0.7			0.3		0.5	1.9	0.3		0.3		0.1
Heterolepa sp. 1			1.6			1.3	1.5				2.6		1.4	2.1	0.5																			0.7		2.0													0.9	1.0	0.3							0.5	0.2	0.6
Heterolepa sp. 4																			0.4																																0.4				
Heterolepa subhaidingerii				0.2	0.3		0.8	0.5	1.2	0.8	2.0	0.2				0.5															0.4		0.7		0.4			0.3	1.6						0.2			1.0	0.3								
Heterostegina depressa																																						0.1																0.4						0.3	
Hoeglundina elegans	0.2		13.2	16.7	9.1	9.3	2.0	14.7	15.9	6.6	3.3	0.8	1.9	3.2	4.3	4.8	4.7	0.6	9.5	1.7	0.7	1.4	2.8	3.2	0.8	1.0	1.5	5.2	3.0	3.1	5.3	4.1	7.2	1.0	2.2		17.1	2.7	2.3		0.2			0.9		2.0	14.1	10.0									
Hoeglundina elegans type 3			0.5												0.5			6.0								0.5		0.6	1.4																										
Hyalinea balthica							0.4													1.7																0.4													0.9										
Hyalinonetrion sahulense				0.2			0.4										0.5																																								
Islandiella japonica																			0.4																4.0	2.6	1.9				0.5	0.4	0.7					0.9			0.4	2.7	5.1	2.9	0.5	1.6		1.7
Lachlanella compressiostoma			0.5	0.5								0.2		0.7																	0.4	0.7			0.4						0.7				0.2			1.0							0.1		
Laevidentalina bradyensis												0.2					0.7		0.4					0.3	0.4				0.4																												
Laevidentalina filiformis					0.3												1.0																																									
Laevidentalina inflexa															0.5				0.4		0.5																																			
Laevidentalina sidebottomi							0.4					0.2			1.0				0.4																																						
Laevidentalina spp.			0.5				0.5																																																		
Laevidentalina subemaciata															0.5	0.5				0.6									0.2																								0.5			
Laevidentalina subsoluta		0.3	0.3		0.2	0.3				0.4										0.6							0.5			0.3															0.3		0.4	0.6									0.5	0.2	
Lagena annellatrachia																																									0.4			1.2																
Lagena gibbera																										0.3		0.3																														

Appendix B.4b. Counting data of stained (*) benthic foraminifera in surface samples on the Sunda Shelf. Numbers are given in percentages of indiv./100 cc.

(*) species / station no. 18-	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285
Lagena hispidula	0.7																		
Lagena spp.																			
Lagena striata						1.3													
Lagena substriata																			
Lamarckina scabra						0.7													
Lamarckina ventricosa						0.3									0.3				
Laticarinina pauperata		0.3																	
Lenticulina anaglypta			0.5	0.4	0.3	1.3	0.4			0.8		0.1							
Lenticulina atlantica			0.5	1.5	0.8	0.3	0.8	0.5	1.2	5.4	0.7	0.2	0.5		0.3			0.6	0.4
Lenticulina calcar			1.0	1.7	0.7	2.6	0.4	1.0	0.6	0.4	2.6	0.2	0.9	1.1	0.7	1.4	2.5	0.6	0.4
Lenticulina echinata			0.8	1.0	0.7	1.3	0.4	3.9	1.5	1.4	0.7	1.2	0.5	0.5	0.7				
Lenticulina gibba	0.2																		
Lenticulina iota			0.5		0.2	0.3													
Lenticulina sp. 1			0.5			0.3							0.5						
Lenticulina spp.			0.5	0.4		0.3		0.5	0.1	0.4									0.4
Lenticulina submamilligera				0.7	0.3	0.7	0.3	0.5		1.2	0.7		0.2	0.5	1.7				
Lenticulina suborbicularis			0.5		0.2											0.5			
Lenticulina thalmanni					0.3				1.2		0.7			0.5					0.9
Lenticulina vortex				0.2							0.7	0.2							
Lernella inflata																			
Marginulina obesa						0.3													
Marginulina spp.						0.3													
Marginulina striata																			
Marginulinopsis philippinensis cf.										0.4		0.2							
Melonis affinis		1.3																	0.9
Miliolinella spp.																			0.4
Millettiana millettii																			
Mississippina chathamensis			0.5	0.5	0.3											1.0			
Neocassidulina abbreviata	0.2																		
Neoeponides auberii			0.5																
Neoeponides bradyi				0.2			0.1	0.5						0.5	0.3	1.0			
Neolenticulina peregrina					0.3						2.6	1.2		0.5					
Neouvigerina ampullacea	0.2																		
Neouvigerina interrupta							0.4											0.6	
Neouvigerina proboscidea				1.7	1.7		2.3												
Nodophthalmidium simplex			1.0	3.2	0.7		1.1												
Nonion japonicum																			
Nonion subturgidum																			
Nonionoides grateloupi																			
Nubeculina divaricata									0.6	0.4									
Nummulopyrgo anomala																	0.7		
Nummulopyrgo globulus						0.7	0.4									1.0			
Nuttallides rugosus																			
Operculina ammonoides ex gr.			0.8		0.2			1.0	3.8	0.6							0.7		
Operculina bartschi				0.2	0.3														
Operculina sp. 2				0.2						0.2									
Operculina sp. 3																			
Operculina spp.																			
Oridolsalis umbonatus	1.6	1.3			0.3														0.9
Oridorsalis sp. 1																			
Osangularia culter	0.4	2.0																	0.4
Paracassidulina minuta																			
Paracibicides endomica							0.4												
Parafissurina subventricosa	0.2	0.3																	
Pararotalia sp. 1																	1.5		1.3
Parrelloides bradyi	2.0	6.6																	
Planularia californica													0.2						0.9
Planularia gemmata			0.3		0.2	0.3	0.8	1.5	0.6	1.2							0.7		
Planulina floridana			0.3																
Planulina retia															0.2				
Poroepistominella decoratiformis			3.1	2.7	2.3	1.7	4.6	4.4	0.6		6.5	2.3	3.3	0.5	3.5	1.4			
Praeglobobulimina ovata					0.2	0.7	0.1	0.5							0.7				
Praeglobobulimina spinescens																			0.4
Pseudoflintina laculata									0.1				0.1						
Pseudohelenina collinsi cf.											2.6						0.7		
Pseudolachlanella artusoris																			
Pseudolachlanella slitella							1.7												
Pseudonodosaria glanduliniformis			0.3	0.7										0.5					
Pseudoparrella exigua	0.2	0.3																	
Pseudorotalia indopacifica			2.1	0.5	2.7	1.3	0.6	5.7	4.4	2.9		1.1		0.5	0.2				
Pseudorotalia indopacifica (juv.)					1.0	1.3	0.3			1.2	0.7				0.2	0.5			
Pseudorotalia schroeteriana					0.2				0.1										
Pullenia bulloides		0.5																1.2	3.0
Pullenia quinqueloba		0.3			0.3		0.8				0.7								0.4
Pullenia salisburyi																			
Pygmaeoseistron nebulosa	0.2																		
Pyramidulina catesbyi																			
Pyramidulina luzonensis			0.3	0.2	0.7		0.2		0.6	0.4			0.5	2.1				0.6	
Pyrgo depressa					0.2					0.4		0.2	0.2		0.2				
Pyrgo murrhina	0.2																		

(*) species / station no. 18-	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304
Lagena hispidula																			
Lagena spp.		0.5							0.3		0.7		0.7						
Lagena striata																			
Lagena substriata															0.3	0.4			
Lamarckina scabra																			
Lamarckina ventricosa																			
Laticarinina pauperata			0.7	0.7				0.5											
Lenticulina anaglypta													0.7		0.3	0.3			
Lenticulina atlantica									0.4	0.4		1.6					0.8		
Lenticulina calcar	1.7											0.4	0.7	1.3					
Lenticulina echinata												1.2						1.9	0.1
Lenticulina gibba	0.6	0.5					1.0		0.6										
Lenticulina iota																			
Lenticulina sp. 1	0.6																		
Lenticulina spp.	0.6	0.2							0.4	0.9					0.3				
Lenticulina submamilligera												0.4							0.6
Lenticulina suborbicularis																			
Lenticulina thalmanni	0.6	0.2		0.2		0.4	0.3		0.4							0.2		1.9	
Lenticulina vortex													2.1						0.3
Lernella inflata	0.6			0.2			0.3												
Marginulina obesa					0.3		0.3												
Marginulina spp.	0.6									0.2						0.4			
Marginulina striata		0.2											0.7						
Marginulinopsis philippinensis cf.										0.4									
Melonis affinis	1.2	2.2	0.7	0.2	0.5	0.4	0.3	1.0											
Miliolinella spp.			0.4		0.5	0.4	0.7												
Millettiana millettii																			
Mississippina chathamensis																	0.4		
Neocassidulina abbreviata											0.7								
Neoeponides auberii											1.4								
Neoeponides bradyi											0.3		0.7		0.3	0.2	0.2		
Neolenticulina peregrina		0.2							0.4							0.2			1.2
Neouvigerina ampullacea		0.5		1.2	1.6	0.4	1.0		4.4										
Neouvigerina interrupta																			0.6
Neouvigerina proboscidea										0.4	2.1	0.8			1.0				1.8
Nodophthalmidium simplex													4.1		0.7	0.7			1.8
Nonion japonicum										0.2									
Nonion subturgidum												1.6							
Nonionoides grateloupi					0.3														
Nubeculina divaricata										0.9	1.0								
Nummulopyrgo anomala																			
Nummulopyrgo globulus		0.7		0.7	0.3		0.7								0.3		0.4		
Nuttallides rugosus				0.9	0.3				3.0										
Operculina ammonoides ex gr.													0.2			1.2	15.3		
Operculina bartschi																			
Operculina sp. 2																			
Operculina sp. 3																			
Operculina spp.															0.3	0.1	1.1		
Oridolsalis umbonatus		0.2	1.1	0.7	1.1	0.4	2.1	1.9		0.2	0.7								
Oridorsalis sp. 1						0.8			0.4										
Osangularia culter			1.8	1.9	2.1	1.2	0.7	0.5	0.6										
Paracassidulina minuta	0.6								0.3										
Paracibicides endomica														2.6					0.6
Parafissurina subventricosa		0.2					0.3												
Pararotalia sp. 1																			
Parrelloides bradyi	0.6	3.2	2.5	2.1	1.3	2.3	4.2	4.4	1.4										
Planularia californica																			
Planularia gemmata										0.4	0.3	0.4							
Planulina floridana				0.5															
Planulina retia				0.2															
Poroepistominella decoratiformis										4.8	1.4	1.6	2.8	2.6	0.3	0.9	1.1	3.8	2.1
Praeglobobulimina ovata																			
Praeglobobulimina spinescens		0.2																	
Pseudoflintina laculata																			
Pseudohelenina collinsi cf.																			
Pseudolachlanella artusoris																			0.3
Pseudolachlanella slitella													0.7						0.3
Pseudonodosaria glanduliniformis					0.3														
Pseudoparrella exigua																			
Pseudorotalia indopacifica											0.2	1.4	1.7	0.7	0.8	1.0	1.3	3.3	0.9
Pseudorotalia indopacifica (juv.)											0.7	0.8	0.7		0.7	1.3			0.3
Pseudorotalia schroeteriana													2.2	0.7		0.4	0.5		
Pullenia bulloides	0.6	0.7	2.2	0.5	0.3	1.2	2.1	0.5	2.4										
Pullenia quinqueloba	0.6														0.3				
Pullenia salisburyi	0.6											0.8							
Pygmaeoseistron nebulosa							0.3												
Pyramidulina catesbyi																			
Pyramidulina luzonensis										1.3	0.7				0.3	0.7			
Pyrgo depressa				0.2	0.3	0.4				0.4					0.7	0.4			
Pyrgo murrhina				0.2															

(*) species / station no. 18-	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323
Lagena hispidula										1.0									
Lagena spp.																			
Lagena striata		0.5																	
Lagena substriata									0.9										
Lamarckina scabra										1.0									
Lamarckina ventricosa																			
Laticarinina pauperata																			
Lenticulina anaglypta								0.1	0.2	0.3									
Lenticulina atlantica	0.3		0.4		0.5							0.4	0.3	0.7	0.6	0.5	0.1		
Lenticulina calcar	0.3									1.0								0.2	0.6
Lenticulina echinata	1.4									1.0									
Lenticulina gibba																			
Lenticulina iota																			
Lenticulina sp. 1																			
Lenticulina spp.										1.0									
Lenticulina submamilligera	0.5																		
Lenticulina suborbicularis																			
Lenticulina thalmanni					0.5			0.2											
Lenticulina vortex																			
Lernella inflata																			
Marginulina obesa																			
Marginulina spp.												0.4			0.6				
Marginulina striata																			
Marginulinopsis philippinensis cf.																			
Melonis affinis													0.3						
Miliolinella spp.																			
Millettiana millettii		1.4	0.9					0.2											0.6
Mississippina chathamensis		0.5						0.4	0.9	1.0									
Neocassidulina abbreviata															0.6				
Neoeponides auberii	0.3				0.7												0.5	0.2	
Neoeponides bradyi		0.2		0.3			0.8			1.0			0.1						
Neolenticulina peregrina	0.8							0.4											
Neouvigerina ampullacea																			
Neouvigerina interrupta						1.2													
Neouvigerina proboscidea	0.3	1.9	10.5			2.4		5.2		3.0			0.3		0.6		2.7	0.2	1.7
Nodophthalmidium simplex						1.2		0.9	0.6	1.0									
Nonion japonicum																	0.5		
Nonion subturgidum	0.3	0.5	1.7			6.1	0.8				0.3	0.4		1.5					
Nonionoides grateloupi												0.4							
Nubeculina divaricata							1.0			1.0			0.2						
Nummulopyrgo anomala											1.0								
Nummulopyrgo globulus	0.3						0.3				0.3	0.9				0.5	0.5	0.7	
Nuttallides rugosus																			
Operculina ammonoides ex gr.		0.5		0.7	9.9		7.8			0.5	2.2	3.7			0.4			4.2	
Operculina bartschi																			
Operculina sp. 2												0.4							
Operculina sp. 3							9.6				0.3								
Operculina spp.				0.3															
Oridolsalis umbonatus																			
Oridorsalis sp. 1																			
Osangularia culter																			
Paracassidulina minuta																			
Paracibicides endomica				0.3			0.7						0.9						0.1
Parafissurina subventricosa																			
Pararotalia sp. 1																			
Parrelloides bradyi																			
Planularia californica																			
Planularia gemmata																			
Planulina floridana																			
Planulina retia																			
Poroepistominella decoratiformis	1.3	0.7	0.2	2.1	3.3	1.2		1.1	0.6	1.0		3.0	2.7	1.1	1.1	2.3	0.7	1.6	1.7
Praeglobobulimina ovata																			
Praeglobobulimina spinescens																			
Pseudoflintina laculata																			
Pseudohelenina collinsi cf.																	0.5		
Pseudolachlanella artusoris			0.2																0.1
Pseudolachlanella slitella								0.2											
Pseudonodosaria glanduliniformis																			
Pseudoparrella exigua																			
Pseudorotalia indopacifica	2.1	0.2	0.2	7.5	1.9	0.9		0.5	1.7	9.8	3.2	1.3	1.5	3.3	3.9	1.3	0.3	1.6	4.7
Pseudorotalia indopacifica (juv.)	1.0		0.2	1.0		0.9		2.6	0.6			1.3	0.8	2.2	0.3	0.8	0.4	1.3	0.9
Pseudorotalia schroeteriana		0.7	0.4	5.6	2.3	0.3	0.5	1.2	1.4	1.5	2.7	1.7	1.7	3.8	1.3	2.9	0.1	4.0	2.5
Pullenia bulloides																			
Pullenia quinqueloba									0.9										
Pullenia salisburyi																			
Pygmaeoseistron nebulosa																			
Pyramidulina catesbyi							0.3		0.9										
Pyramidulina luzonensis		0.5											0.3						1.1
Pyrgo depressa		0.2	0.4																
Pyrgo murrhina																			

Appendix B.4b. Counting data of stained (*) benthic foraminifera in surface samples on the Sunda Shelf. Numbers are given in percentages of indiv./100 cc.

(*) species / station no. 18-	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285
Pyrgo nasuta																1.0			
Pyrgo sarsi		0.5	0.5	0.2		0.7													
Pyrgo serrata	0.7								1.2										
Pyrgo sp. 1																			
Pyrgo spp.	0.2								0.6							1.0			
Pyrgoella tenuiaperta			0.5	0.2	0.3	0.7	0.6						0.2						
Pyrulina angusta	0.2																		
Q. philippinensis ex gr.																			
Quinqueloculina auberiana			1.0		0.2					0.4				1.1					
Quinqueloculina bicarinata								0.5											
Quinqueloculina collumnosa			0.5	0.5						0.4			0.5	0.5					
Quinqueloculina fichteliana																			
Quinqueloculina laevigata																			
Quinqueloculina lamarckiana			0.3		1.0												0.7	0.6	
Quinqueloculina pseudoreticulata																			
Quinqueloculina pygmaea		0.3												1.1					0.4
Quinqueloculina quinquecarinata																			
Quinqueloculina sagamiensis															0.1				
Quinqueloculina seminulum		0.3	0.3										0.5					1.2	
Quinqueloculina sp. 1																			
Quinqueloculina spp.				0.2			0.1			0.4		1.2			0.5				0.9
Quinqueloculina tropicalis																			
Reussella pulchra																			
Reussella spinulosa																	0.7		
Robertina subcylindrica																		0.6	
Robertinoides bradyi		0.3																	
Robertinoides wiesneri	0.2	0.3																	
Rosalina globularis						0.7									0.5	1.0	2.9		0.4
Rosalina spp.											1.3								
Rosalina vilardeboana					0.3														0.4
Saidovina amygdalaeformis				0.7	0.8	2.3	1.7	5.4	1.8	0.4			0.5	2.1	0.5				
Saracenaria altifrons																			
Saracenaria italica																			
Seabrookia pellucida					0.3														
Sigmoilopsis carinata															0.3				
Sigmoilopsis orientalis																			
Sigmoilopsis schlumbergeri	0.2	0.3																	
Siphogenerina raphana											1.3	0.4	2.8	1.6	1.2	3.4	2.2		
Siphonaperta crassatina																			
Siphonaperta spp.																			
Siphonina bradyana														0.5				1.8	1.7
Siphonina tubulosa				1.2	1.0		0.4					1.2	0.9	1.1			1.8	0.6	
Sphaeroidina bulloides	0.2		2.1	1.2	3.2		1.7		1.2	5.4	2.0		2.1	0.5		2.4	0.4	1.8	2.2
Spiroloculina communis			0.3	1.2	1.2	1.3	1.7	0.5	1.2	1.2	2.0		0.5	1.1	0.3	1.4	0.7		
Spiroloculina excisa			0.3		0.3		0.2			1.7									
Spiroloculina manifesta							0.2			0.4						0.5			
Spiroloculina scrobiculata					0.3		0.4												
Spirophthalmidium concava																			
Spirosigmoilina tenuis	0.7																		
Trifarina bradyi																			0.4
Triloculina elliptica																			
Triloculina tricarinata			2.1	1.0	0.3									1.1	0.7				
Triloculinella californica									1.2										
Triloculinella pilasensis																			
Triloculinella pseudooblonga cf.	0.7	0.3														1.4			
Triloculinella robusta			0.5				1.5				1.3								
Triloculinella sp. 1			0.5									1.2							
Triloculinella spp.																			
Uvigerina auberiana ex gr.	0.4	0.5																	
Uvigerina bassensis cf.																		6.6	9.1
Uvigerina canariensis cf.																			0.4
Uvigerina dirupta																			0.4
Uvigerina hispida	0.4	0.3																	
Uvigerina peregrina																			
Uvigerina schwageri type 1 & 2			8.3	8.5	11.4	16.9	4.4	6.4	8.2	14.1	9.2	6.6	13.3	11.7	8.8	2.9	4.7	0.6	1.7
Uvigerina sp. 1			3.1	1.5		3.3	3.1				2.6								
Vaginulina subelegans					0.3														
Vaginulinopsis sp. 1				0.5							1.3								
Vaginulinopsis sublegumen				0.2			0.1		0.6			0.2							
Valvulineria minuta	0.2																0.7		
∑ of species present in single station	0.4	1.3	1.0	0.2	0.2	0.7	0.2				2.6	0.2			1.2		1.8	1.8	1.3
unidentified agglutinated specimens		0.3					0.4			0.8	2.6	1.3	1.4		1.2				0.4
∑ - of tests in 100 cc	446.0	197.0	386.0	802.0	596.0	302.0	1048.0	407.0	681.0	483.0	306.0	689.6	854.0	376.0	801.0	414.0	550.0	235.6	325.8

(*) species / station no. 18-	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304
Pyrgo nasuta				0.2		0.4													
Pyrgo sarsi											0.7		0.7		0.3		0.8		0.3
Pyrgo serrata						0.4													
Pyrgo sp. 1															0.3	1.8			
Pyrgo spp.													0.7						
Pyrgoella tenuiaperta										0.4		1.6	0.7	0.7	0.7	0.4	1.7		2.4
Pyrulina angusta																			
Q. philippinensis ex gr.																0.2	0.2		
Quinqueloculina auberiana						0.4				0.2					0.7				0.3
Quinqueloculina bicarinata																			0.3
Quinqueloculina collumnosa											0.3								
Quinqueloculina fichteliana																			
Quinqueloculina laevigata	0.6																		
Quinqueloculina lamarckiana					0.5		0.3		0.4			0.4	0.7	2.6			0.4		
Quinqueloculina pseudoreticulata																			
Quinqueloculina pygmaea																			
Quinqueloculina quinquecarinata																			
Quinqueloculina sagamiensis																0.2			0.3
Quinqueloculina seminulum							0.7	0.5				0.8	2.1	0.7	3.3	4.6	2.9		
Quinqueloculina sp. 1										1.3			0.7						0.3
Quinqueloculina spp.								1.9			0.3				1.0	0.2		1.9	
Quinqueloculina tropicalis																			
Reussella pulchra															0.3				
Reussella spinulosa										0.2					0.3				0.6
Robertina subcylindrica															0.3				
Robertinoides bradyi							0.3												
Robertinoides wiesneri						0.8											0.4		
Rosalina globularis	0.6	0.5								0.4	2.1				0.3	0.2			
Rosalina spp.							0.3												
Rosalina vilardeboana																			
Saidovina amygdalaeformis										0.6	1.7	1.2	1.4	5.2	1.3	2.6	1.0	9.5	0.6
Saracenaria altifrons		0.2								0.2		0.4			0.3				
Saracenaria italica																		1.9	
Seabrookia pellucida										0.2				2.6					
Sigmoilopsis carinata	0.6																		
Sigmoilopsis orientalis																	0.2		
Sigmoilopsis schlumbergeri				0.2	0.3	0.8	0.3		0.3										
Siphogenerina raphana																			
Siphonaperta crassatina														0.7					
Siphonaperta spp.																	0.2		
Siphonina bradyana	1.2	0.5											0.7						
Siphonina tubulosa										1.1	1.4					0.9	1.1		1.2
Sphaeroidina bulloides	0.6	0.2	0.4				0.3	0.5	0.9	1.1	3.8		5.5	0.7	2.0	2.2			2.1
Spiroloculina communis										1.3		1.2							
Spiroloculina excisa											0.3	0.8	0.7	0.7	0.3	0.7			
Spiroloculina manifesta															0.7	1.8	1.9		2.1
Spiroloculina scrobiculata														0.7	0.7	0.7			
Spirophthalmidium concava															0.3	0.4			
Spirosigmoilina tenuis		0.2				0.4													
Trifarina bradyi																			
Triloculina elliptica				0.2	0.3														
Triloculina tricarinata		0.2		0.2	0.3	0.4				1.5		2.1	2.1			0.2	1.5		
Triloculinella californica																			
Triloculinella pilasensis															0.3				
Triloculinella pseudooblonga cf.		0.5	0.7	1.2		0.4	0.3		0.3				0.7		1.7		0.4		
Triloculinella robusta							0.3				0.7				0.3	0.4			0.6
Triloculinella sp. 1								0.5		0.2									
Triloculinella spp.										0.9						0.4	0.4		
Uvigerina auberiana ex gr.	2.3	9.4	23.0	11.4	6.4	7.0	2.8	0.5	17.7										
Uvigerina bassensis cf.	3.5																		
Uvigerina canariensis cf.															0.7	0.4			
Uvigerina dirupta		1.0		0.9	2.4	1.2	0.7		0.7										
Uvigerina hispida		1.0	1.1	2.8	2.7	1.6	1.7		3.1										
Uvigerina peregrina		0.2	1.8	1.4	1.1	2.0	1.4	0.5	0.3										
Uvigerina schwageri type 1 & 2										13.2	11.7	13.6	3.5	2.0	0.3				4.1
Uvigerina sp. 1										2.2								3.8	0.6
Vaginulina subelegans									0.4			0.4							
Vaginulinopsis sp. 1													0.7						
Vaginulinopsis sublegumen	0.6																		
Valvulineria minuta		0.2		0.2		0.4	0.3												
∑ of species present in single station	3.5	1.0	0.7		0.8	0.8	0.7	0.5	1.0	0.6			0.7	0.7	0.7		0.4		
unidentified agglutinated specimens									0.3	1.1					0.3		0.4		0.3
∑ - of tests in 100 cc	483.8	572.6	392.0	603.5	525.9	361.0	403.5	290.6	360.7	926.0	579.0	487.0	579.0	610.0	605.0	906.0	1051.0	211.0	678.0

(*) species / station no. 18-	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323
Pyrgo nasuta																			
Pyrgo sarsi	0.3			2.1			0.2	0.2				0.7	0.2						0.1
Pyrgo serrata																			
Pyrgo sp. 1			0.4	0.3															
Pyrgo spp.																			
Pyrgoella tenuiaperta	0.5	2.3	0.2	1.0			0.3	1.1			0.3	0.7				0.3	0.7	0.6	
Pyrulina angusta												0.6	0.3						
Q. philippinensis ex gr.			0.2	0.3			0.7						0.3	0.4		0.5	0.1	1.4	0.6
Quinqueloculina auberiana	0.5	0.2		0.7			0.5	0.4			0.3						0.3		0.4
Quinqueloculina bicarinata											0.6								
Quinqueloculina collumnosa														0.4					
Quinqueloculina fichteliana											0.2		0.2						
Quinqueloculina laevigata							0.3				0.3					2.0		0.8	
Quinqueloculina lamarckiana	0.3		0.7	0.7	1.5			1.3	2.8				0.3		0.6		0.7		
Quinqueloculina pseudoreticulata											0.3			0.4		0.5		0.2	0.1
Quinqueloculina pygmaea																			
Quinqueloculina quinquecarinata										1.0	0.3	0.7	0.9			0.5			
Quinqueloculina sagamiensis																0.3			0.1
Quinqueloculina seminulum	0.8	4.0	3.9	2.8	2.4	1.8	9.8	2.6	6.7	5.0	8.0	8.0	2.4	2.2	7.1	6.6	8.2	10.5	1.7
Quinqueloculina sp. 1	0.3		0.2					0.2							0.3	0.3			
Quinqueloculina spp.	0.3			1.0	2.9	0.3	0.8				0.3	1.0	0.5	1.2	0.3	2.4	1.2	0.8	0.1
Quinqueloculina tropicalis								0.4						0.7					0.1
Reussella pulchra			0.4	0.3			0.7											0.2	
Reussella spinulosa							1.6				0.3				0.6				
Robertina subcylindrica																			
Robertinoides bradyi																			
Robertinoides wiesneri																			
Rosalina globularis																0.5			
Rosalina spp.												0.4							
Rosalina vilardeboana																			
Saidovina amygdalaeformis	1.3	0.5	3.5	1.0	4.6	4.9		3.9	4.0	5.0			0.2			0.3	0.7	0.4	1.4
Saracenaria altifrons																			
Saracenaria italica	0.3									1.0									
Seabrookia pellucida	0.3				0.7														
Sigmoilopsis carinata																			
Sigmoilopsis orientalis											0.6								0.4
Sigmoilopsis schlumbergeri																			
Siphogenerina raphana																			
Siphonaperta crassatina	0.8				1.6						1.3		0.3			0.3	0.7		0.3
Siphonaperta spp.							0.2						2.1	0.4	1.1				
Siphonina bradyana																			
Siphonina tubulosa			0.4					0.7				0.4						0.2	
Sphaeroidina bulloides	1.0	1.4	0.2	0.3		1.2		1.3		2.0		0.4		0.7	0.3		0.5	0.4	
Spiroloculina communis		0.2		0.3			0.3		0.6			0.2		1.5			1.1	1.0	0.9
Spiroloculina excisa	0.5	0.2	1.1	0.9				0.9	0.6		0.6		0.6			1.0	0.3	0.2	0.3
Spiroloculina manifesta	1.0	1.4		0.7				0.9				0.4	0.3						
Spiroloculina scrobiculata					1.2		0.3					0.4		0.7				0.4	
Spirophthalmidium concava				0.7	0.5							0.7	1.4	0.7	1.4	0.5			
Spirosigmoilina tenuis																			
Trifarina bradyi			0.4																
Triloculina elliptica		0.5	0.4														0.5		
Triloculina tricarinata	0.8			2.1	1.5		1.5	0.9	0.6	2.0	1.0	0.9	0.6	0.7		0.8	0.7	0.8	0.9
Triloculinella californica		0.9	0.4				0.3				0.3								0.6
Triloculinella pilasensis		0.5		0.3															
Triloculinella pseudooblonga cf.				0.3			0.3			1.0		0.4			1.1	0.5		0.2	0.6
Triloculinella robusta	0.3	0.5	0.4				0.3					0.7	0.3					0.2	
Triloculinella sp. 1								0.4								0.5	0.5	0.6	
Triloculinella spp.			0.2												0.6				0.1
Uvigerina auberiana ex gr.																			
Uvigerina bassensis cf.																			
Uvigerina canariensis cf.				0.3	0.7														
Uvigerina dirupta																			
Uvigerina hispida																			
Uvigerina peregrina																			
Uvigerina schwageri type 1 & 2	6.0							0.2											
Uvigerina sp. 1	1.6																		
Vaginulina subelegans																			
Vaginulinopsis sp. 1																			
Vaginulinopsis sublegumen																			
Valvulineria minuta																			
∑ of species present in single station		0.7		0.7			6.5	0.4			1.9	0.4		0.4	0.3	0.5		1.0	
unidentified agglutinated specimens	2.6		0.9	0.3	1.5	1.2	0.2	0.2				0.2				0.5			0.6
∑ - of tests in 100 cc	767.0	426.0	459.0	575.0	731.7	327.0	2447.0	917.0	1526.7	400.0	625.0	2153.0	1325.0	2201.0	1402.0	782.0	735.0	1278.7	1396.0

Appendix B.4b. Counting data of stained (*) benthic foraminifera in surface samples on the Sunda Shelf. Numbers are given in percentages of indiv./100 cc.

(+) species / station no. 18-	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323
Adercotryma glomeratum	0.7	2.0																				0.2	1.1	0.4	0.2	0.5	1.3																														
Aggerostramen rustica	0.2																			0.1																																						
Ammobaculites agglutinans						x				0.1	0.3	0.3	x	0.1		0.1		x			0.2							0.3	x								0.1			0.2			0.1		x	0.1			0.2			0.2		x			
Ammobaculites baculusalsus	0.7	0.5																			0.2	0.4	0.4	1.3	1.3	1.1	0.9	0.6																													
Ammobaculites sp. 1			0.1	0.5		0.1	x			0.3	0.1	0.1	x	0.1	0.1	0.3	0.8												0.1	0.1			0.1																	x							
Ammobaculites spp.								0.1														0.1																														0.1					
Ammodiscoides sp.	1.0	0.6																			1.0		0.6	0.2	1.3																																
Ammodiscus anguillae																					0.2	0.1		0.2	0.4																																
Ammodiscus catinus	1.2	0.6	0.1			x									0.2				x	0.2	0.8	2.0	0.1	0.7	1.1	0.1	0.3	1.5	0.0	0.4									0.5										0.1		0.3	0.4		0.1	0.1	0.2	
Ammodiscus planorbis			0.4		0.4		x			0.3										0.1		0.1	0.8					0.2											0.1	0.4				x										0.1		0.2	
Ammodiscus sp. 1	0.2								0.1										x			0.6	0.1	0.2	0.4			0.8																													
Ammodiscus tenuis	0.5	0.3																			0.4	0.4	0.1				0.2																														
Ammoglobigerina globulosa																						0.2			0.2	0.7																															
Ammolagena clavata	0.3		0.3	0.2	0.1	0.1	0.1					x	0.1	0.2	0.2	0.1			x		2.2		0.3	1.5		0.1		0.1	0.1	x				0.1	0.1			0.1	0.1	0.3																	x
Ammomarginulina rostrata aff.																				1.4	0.3		0.4	0.2	1.3																																
Ammoscalaria compressa			0.4		0.1	0.2	x	0.1	0.1	0.4		0.1				0.1			0.3	0.1																																					
Ammoscalaria pseudospiralis																		0.1																											0.1	0.1					0.3	0.2	0.2			0.2	
Ammoscalaria tenuimargo													x	0.1					0.1																																						
Ammoscalaria sp. 1																				0.1																									0.6				1.0	0.8				x			0.1
Ammoscalaria sp. 2																																																							0.2		
Ammoscalaria spp.																																												0.1								0.4					
Ammosphaeroidina sphaeroidiniformis			0.1										x							0.1	0.2																																				
Astrammina sphaerica	1.0	0.1																					0.1	1.0																																	
Astrorhiza arenaria			x														0.1																			x		x																			
Astrorhiza crassatina		0.2	x									x		0.1			0.4		0.1	0.2	0.1								x	0.1	x					x		0.3	x	x	0.3		x														
Astrorhiza spp.																													0.1																										0.1		
Bigenerina nodosaria			0.6	0.1	1.0	0.2	0.1	0.3	0.8	0.6	0.6	0.3	x	0.6		0.1	0.3	0.1											0.1	0.2	0.3	0.2	0.4	0.3	0.6	1.1	0.5	0.1		x	x	0.4	0.6	x	0.1	0.4	0.6	0.2	0.4	0.5	0.5	0.8	0.6	0.2	0.1	0.8	0.7
Bigenerina sp. 1																																								0.3				0.1				0.1			0.3						
Buzasina ringens	1.0	0.4																			0.2		0.7	0.4	0.8	0.3	0.6	0.3																													
Clavulina humilis							0.2	0.1	x	0.2	0.4	1.0	0.3	1.7	0.2	1.3	0.2	1.2													0.3																										
Cribrobigenerina robustiformis			1.1	1.2	0.9	1.2	x	0.4	1.7	0.9		0.1		0.1		0.1	0.2			0.2									0.1									0.8	0.4	x	x		0.2			0.4	0.3	1.3		0.7	0.5	1.1	3.1	0.3	0.2	0.7	0.9
Cribrobigenerina textularioidea					0.2			0.1	0.1			x																										0.2	0.1			0.3	0.5					0.3				0.2					
Cribrobigenerina (?) sp. 1																																										0.1	0.3	x													
Cribrobigenerina spp.						0.5																																									0.3								x	0.3	0.8
Cribrostomoides nitidus	0.3	0.2																			1.2	0.7	0.2	0.2	0.2	0.4	0.2	0.1																													
Cribrostomoides scitulus															x						0.2	0.2		0.2	0.4	0.3	0.3	0.2									0.1			x																	
Cribrostomoides subglobosus	0.5	1.3																		0.1	0.5	0.1		0.3				0.1																													
Crithionina hispida																				0.1																																					
Crithionina mamilla																																	0.3										x														
Crithionina pisum		0.3	x																							0.1																															
Cyclammina cancellata	0.2	0.1																				0.2	0.4		1.3	1.2	1.3	0.1																													
Cyclammina subtrullissata																						0.1	0.2			0.3	0.2				x														x							0.1					
Cyclammina trullissata		0.1																					0.9	0.9	0.6	0.3	0.3																														
Cylindroclavulina bradyi			0.1	0.4	0.2		0.1		0.3	0.1					x			x			0.1												0.1						0.2									0.1			0.1	0.2	0.1				
Cystammina pauciloculata																			x		0.3	1.2	0.8					0.6																													
Deuterammina grisea																				0.1	0.2	1.0	0.7				0.2	0.8																													
Deuterammina montagui																			0.3			1.6	0.8	0.7				0.3																													
Discammina compressa																				0.2	1.4																																				
Dorothia rotunda																						0.2		0.2				0.1																													
Dorothia scabra			0.1		0.1	0.1				0.1					x					0.4	0.2														0.1	x			0.2																		
Dorothia (?) sp. 1	0.2												0.3						0.3	2.3	1.0	0.5	0.2		0.4	0.1																															
Dorothia (?) sp. 2																			x	0.1																																					
Duquepsammia bulbosa																			0.3									0.3																													
Earlandammina drakensis cf.	1.0	0.1																									0.2																														
Eggerella bradyi	4.1	4.6																	0.3	0.3	3.7	2.9	1.0	0.6	3.4	3.6	2.7	1.7																													
Eratidus foliaceus	0.2	0.1																x							0.2																																
Eratidus recurvus	1.0	1.4																					0.2	0.4	1.3	0.8	0.5																														
Evolutinella rotulata																										0.1		0.1																													
Gaudryina flintii										0.1	0.4	0.1	0.3	0.4	x						0.1		0.1		0.2	0.4																		x													
Gaudryina quadrangularis				0.2																												0.3		0.1																							
Gaudryina robusta				0.1	0.1		0.1	0.2	0.1								0.2												x	x		x				x			0.1		0.1	1.3					0.3	0.2		x	0.3		0.2				
Glaphyrammina americana																			x	1.5	0.1	0.1																0.2		x																	
Glomospira glomerata	1.0	1.6																		1.4	0.7	1.3	0.7	2.6	0.4	0.3	0.2	0.7																													
Glomospira gordialis	3.6	2.7													x						0.6		0.8	0.3	1.9	1.6	0.8	0.8																													
Haplophragmoides bradyi																		0.1	0.3		1.1	1.2	0.2	0.6	0.4	0.3	0.2	0.3						0.1																							
Haplophragmoides grandiformis				0.1			x		0.1			0.1																	x														x									0.5	0.1				
H. sphaeriloculum	0.2	0.2										0.2								0.2	1.2	1.2	0.2	0.8	0.6	1.7	3.0	0.3																													
Haplophragmoides sp. 1																		0.1			0.2																																				
Haplophragmoides sp. 2																			0.4		0.2		0.1	0.2			0.2																														
Haplophragmoides (?) sp. 3																						0.2					0.2	0.5																													
Haplophragmoides spp.																					0.2	0.7					0.2			0.2				0.1																							
Hormosina globulifera	1.2	1.7																			0.7		0.1			0.1	0.5																														
Hormosina normanii	0.5																				0.2	0.1	0.3	1.0		0.3	1.3																														
Hormosina pilulifera	1.5	1.4																			1.1	1.1	0.2	0.2	0.8	2.0	0.5	1.0																													
Hormosina sp. 1																																																			0.3				0.2		
Hormosina sp. 2																			0.1		1.0	0.2																																			
Hormosinella distans	1.2	2.6																			1.7	0.7	0.8	0.9	0.4	1.1	2.0	0.1																													
Hormosinella distans type 1		0.6																			0.3																																				
Hormosinella guttifera	3.1	3.3															0.2				0.1	0.5	0.1	0.2	0.2	0.1	0.3																														
Hormosinella guttifera type 1	0.7	0.2																			0.2	0.4		0.2	0.4	0.1	0.3																														
Hormosinella guttifera type 2																				0.1	0.1	0.1		0.3				0.1																													

Appendix B.4c. Counting data of empty tests (+) of the benthic foraminifera in surface samples on the Sunda Shelf. Numbers are given in percentages of indiv./100 cc.

(+) species / station no. 18-	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323
Jaculella acuta cf.																																													×				0.2								
Karreriella bradyi																			×		0.3	0.2	0.4	0.2	0.2	0.1		0.4																													
Karreriella novangliae		0.4																			0.3		0.1			0.1	0.2	0.2																													
Karreriella pupiformis		0.1																0.5	×	0.4	0.6	1.1	0.3	0.3	1.1	1.1	0.2	0.2																													
Karreriella cf. siphonella																				0.1	0.3					0.3	0.3																									0.1					
Karrerulina apicularis	1.4	0.9						0.1												0.1	1.5	0.4	1.7	0.9	0.2		0.2	2.0																													
Karrerulina attenuata																	×		×			0.7	0.1																																		
Lagenammina arenulata		1.1							0.2		0.3	0.0	0.2		×	0.1		×	1.3	3.7	1.5	2.2				0.3	0.2	0.5		0.4			0.1	0.2	0.2	0.1			0.2	0.1	0.2	0.1			0.6	0.4	0.6	0.2		×				1.3	0.2	0.8	0.7
Lagenammina difflugiformis	1.7	0.8													0.1			0.2		0.1	0.2	7.7	11.4	8.8	10.1	3.7	3.8																						1.2								
Lagenammina tubulata																						0.2	0.1	0.4	0.4	0.4	0.6	0.8																													
Lagenammina spp.		1.2			0.1																		0.1			0.1	0.5	0.3																									0.2		0.3		
Liebusella improcera	0.2	0.1																			0.2	0.1					0.3																														
Lituola lituilinoidea																		0.1	×	1.2	0.5		0.1	0.6	0.4	0.5	0.3	0.1																													
Lituola sp. 1														0.6			0.2																																								
Lituotuba lituiformis																					0.2	0.1	0.6					0.1																													
Marsipella cylindrica																					0.2																								0.1												
Martinottiella communis	0.2	0.2																	×		0.7	0.4	0.7	3.2	3.4	1.1	0.8																														
Martinottiella milletti																							0.1	0.3		0.3	0.3	0.3																													
Nodellum membranaceum	0.2	0.1																										0.5														×															
Nodosinum gaussicum																						0.1				0.3	0.2	0.2																													
Nouria harrisii																						0.4			0.2			0.3																													
Nouria polymorphinoides																																																				0.1					
Paratrochammina challengeri	1.2	3.5																	0.7		1.9	3.1	1.8	2.4	2.7	5.7	4.1	3.3																													
Paratrochammina simplissima																												0.5																0.1													
Paratrochammina sp. 1	0.5	0.1																					0.6	0.2		0.1	0.3																													0.1	
Paratrochammina sp. 2																											0.2																														
Parvigenerina sinensis																		0.1	1.0	0.6	0.1																																				
Pelosina cylindrica						0.1													×											×																											
Pelosina spp.																																								0.2				×	×				0.2								×
Placopsilina bradyi				0.1	0.1	0.1	0.1	0.3	0.1	×	0.1	0.1		×		0.2					0.1											×	0.1	0.2	0.1	0.4	0.1		0.2		0.1	0.1		×		0.2	0.2	0.2		0.2		×				0.2	0.1
Placopsilina confusa																				0.1																																					
Polystomammina elongata						0.2													0.3						0.6										0.2																						
Psammosphaera fusca	0.5																		×	0.3	0.9	0.1	0.2			0.1		1.3					0.1							0.3																	
Pseudobolivina nasostoma				0.2	0.5		0.2				0.3	0.2																		0.4					0.2			0.4		0.3				0.4		0.2	0.2						0.2	0.3			
Pseudoclavulina serventyi			0.2	0.2	0.3	0.3	0.1								×															×		×					0.1	0.2	0.2							0.2		0.1									
Pseudogaudryina pacifica			1.2	0.4	0.1		1.8	1.3	0.2	0.9	0.5		1.0	0.6	0.5	1.3	0.3	1.3	2.2										1.1	1.1	1.8	1.0	1.4	1.1	1.3	0.6	0.9	3.3	3.1	2.0	1.9	0.7	0.6	2.1	1.2	1.9	0.7	1.3	1.7	2.0	1.5	0.2	0.9	1.9		0.4	1.2
Pseudonodosinella bacillaris																				0.1	0.9	0.7		0.2				0.5																													
Pseudonodosinella sp. 1	0.5																	×	×	1.4	0.7	0.1			0.4	0.1	0.6	0.2																													
Pseudonodosinella sp. 2			0.1	0.5		0.1	×		0.1	0.1																			×		×	0.1				0.2				×		0.1			0.1		0.1			0.1			0.1	0.1		0.1	0.2
Pseudotrochammina atlantica																					0.2				0.2	0.3	0.3																														
Pseudotrochammina dehiscens																					0.1	0.8	0.1	1.1	0.4	0.1	0.3	0.3										0.2																			
Pseudotrochammina sp. 1	0.5	1.4																								0.3																															
Pseudotrochammina sp. 2	2.4																						0.2	0.7	1.3	0.3																															
Recurvoides contortus	0.2	0.7								0.3										1.9	1.1	1.0	2.1	0.6	1.5	1.5	0.6	1.0												×												0.2					
Recurvoides trochamminiformis																				0.1			0.1																																		
Recurvoides spp.		0.2											0.1						×	0.2	1.1						0.2	1.0			3.3	0.2	0.3	1.0	0.1	5.0		0.4										0.1									
Reophanus oviculus		1.2																			0.2	0.2		1.2	0.2		0.2	0.2																													
R. oviculus var. mexicanus																				0.3	0.6	0.4						0.2																													
Reophax bilocularis	1.0	1.4									0.2	0.1				0.2	0.2	×	0.1	0.8	0.5	1.7	0.1	0.9	0.2	1.3	0.5		×						0.2	×			0.2	0.2					0.3	0.1								0.1			
Reophax bradyi																				0.6	0.5				0.2						0.1		0.1			0.3		0.2		0.1									0.3								
Reophax dentaliniformis	1.2	1.0						0.1												0.5	1.5	1.2	0.5	0.8	0.6	2.2	0.8	0.4																									0.3				
Reophax helenae																						0.1			0.2	0.1	0.2																														
Reophax longicollaris																				0.6				0.2			0.2																														
Reophax micaceus																					0.1			0.2		0.1																															
Reophax pesciculus																											0.2																														
Reophax regularis			0.1			×									0.3			0.3	0.7				0.7						0.1				0.1																					0.1			
Reophax scorpiurus						0.2	×	0.1			0.1	0.1	0.3	0.2	0.2	0.6	0.4	×	0.4	2.3									0.1	0.1	0.3	×						0.1					0.2	×					1.3	0.1		1.3	0.1				
Reophax spiculifer	0.2																						0.2	0.2	0.2																																
Reophax subdentaliniformis	1.5	1.2			0.1								0.3	0.3							0.3				0.2		2.5				×													×									0.1				
Reophax subfusiformis	0.9	1.8																								0.7	1.9																														
Reophax tubulus		0.4									0.1											0.8	2.7	0.3	0.4	0.8		0.7																				0.5									
Reophax sp. 1		0.2																					0.1		0.4		0.3																														
Reophax sp. 3	0.9	0.2			0.1													×			0.7	0.2	0.5		0.8	0.8	0.8																				0.2										
Reophax spp.	1.4		0.6	1.2	0.7	0.3	0.1		0.7	0.4		0.2		0.6	0.2	0.1		0.1	0.2	1.0	2.0	0.4	2.1	0.8	4.2	2.2	3.1	0.4	1.1		0.7	0.1		0.1	0.2	0.3	0.1	0.1	0.2	1.1	0.1	0.6	1.4	0.1	0.2	0.6	1.0	0.6	0.4	0.2	0.2	0.4	0.5	0.4	0.2	0.7	0.6
Rhumblerella sepetibaensis													×							0.1	0.4	0.8						0.4																													
Saccammina edita																				0.2	1.3														0.1																						
Saccammina sphaerica	14.9	6.1																			0.4		3.3	2.2	2.7	2.4	4.5	3.3		×																											
Sahulia barkeri			0.6	0.4		0.1											0.5												0.1						0.1			0.1	0.1					×		0.2											
Sahulia conica					0.1	0.1	0.1		0.4	0.1		×			0.1	0.1													×		0.3		0.1	0.5	0.1	0.5					×	0.4	0.1	0.1		0.3	0.3	0.2		0.8	0.1	0.3	0.3	0.1	×		0.1
Scherochorella moniliforme																						0.1	0.1																																		
Siphotextularia curta			0.3		0.3	×	×		0.1		0.1	×	0.3		×	0.6													1.2	1.5				0.1				0.2	0.5								0.2							0.3			
Siphotextularia flintii	1.4	0.1																		0.1	0.1	0.4	0.2		0.4	0.3	0.8	0.1																													
Siphotextularia foliosa																	0.1	1.3	4.9	1.1																																					
Siphotextularia mestayerae			0.5			0.5	0.6	0.7	0.6	0.3	1.0	1.7	×		0.7	0.9	0.9		0.7										0.9	0.7	0.9		1.0	0.3		0.3	0.4		0.9	1.5	1.1	0.2	0.5	0.8			0.2				0.3				0.7		0.4
Siphotextularia rolshauseni	0.5	1.4																					1.2	0.7																																	
Siphotextularia subplanoides			1.0	0.9	0.7	0.1	1.6	0.5			1.3	0.1	3.5	1.1	0.9	3.3	0.3	0.4	1.4										0.6	1.8	1.8	0.7		0.5	0.3			2.2	1.9	4.1				0.6		1.7	0.6	0.5		0.1	0.6		0.5	0.8			0.2
Siphotextularia wairoana cf.				0.1			0.1	0.1		0.2	1.0	×		0.2															×	0.4	0.1	0.7	0.1	0.3	0.2	0.5		0.3		×	×	0.2	0.1	0.2	0.1	0.1	0.3	0.2		0.1	0.1		0.2	0.2	×	0.1	
Siphotextularia (?) sp. 1			1.8	1.4	0.5	2.3	0.4	2.0	2.3	4.0	0.9	0.6	0.1	0.8	0.1	1.2													0.6	0.8	1.2	1.3	1.3	1.4	1.8	1.6	1.7	1.7	1.1	0.6	0.5	0.7	1.9	0.1	1.3	3.6	2.7	3.4	1.8	0.9	3.8	3.1	3.1	1.1	1.8	3.7	1.7
Siphotextularia sp. 2																																																						0.3			
Sorosphaera consociata		0.1																×			0.3	0.1	0.2	0.2		0.7		0.6																													

Appendix B.4c. Counting data of empty tests (+) of the benthic foraminifera in surface samples on the Sunda Shelf. Numbers are given in percentages of indiv./100 cc.

(+) species / station no. 18-	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323
Spiroplectinella higuchii			0.6	1.3	0.7	0.3		0.7	0.1	0.8				0.3	x	0.9	0.1	0.3	x				0.1				0.2		1.5	0.1	0.4	1.5	0.4	0.7	1.9	1.2	0.7	1.3	0.5	0.3	0.1	1.6		0.4			1.5	2.0	0.7	0.4	0.9	0.3	0.2	x		1.0	1.2
Spiroplectinella kerimbaensis			0.2	0.3	0.2													x																														0.1	0.2								
Spiroplectinella pseudocarinata			0.4	0.6	0.1	0.4	0.2	0.5	0.7	0.4	1.1	1.3	2.6	0.9	1.6	0.2	1.9	0.6											0.1					0.2	0.1	0.4		0.3	0.1	0.0	0.1	0.2	0.7		0.1	2.2	0.4	0.4	0.3			0.1	0.1	0.2		0.2	0.1
Spiroplectinella wrightii							0.3		0.2	0.1		0.2	0.3				0.1	1.9	1.7																						0.3						0.3										
Spirotextularia fistulosa				0.2	0.1	1.0	0.3	0.2				0.2						x											0.9		0.6		0.1	0.1	0.4		0.2		0.2				0.2			1.0	0.2			1.2				0.3			
Spirotextularia floridana			0.4	1.3	1.6	2.8	3.1	2.2	1.5	1.8	1.7	0.8	0.4	2.5		1.1	1.6	x	x	0.1									1.2	0.7	2.3	1.1	2.7	2.5	2.0	2.7	3.9	1.9	3.0	1.8	0.5	3.8	2.9	1.8	0.9	2.9	3.9	3.0	0.8	0.6	2.1	1.1	0.8	0.8	1.2	0.7	1.3
Subreophax aduncus	1.4	2.7																			0.3	0.7	0.4	2.3	0.6	0.4	2.5	0.5																													
Subreophax sp. 1																					0.4	0.1	0.6				0.2	0.1																													
Textularia abbreviata aff.																	x																		0.3	x	0.2						0.1	0.1					0.2	0.1							
Textularia agglutinans			0.7	0.6	0.5	0.1	0.3	0.3	0.4	0.2	0.3	2.8	0.4	1.5	0.2	0.1		0.2											0.4	0.2	0.3	0.3	0.8	1.2	0.4	0.2	0.1	1.9	0.9		0.1	0.3	3.6	0.9	0.1	0.8	0.8	0.8		0.1	0.2	1.1	0.2		x	0.1	1.1
Textularia bocki			5.3	3.6	3.4	2.6	1.8	4.3	2.8	0.1	5.1	2.1	2.9	2.4	3.4	6.3	0.6	0.1												0.7	3.7	2.6	2.3	1.6	1.5	1.8	2.4	0.4	1.4	1.0	1.4	1.5	0.6	x	0.3	1.7	1.9	2.0	1.1	0.8	0.9	0.6	1.0	1.2	0.5	0.4	
Textularia cuneata aff.				0.2					0.3																							x			0.1	0.4		x		0.2			0.1							0.1							0.1
Textularia foliacea																																		0.1		0.2		x		x					3.3				2.2	0.1		0.7		0.8			0.2
Textularia hauerii																																													0.1					x						1.0	
Textularia lancea				0.2	0.2	0.8	0.1	0.1	0.4	0.1	0.1			0.1															x	0.1	0.4	0.5	1.4	1.8	0.5	0.2	1.1	0.2	0.2			0.2	0.5	0.1			0.1	0.7	1.2	0.5	0.4	0.6	1.5	0.4	0.4		0.9
Textularia lateralis			0.2	0.1		0.8		0.1				0.8	0.3	0.3		0.6				0.3		0.1			0.2						0.1	1.0	0.6		0.2		0.3	0.4		0.3	0.5	0.8	0.1					0.4							0.1	0.2	
Textularia lythostrota cf.			1.0	0.6	3.4	2.5	1.5	4.3	3.8	4.5	1.7	1.0	0.7	0.3	0.5		0.2												1.0	0.9	1.0	3.1	4.7	4.0	5.2	8.0	3.7	2.7	0.9		3.4	5.1	2.8	2.2	0.1	1.4	6.1	3.9	5.0	5.7	4.1	1.8	4.9	4.9	2.0	4.5	4.5
Textularia milletti cf.																						0.1	0.1			0.1		0.1																													
Textularia parvula																					0.5						0.2	0.1																													
Textularia porrecta																					0.2	0.4	0.4		0.2																																
Textularia pseudogramen			0.1			0.2			1.0	0.6		0.7	1.3		1.4	0.1	0.8	1.7													0.1	x	0.1	0.1	0.1	0.1			0.1	x	x	0.1	0.2	x	x			0.2	0.1	0.1	0.1			0.1			0.1
Textularia pseudosolita cf.											0.1		0.1					x	x										1.4																												
Textularia secasensis																																			0.4										0.6											0.3	
Textularia stricta			0.3	0.1	0.2	0.9		0.6	1.1	2.2		0.2		0.2		0.2		0.1											x	0.2	0.3	x	0.3	0.4	0.2	0.7	0.6		0.1	x		0.1	0.1	x	0.1	0.1		0.3		0.1			0.1	0.1	x		0.3
Textularia subantarctica		0.1					x	0.1																																																	
Textularia sp. 3																																							0.1		x										0.6						
Textularia sp. (22)																																		0.1	0.4	0.6						0.3					0.2			0.8			0.3		0.4		0.1
Textularia sp. 4																																																						1.1	0.2		
Textularia sp. 5																																	0.2	0.1	0.4	0.7	0.1	0.7	0.1	2.0	0.2		0.7		0.2				0.8	0.4		2.3	3.9	0.5	0.5	3.5	0.4
Textularia spp.			0.2	1.1	0.4	0.2	0.1	0.7		0.2		0.7	0.8			0.1	0.3	x				0.5	0.1	0.2				0.5	1.1	1.5	0.3	x	0.6	1.0	0.2	0.1	1.1	0.3	0.2	x	0.4	3.3	1.0	0.4	1.5	1.0	0.9	1.8	0.3	1.0	3.5	1.8	1.0	2.6	0.8	3.6	1.3
Thurammina compressa		0.1																																																							
Thurammina papillata		0.3													x								0.2	0.5		0.5	0.3	0.1																													
Tritaxilina atlantica			0.4	0.1		0.3	0.1		0.1	0.1	0.1	x			x				x	0.1																																					
Tritaxilina caperata			0.1		0.3						0.1																																														
Tritaxis challengeri			0.1		0.1	0.1																																	0.1	x																	
Tritaxis fusca					0.1																	0.1																															0.1				
Tritaxis primitiva																													x						0.2																						0.1
Trochammina inflata		0.1																				0.2		0.4	0.2	0.1																											0.2				
Trochammina nana		0.1																								0.1																															
T. subglobigeriniformis	1.7	0.4																		1.7	1.1	0.1	0.1				0.5																														
Trochammina tasmanica																				0.1																																					
Trochammina spp.																					0.2	0.2			0.2	0.3		0.1																													
Trochamminopsis quadriloba		0.8																								0.5																															
Usbekistania charoides	2.7	2.5																			0.8	0.5	0.3	0.2	1.5	0.7	0.6	1.2																													
Veleroninoides jeffreysii		0.1													0.2					0.3										0.4																					0.1						
Veleroninoides kosterensis																					0.2																		0.1					0.1					0.3								
Veleroninoides wiesneri	0.2	0.4																				0.1		0.2		0.5	0.2																														
Verneuilinulla propinqua																					0.2	0.2		0.7	0.2	0.4	0.3																														
Verneuilinulla superba																					0.2	0.1	0.2			0.1		0.1																													
Verneuilinulla sp. 1	0.2																						0.1				0.2																														
∑ of species present in single station	0.5			x										0.1	x				x	0.1	0.4		0.1		0.2	0.3	0.5	0.6		0.4															0.1											0.2	
unidentified agglutinated forams	3.4	0.1	0.7		0.6	4.3	0.9	1.8	3.1	3.7	0.4	0.7	0.4	1.1	0.8	0.1	0.4		0.4	0.5	0.9	1.2	1.3	0.9	0.8	0.7	8.1	2.9	0.5	0.5		5.1	2.7	0.1	6.0	1.6	3.9	3.4	0.2	0.9	0.7	0.8	4.7	1.6	1.5	0.4	2.9	2.6	2.7	5.1	2.8	5.4	5.8	2.5	2.9	2.0	4.9
Adelosina laevigata																																x			0.2																						
Adelosina litoralis					0.8	0.2	0.2	0.2		0.3	0.5	0.6	0.3	0.3	0.6	0.6													0.6		0.3							0.4	0.5	0.5	0.3			1.0		1.0	0.2								0.2		
Adelosina spp.						0.1		0.1		0.1		0.2																	0.3																	0.2		0.7									
Agglutinella agglutinans			0.1	0.1	0.3	0.3		1.0	0.8	0.6	0.1	1.1	0.3			0.1													0.2	x	0.8	1.5	1.2	1.2	1.0	1.5	1.3	0.8	0.8	0.3	1.0	1.2	1.8	0.4	0.7	0.9	2.2	2.4	1.5	3.4	2.3	2.1	2.7	x	0.3	0.9	0.3
Agglutinella arenata							0.3	0.1								0.1	0.3	0.1																						0.3	0.3			0.1	1.2	0.6	0.3	0.6		0.6		0.2	0.8	0.6			0.4
Agglutinella reinemunde			0.1																										x			x	0.3	0.3	0.4																				0.5		
Agglutinella spp.																																	0.5							x	1.2	3.1	0.1	1.0	0.3			0.9	2.9			0.8	0.3	5.0	x		1.1
Alectinella elongata																																0.3													0.3												
Allassoida virgula					0.1			0.1	0.2																							0.7	0.1				0.4							0.4	0.6				0.3								
Alliatina variabilis																																												0.1					0.3								
Alliatinella differens																																						0.2			0.5		0.2											0.3			
Ammomassilina alveoliniformis			3.4	3.3	4.6	6.4	4.5	7.1	5.1	4.9	2.1	3.7	2.8	2.3	1.8	2.4	4.8	2.9	0.7	0.6	0.1								4.0	2.6	2.5	3.0	3.6	2.0	2.5	1.4	3.5	4.0	5.9	4.7	7.5	7.2	6.1	8.9		7.6	8.6	6.4	6.0	4.1	6.7	4.6	5.0	4.0	7.9	7.6	##
Ammonia beccarii			2.0	2.6	1.3	3.1	2.3	2.6	1.1	2.2	2.1	2.7	1.9	2.9	1.7	0.7	0.4	1.5	1.5	1.0	1.1	0.1							1.4	1.8	1.6	2.1	3.5	2.5	2.0	1.8	3.8	1.6	0.7	2.0	1.4	3.8	1.8	2.3	1.2	3.1	2.0	2.1	4.1	1.6	1.5	3.0	2.1	3.5	3.9	5.2	1.4
Ammonia parkinsoniana				0.1													0.1	0.4	0.7															0.1																							
Ammonia pauciloculata			0.2		1.7		0.6	0.1			0.8		0.8	0.8	0.7		0.5	0.1	0.7										0.6			1.0		0.1		0.6		0.4	0.2				1.0	0.5		0.2	0.3		0.3	0.8		0.4		0.3	0.7		0.4
Ammonia tepida			0.2		0.1												0.1																0.3	0.1		0.3	0.2			0.3		0.2		0.1	1.5					0.8						0.2	
Ammonia spp.																	0.1		1.0												x																										
Amphicoryna hirsuta			0.9	0.6	0.9	1.0	2.3	1.5	0.8	0.2	1.9	3.2	1.3	1.4	3.7	2.8	1.1	0.9	1.0		0.3								1.2	0.8	0.6	0.4	0.8				0.5	0.9	0.4		0.3			0.1			0.5										
Amphicoryna papillosa							0.1		1.4		0.1	0.9	0.8	0.6	0.5	0.6		0.1		0.6										x			0.1					0.1	0.1	x	x							0.1			0.1					0.1	
Amphicoryna scalaris				0.3		0.2	0.5	0.6	0.4	0.6	0.8	1.2	0.3	1.3	2.1	1.2	0.1	x	1.0	0.1									x	0.4		x					0.2																				
Amphicoryna separans			0.3	0.2	0.6	0.2	0.9	0.7	0.3		1.3		0.2	0.1			0.2	x											0.3	0.5	0.1	0.1						x	0.1																		
Amphicoryna sublineata			0.2	0.3	0.1	0.4	x	0.4				x	0.1	0.1		0.1	0.2	0.1	0.1	0.3									0.2		0.1					0.1	0.2	0.2		0.1	0.1		0.1	x	0.2	0.1		0.9	0.3	x	0.4	0.2	0.2	x		0.1	
Amphicoryna spp.				0.2			0.2			0.1	0.3		0.8	0.1	1.2				0.3											0.2	x							x	0.4	0.5	0.5		0.2							0.4				0.5			0.1
Amphistegina papillosa				4.9	0.3	0.3	0.2	0.1	0.4	2.0			0.3			0.7			0.3	0.1									0.1					0.5	0.1					0.3		1.5		0.6				0.3		0.8							
Amphistegina radiata																																									x									x							
Angulogerina bradyana				0.2			0.1	0.1							0.5		x													0.4																											
Anomalinoides colligerus					0.3	0.2	0.4	0.1		0.6	0.2				1.3			0.3			0.2						0.2					0.3		0.1										x			0.3										
Anomalinoides globulosus																	x		x				0.6	0.2		0.5	0.3	0.3	0.3			0.3								0.5	0.3			0.3								0.2	0.5				
Anomalinoides welleri cf.			1.4	0.6	0.3	0.6	0.3	0.5	0.3	0.3	1.9	0.8	1.2	1.5		0.4	0.1	0.1											0.4		0.3	0.8	0.3		0.2		0.4	0.2	0.1	0.3	0.3	x		0.1			0.1	0.6									

Appendix B.4c. Counting data of empty tests (+) of the benthic foraminifera in surface samples on the Sunda Shelf. Numbers are given in percentages of indiv./100 cc.

(+) species / station no. 18-	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295
Anturina haynesi	0.2																		x					0.2					
Articularia sagra																0.3													0.3
Asterorotalia compressiuscula				1.8	0.4				0.5	0.1		2.7		0.2			0.7												0.2
Asterorotalia concinna																													
Asterorotalia gaimardii			4.5	0.9	2.9	5.4	2.1	3.8	4.7	3.6	2.4	1.3	2.3	1.9	1.5	2.2	2.4	2.3	0.4										3.0
Asterorotalia milletti								0.1																					
Asterorotalia pulchella				0.8	1.7	0.5	0.6	0.6	1.0	0.1	1.5	2.6	1.4	1.8	2.1	3.6	7.2	7.5	5.1										x
Asterorotalia sp. 1																	x												
Asterorotalia ? sp.					0.7																								
Asterorotalia spp.				0.1																									
Astrononion novozealandicum	5.1	5.9																								1.6	2.3		
Astrononion stelligerum					0.1	0.2	0.1			0.3								0.1	x										0.3
Astrononion spp.												0.2		0.3					x										
Baggina indica					0.1				0.1	0.1																			
Biloculinella inflata				0.2				0.1	0.1			x		0.1	x		0.3												
Biloculinella labiata			0.3	0.2		0.3		0.4		0.6		0.2	0.5	0.4	0.2	0.1			0.3	0.3									0.3
Bolivina earlandi												0.4		0.3	1.0					0.6									0.3
Bolivina glutinata				0.4	0.9		2.8	0.3	0.2		0.3	1.0	0.3		1.2	1.9	0.2	0.3	1.5		0.2								0.3
Bolivina macella																													
Bolivina robusta											0.5									0.4	3.5	6.0	2.7	0.8	0.2	0.1		3.3	
Bolivina spathulata			0.5	1.7	1.3	0.2	3.3	1.3	0.6	0.3	1.0	1.5	0.8		0.2	1.3	0.1	0.3	1.0										1.4
B. subaenariensis v. mexicana																	0.2	3.5	1.1										
Bolivina subreticulata		0.1					0.2					1.7	3.6	2.8	3.5	4.1	0.9	4.3	0.8										
Bolivina spp.																													
Bombulina echinata			0.2		0.2	x	0.2					0.1																	
Bulimina aculeata	0.5	0.2																		1.4			0.3	0.7	1.9	0.5	0.9		
Bulimina affinis																			x	0.6	0.1					0.5	0.2		
Bulimina marginata			3.0	3.9	3.5	2.3	9.8	2.1	1.5	1.1	6.2	4.0	4.4	2.5	4.0	4.1	0.9	2.5	5.3	0.7									7.0
Bulimina mexicana	0.2	1.1																	0.4	5.8	2.4		1.1	1.1	1.1	1.2	0.5	0.6	
Bulimina rostrata	0.2																			1.3	0.2		1.0		0.2	0.1			
Bulimina striata	1.4																		0.7		0.2	0.8	0.4		0.4		0.3	0.5	
Cancris auriculus			0.3	0.2	0.5	0.1	1.0	0.5	0.4	0.1	0.7	1.2	0.3	0.4	x		0.9		1.1										1.3
Cancris carinatus						x		0.1						0.1															
Cancris oblongus											0.3		0.6	0.1	0.8	0.4	x	x	x	0.2									
Caribeanella philippinensis												x			0.4	0.1													0.1
Cassidelina subcapitata				0.2	0.1		0.5		0.2	0.3		0.6			0.2	0.6	0.1												
Cassidulina carinata	1.5	1.2													0.2				0.4	1.1	0.1			2.6	1.9	5.1	3.1		
Cassidulina crassa															0.2				0.7										
Cassidulina obusta																		x				0.1							
Cellanthus craticulatus									x	x																			
Ceratobulimina jonesiana	0.2																					1.7	1.1	1.2	0.2	0.5	0.6	1.4	
Chilostomella cushmani																			x	1.0	0.2		0.1	0.4					
Chilostomella oolina	0.3																0.1		x	0.7	0.1								
Chilostomella ovoidea		0.2											0.4		0.3		0.7	0.0			0.1			0.7					
Cibicides deprimus			4.7	1.8	5.2	4.5	4.4	0.6			3.7		1.3	1.0	2.2		0.7	1.9		2.2								0.5	1.7
Cibicides kullenbergi							0.6						0.3	0.8							0.1	1.8	0.3	0.6				1.8	x
Cibicides lobatulus			0.4	0.6	0.7	0.3	0.8	0.4	0.1	1.2	0.6	0.2	0.6	0.5	0.7	1.7	0.7	0.4	2.1		0.1			0.2					2.1
Cibicides sp. 1				6.1	0.9			0.8	2.0	0.3			2.6				0.4												1.4
Cibicidoides cicatricosus							0.1	0.3	0.3	0.1						0.9		0.1			0.2	0.5	0.3					0.3	
Cibicidoides pachyderma ex gr.	2.2	5.5	3.5	3.3	1.0	1.5	1.4	2.1	2.3	4.7	4.7	5.3	0.4	0.4	3.4	3.0	3.6	3.4		0.1	0.7	1.6	3.4	1.0		2.6	1.1		x
Cibicidoides robertsonianus																		0.1	3.1	0.6		0.6	0.1						
Cibicidoides sp. 1			0.1																										
Cibicidoides spp.			0.1					0.1		0.6		1.0					0.3		0.7	0.1	0.2	0.4							
Cornuspira carinata							x					x																	
Cornuspira foliacea			0.1	0.1	0.1	x	x			x	0.1	x	x		x														0.3
Cornuspira involvens	0.3		0.2									0.2		0.8	0.7											0.1			
Cornuspira planorbis		0.1	0.1		0.1		x						0.3		0.3		x												0.6
Coronatoplanulina okinawaensis	0.2	0.4																										0.3	
Cymbaloporetta bradyi																													
Cymbaloporetta squammosa																													
Dentalina albatrossi				0.1		x		0.1	0.3			x						0.1	0.7										
Dentalina catenulata					0.1		0.1	0.2					0.3					0.1											0.3
Dentalina mutsui						x			0.1																				
Dentalina ruidarostrata																													
Dentalina sp. 1																			x										x
Dentalina sp. 2																							0.2						
Dentalina spp.							x	0.1				x		0.1					0.3										
Dimorphina nodosaria			0.2				x	0.1											0.0	0.3									
Discorbia candeiana																	0.2												
Discorbinella araucana												0.1					0.3		0.4										
Discorbinella bertheloti			1.1	0.4	1.4	0.1	0.7	0.2		0.8	1.6	2.2	1.0	0.9	3.1	2.7	1.5	0.2	1.8										3.2
Discorbinella bodjongensis																													
Discorbinella montereyensis					0.1							x		0.1					x										
Discorbinella sp. 1																													
Discorbinella spp.									0.1				0.3																
Edentostomina cultrata					0.1	0.1		0.1																					x
Ehrenbergina undulata																				0.1	6.9	0.8		0.2				0.9	
Elphidium advenum			1.0	0.6	1.3	0.8	0.9	1.4	0.9	0.8	0.8	1.3	2.9	0.6	1.2	0.8	0.3	0.6											0.3
Elphidium crispum				0.3	0.2	x		0.1	0.4	1.3						0.3		x											
Elphidium jenseni			0.2	1.3	0.5				0.2								x												
Elphidium macellum				0.3	0.1			0.4	0.4	0.1																			

(+) species / station no. 18-	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323
Anturina haynesi																												
Articularia sagra																												
Asterorotalia compressiuscula	0.1				0.1	0.1								1.0								1.7					0.5	
Asterorotalia concinna					0.1	0.1														0.4			0.4	0.2	x		0.1	
Asterorotalia gaimardii	2.9	3.5	4.0	3.0	3.5	3.5	2.9	4.3	2.7	1.9	0.8	2.6	3.3	4.6	2.5	0.1	5.4	4.7	4.8	2.3	4.7	0.9	4.0	4.3	4.8	5.1	3.0	7.1
Asterorotalia milletti				0.8							x				0.4	4.7				0.5						0.1	0.8	
Asterorotalia pulchella		0.3	1.8	5.0	4.3	4.7	0.2	2.2	x		0.1	2.4	3.7	1.9	1.7	x	1.0	4.9	1.5	1.4	0.4			0.2	0.5	2.7	1.4	
Asterorotalia sp. 1															0.1				0.1									
Asterorotalia ? sp.						0.2	x		0.2			0.5	0.2	0.2	1.1		0.2		0.4									0.2
Asterorotalia spp.						0.1						0.5																
Astrononion novozealandicum																					0.8							
Astrononion stelligerum		0.3				0.2		0.2	0.4	0.5	0.3			0.2	0.1				0.2	0.3		0.3	0.4		0.3			
Astrononion spp.																	0.2											
Baggina indica																												
Biloculinella inflata					0.1				x	0.2	1.3																	
Biloculinella labiata	0.4	0.3	0.1	0.1	0.1		0.3	0.5	0.2	0.2					0.1		0.8					0.3		0.2				0.1
Bolivina earlandi											0.3	0.3			1.1	0.3	0.5											
Bolivina glutinata	1.1	0.3	0.3						0.2		0.3	0.8		2.2	4.0	0.6	0.5								0.3	0.2		
Bolivina macella						0.2			0.2		0.3	0.5			0.4	x							0.2	0.2	0.3			
Bolivina robusta																												
Bolivina spathulata	1.4	1.5	1.7	1.4	0.2			0.7	1.6	0.9		0.5		0.2	1.1	0.6	1.7	0.3	0.4									
B. subaenariensis v. mexicana																												
Bolivina subreticulata	0.7																											
Bolivina spp.							0.3														0.4							
Bombulina echinata	x	x		0.3	0.1		0.1		0.3	0.4	0.3	x				x				0.2	x			0.3	0.3		0.2	
Bulimina aculeata											x																	
Bulimina affinis																												
Bulimina marginata	3.6	5.4	2.4	3.2	2.7	1.5	1.8	1.3	3.7	5.0	2.8	4.9	0.4	1.6	2.5	0.6	3.4	1.5	1.8	1.0	2.0	2.0	1.7	1.4	2.9	1.4	0.6	1.7
Bulimina mexicana																												
Bulimina rostrata																												
Bulimina striata																												
Cancris auriculus	x	x	0.9	1.0	0.3	0.9	0.5	0.5	1.1	1.3	0.9	0.4	x	0.7	0.9	x	0.1	0.3	0.8	0.1	x	0.3	0.2	1.3	0.7	0.5	0.5	0.2
Cancris carinatus				0.1			0.1				x				x	0.3	0.1					0.1	0.2		0.2	x		
Cancris oblongus	0.4	0.9				0.2																						0.1
Caribeanella philippinensis		0.1		0.2	0.1	0.1	x			0.2		0.1			x		0.1											
Cassidelina subcapitata	x	0.3							0.2														0.2					
Cassidulina carinata														0.6												0.5		
Cassidulina crassa																												
Cassidulina obusta																												
Cellanthus craticulatus			x																								0.1	
Ceratobulimina jonesiana																												
Chilostomella cushmani																												
Chilostomella oolina																												
Chilostomella ovoidea																												
Cibicides deprimus	0.4	2.4		0.1		0.1		2.0				0.6	0.7		x									1.2			0.6	
Cibicides kullenbergi																			0.1									
Cibicides lobatulus	3.3	0.4	0.5	0.8	0.7	0.5	1.1	0.4	0.3	2.3	2.0			0.1	0.3		0.5	0.2	0.6									0.2
Cibicides sp. 1	4.6	1.8	3.5	4.5	2.7	1.1	1.9	0.9	3.0	8.3	1.8	1.7		0.1	0.5		3.6	1.9	2.9			0.3			0.5			0.6
Cibicidoides cicatricosus																			0.1									
Cibicidoides pachyderma ex gr.	0.4		2.4	0.7		3.6	0.9	1.8	1.9	0.1		0.1	4.4	3.0	1.9	1.8	1.0	2.7	0.2	4.0	4.3	2.9	4.0	1.8	3.4	2.1	1.8	2.6
Cibicidoides robertsonianus																												
Cibicidoides sp. 1		x		0.2			0.6		0.2		0.8		0.1					0.2										
Cibicidoides spp.	0.4											0.3			x							0.1			0.1			
Cornuspira carinata																												
Cornuspira foliacea		0.1															0.1							0.2				
Cornuspira involvens	0.7				0.1												0.2											
Cornuspira planorbis	0.4	0.3	0.3		0.1				x	0.1	0.3					0.3									x			0.1
Coronatoplanulina okinawaensis																												
Cymbaloporetta bradyi											0.8	x																
Cymbaloporetta squammosa				0.1							2.0	1.1	x		0.3	3.2	0.3											0.1
Dentalina albatrossi		0.1						0.1		x			x						0.1									
Dentalina catenulata			0.3																									
Dentalina mutsui	x	x																										
Dentalina ruidarostrata												0.3																
Dentalina sp. 1																												
Dentalina sp. 2																												
Dentalina spp.		x												x														
Dimorphina nodosaria																												
Discorbia candeiana			x	0.1	0.7			0.2	0.8		2.8	1.1			1.7		0.1					1.5		0.2				0.2
Discorbinella araucana			x																									
Discorbinella bertheloti	6.4	0.7		0.4	1.9	0.5	0.9	0.2	1.4	1.1	6.9	4.4			1.5	0.6	1.3	0.2	0.1		1.2			0.2	0.3			0.1
Discorbinella bodjongensis					0.1	0.3	0.1							0.2		0.5					0.5		0.3	0.1	x			0.1
Discorbinella montereyensis	0.7		0.3			0.1				0.1		x	0.4															
Discorbinella sp. 1					0.2		0.4						0.5	0.1		0.6			0.1		0.4		0.2				0.2	
Discorbinella spp.																												
Edentostomina cultrata									0.2		x		x							0.1	0.4	0.3		0.3				
Ehrenbergina undulata				0.2																								
Elphidium advenum	0.7	1.2	2.8	1.7	1.4	1.4	2.7	2.0	2.4	1.4			2.7	2.0	0.5			1.4	1.3	5.6	5.8	6.7	5.2	1.8	3.8	0.2	3.9	2.0
Elphidium crispum						1.3								0.1				0.1	0.2		x							
Elphidium jenseni				0.1	0.8		1.8	0.2				0.3				1.2					x							
Elphidium macellum			x		0.3	0.2	0.1				x					0.1												

Appendix B.4c. Counting data of empty tests (+) of the benthic foraminifera in surface samples on the Sunda Shelf. Numbers are given in percentages of indiv./100 cc.

(+) species / station no. 18-	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295
Elphidium reticulosum				0.1				0.1									0.3												
Elphidium singaporense																													
Elphidium vitreum											0.3																		
Elphidium spp.					0.1			0.1				0.2			0.2		0.3												
Eponides cribrorepandus						0.1		0.1		0.1																			×
Eponides repandus						×	0.1	0.3	0.2	0.3						0.1													
Euloxostomum pseudobeyrichi												0.2	1.6	1.1	2.5	1.3	0.2	×											
Facetocochlea pulchra			3.0	0.7	2.5	2.0	3.0	2.3	1.7	3.4	1.8	2.3	4.7	3.7	3.7	2.8	0.8	2.6	×										4.2
Fijinonion fijiense			1.0			0.2	0.9	0.6	0.4	0.3	0.5	0.4	0.8	0.8	0.5		0.2	0.8	0.7	0.1						0.3			0.8
Fissurina bradii																													
Fissurina bradyiformata	0.3	1.1																						0.6		0.3	0.2		
Fissurina formosa							0.1													0.3	0.2	0.1	0.3	0.4	0.2	0.1	0.2	0.3	
Fissurina orbignyana																										0.1	0.2		
Fissurina submarginata	0.2	0.4																				0.6	0.6	0.2	0.4	0.1			
Fissurina spp.		0.6	0.2					0.1										0.1	0.4	0.1	0.2		0.1		0.4	0.4	0.2		
Floresina philippinensis												0.2																	0.3
Fontbotia wuellerstorfi	0.9	0.6																			0.8		0.6	1.6	0.4	2.9	1.7	0.5	
Fursenkoina pauciloculata																										0.1		0.3	
Fursenkoina schreibersiana																			×	0.1									
Gavelinopsis lobatulus																			0.7	0.3	0.7		0.4	1.6	1.7	0.3	1.2	3.6	
Gavelinopsis praegeri						0.3				0.3							0.1		×										
Gavelinopsis translucens																				0.1		0.5	0.1	0.2	1.1	0.9	0.2	0.3	
Geminospira bradyi																													
Glandulina laevigata			0.3		0.1	×	0.1		0.3					0.3	×		0.3												0.1
Glandulina torrida			0.1								0.3				0.5				0.3	0.3									
Glandulina spp.																				0.1									
Globobulimina pacifica															0.5					0.1						0.5			
Globocassidulina gemma		0.1																0.1					0.4					0.5	
Globocassidulina minima	0.5	0.2																									0.2		
Globocassidulina subglobosa		0.3																	×	1.4	2.6	0.4	1.9	2.5	0.6			2.0	
Gordiospira elongata																													
Grigelis orectus							×	0.1			0.3				×					0.3		0.5			0.2				0.6
Grigelis semirugosus				0.1																	0.2								
Gyroidina altiformis	0.3	0.3				×			0.1			×	×				0.1	0.7		0.2	0.2		0.1	0.4	0.4	0.7	0.6		0.3
Gyroidina broeckhiana		0.4																		1.0	0.4	1.0	0.7	0.9	0.2	0.7	1.6	0.5	
Gyroidina lamarckiana	0.3	0.3											0.3		0.3	0.3	0.2								0.2	0.4	0.2	0.5	
Gyroidina neosoldanii	0.3	0.2														0.4				0.1		0.4	0.4			0.4	0.3		
Gyroidina orbicularis	0.3	0.6				0.2	0.1												×		0.2	0.1				0.4	0.6		
Gyroidina sp. 2	0.2																									0.4			
Gyroidina spp.	0.2																	0.3	0.3										
Gyroidinoides nipponicus	0.2	0.2																0.1		0.1			0.2		0.2		0.2	0.3	
Gyroidinoides soldanii																			1.1	0.2	0.1								
Gyroidinoides sp. 1																		0.3	×										
Hanzawaia boueana			0.2	1.1	0.1		×		0.1								0.3												
Hanzawaia concentrica									0.2		1.0					0.3	0.0	0.1	1.8	0.8									
Hanzawaia grossepunctata			2.7	2.9	2.0	3.6	2.1	2.5	1.9	2.3	3.0	2.0	4.1	1.5	2.1	4.4	0.6	1.0	0.1										2.7
Hanzawaia nipponica					0.3			0.1	0.2			0.2	0.3	1.1	0.2		4.5	5.5	1.5										0.6
Hauerina fragilissima				0.6					0.4																				
Helenina anderseni			0.4	0.4	0.7	0.5	0.2	0.1	0.7	0.6	0.3	0.3	0.3	0.8	0.3	0.4	0.1	0.2	×										0.3
Heterolepa dutemplei aff.			8.4	3.4	5.9	8.5	4.3	8.5	6.2	6.9	4.3	4.1	2.5	3.9	0.1	0.9	1.5	1.6	×										3.8
Heterolepa margaritifera			0.4	0.6	0.3	0.3	0.1	×	0.4	0.1	0.3	0.3			0.1	0.1		×											
Heterolepa margaritifera type 1			0.1				0.1			0.1	0.1	×																	
Heterolepa margaritifera type 2			0.4	0.4	0.3	0.1	0.2	0.3	0.7	0.1	0.7	0.1	0.3	3.9			0.2	×											0.4
Heterolepa ornata																			0.3	0.1									
Heterolepa praecincta			0.1	0.2	0.2	0.3	0.1		0.1	0.3	0.4	0.2				0.1	0.5		0.2										
Heterolepa subhaidingerii			0.4		0.3	0.3	0.2	0.8	0.3	0.9	0.2	0.9	0.2	0.4		0.1	0.5												0.2
Heterolepa sp. 1			1.0	0.4		0.3		0.2		0.3		0.8	0.5			0.3	0.2	0.1			0.2								0.6
Heterolepa sp. 4																			0.1										
Heterostegina depressa																0.3													
Hoeglundina elegans			0.7	1.0	0.9	0.6	0.1	0.7	2.8	1.8	1.1	2.1	1.5	2.0	1.4	1.4	2.3	0.4	0.4	0.8	1.3	1.1	0.8	1.3	0.4	0.5	0.3	0.3	0.9
Hoeglundina elegans type 3			0.5			×		0.1	0.1			0.5	0.1	0.1		0.3	0.4	1.1		0.3			1.2			0.4			1.1
Hyalinea balthica			0.5	0.2	0.3		0.7	0.1	0.4		0.5	0.4		0.3	0.7	1.3	0.1	0.4	0.4	4.2	0.5								2.5
Hyalinonetrion sahulense																0.3			×										
Inaequalina disparilis				0.2	0.1		×							0.3	0.7			×											×
Inaequalina venusta								0.2			0.3	0.2			×	0.3	0.1												
Islandiella japonica				0.2	0.3	0.8	1.2	0.2	0.4	0.6	1.0		0.5	0.6		1.6	0.5	4.0	×										
Lachlanella compressiostoma			0.4	0.7		0.3	0.3	0.1		0.1	0.9	0.1	0.3	0.3	0.3	0.1			×										0.6
Laevidentalina bradyensis		0.1													0.2		0.2			0.3		0.2	0.1	0.2		0.3	0.2	0.2	
Laevidentalina filiformis																				0.3									
Laevidentalina inflexa	0.2			0.2			0.2																					0.1	
Laevidentalina sidebottomi											0.6									0.4	0.1		0.2						
Laevidentalina subemaciata	0.2			0.1	0.1			0.2				×					0.2											0.1	
Laevidentalina subsoluta		0.2	0.1						0.3										×			0.2	0.1		0.2	0.1	0.3	0.2	
Laevidentalina spp.	0.2					0.2						0.2				0.3				0.3								0.3	
Lagena annellatrachia																	×												
Lagena dorbignyi																0.3									0.2				
Lagena gibbera																										0.3		0.1	
Lagena hispida																			×										
Lagena hispidula	0.3																										0.2		
Lagena perlucida																	0.1												
Lagena semistriata																													

(+) species / station no. 18-	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323
Elphidium reticulosum						0.7	0.3									×											0.1	
Elphidium singaporense				0.2	0.7	0.2										0.9											0.2	
Elphidium vitreum												0.3				0.3												
Elphidium spp.							0.3							0.1				0.2									0.4	
Eponides cribrorepandus					0.1								0.1			×				0.1				0.2	×			0.1
Eponides repandus	0.1	0.3	×	0.2	0.3		0.4	0.1		0.1			0.4	0.4	0.1			0.3	0.1			0.7	0.5	0.2	0.1		0.1	
Euloxostomum pseudobeyrichi																												
Facetocochlea pulchra	3.9	3.9	2.4	1.2	1.6	1.3	0.6	1.5	3.5	5.2	1.5	2.5	1.8	5.6	3.1		2.2	2.4	2.1	1.7	1.2	1.7	1.3	1.2	2.1	4.6	2.2	3.8
Fijinonion fijiense	0.4	1.2	0.7	1.0	0.7	0.6	1.2	1.3	1.0	1.2	0.8	0.8	0.9	1.0	1.5	1.8	1.4	0.2	1.1	0.3	0.4	1.7	0.9	0.5	0.5	1.6	0.6	1.0
Fissurina bradii															0.3													
Fissurina bradyiformata	0.7																											
Fissurina formosa																												
Fissurina orbignyana																												
Fissurina submarginata															0.1													
Fissurina spp.											0.5													0.2				
Floresina philippinensis					0.1	0.2			0.2			0.5					0.2		0.2									
Fontbotia wuellerstorfi																												
Fursenkoina pauciloculata															0.1													
Fursenkoina schreibersiana																												
Gavelinopsis lobatulus																												
Gavelinopsis praegeri	1.4	0.6													1.0	0.6									0.8			
Gavelinopsis translucens																												
Geminospira bradyi															0.1													
Glandulina laevigata			×			0.5			0.1		0.5	0.3		0.2	×		0.2			0.1	×	0.6	0.1					
Glandulina torrida			×		0.1										×	×					×						0.1	
Glandulina spp.																												
Globobulimina pacifica																												
Globocassidulina gemma																												
Globocassidulina minima																												
Globocassidulina subglobosa																												
Gordiospira elongata															0.1													
Grigelis orectus										0.1	0.3																	
Grigelis semirugosus			0.3										×	0.1			0.1	0.3										
Gyroidina altiformis	0.4	0.3							0.2																			
Gyroidina broeckhiana																												
Gyroidina lamarckiana																												
Gyroidina neosoldanii																												
Gyroidina orbicularis																												
Gyroidina sp. 2																												
Gyroidina spp.																												
Gyroidinoides nipponicus																												
Gyroidinoides soldanii																												
Gyroidinoides sp. 1																												
Hanzawaia boueana											×	0.3	0.7	0.4	0.7	0.3												
Hanzawaia concentrica	0.7		0.3			0.6											0.2					0.9		0.2	0.5		0.4	
Hanzawaia grossepunctata	1.1	3.7	3.0	2.8	2.4	2.6	3.0	2.4	1.1	1.8	0.6	1.1	3.1	1.9	1.4	0.7	0.6	2.9	1.5	1.2	1.1	2.9	4.3	2.4	5.1	3.9	4.2	3.5
Hanzawaia nipponica			0.7	2.1	5.2	4.6	0.3	2.2	0.2				1.8	0.2	1.5		1.0	1.0		3.3	×	2.0	0.4	0.9	0.5	6.4	1.0	
Hauerina fragilissima			0.3		0.6		0.1									1.2												
Helenina anderseni		×	0.3	0.8	0.6	1.3	0.6	0.7	1.8	0.4	0.8	1.4	0.4	1.3	0.7	0.6	1.4	0.4	0.3	1.3	0.5	0.1	1.3	0.5	1.4		0.4	1.1
Heterolepa dutemplei aff.	1.5	7.5	10.3	8.6	8.9	8.8	11.1	12.7	4.8	5.0	2.3	4.2	9.0	8.1	4.1	3.9	5.6	10.0	10.5	11.0	5.9	9.3	11.4	12.0	6.6	18.9	10.5	13.5
Heterolepa margaritifera			0.1	0.3	0.2	0.2	0.2	0.1	0.7	1.6	×	0.4		0.1	0.9		0.5	0.4	0.6									0.1
Heterolepa margaritifera type 1	×	0.4						0.1																				
Heterolepa margaritifera type 2	0.1	0.2																	0.3									
Heterolepa ornata																												
Heterolepa praecincta			0.2	0.2	0.2		0.3	0.2	0.1	0.1	×		0.1	0.5		0.3	0.1	0.4	0.6		0.3	0.1	1.0	0.9			0.3	0.3
Heterolepa subhaidingerii	0.4	0.1	0.1		0.3	0.3	0.4	0.5	0.3	0.5			0.4	0.2	×	0.2	0.1	0.2	0.2		0.1						0.2	
Heterolepa sp. 1	0.7	0.9		0.4	0.1			0.7	0.6	1.2		0.8						0.3									0.4	0.2
Heterolepa sp. 4													7.8	1.1	×			0.2		0.2	0.9	0.1	0.5		0.1			
Heterostegina depressa							×						×							×	×						0.1	
Hoeglundina elegans	0.6	0.2	0.6	0.4	0.5	0.4	×	0.5	0.5	0.4			0.1	0.1	×		0.7	0.9	2.1							×		
Hoeglundina elegans type 3																												
Hyalinea balthica	0.4	3.6	0.3	0.4		0.2		0.4	1.4	1.4		0.5	0.2	0.6	1.4		0.2	0.2										
Hyalinonetrion sahulense																												
Inaequalina disparilis								0.1			×	0.1			0.1		0.3	0.2	0.1									
Inaequalina venusta		0.3	×							0.2		0.3		0.3				0.1										
Islandiella japonica	0.7	0.6	1.0	1.0	2.7	1.7	1.2	0.4	0.8		1.8	1.1	0.9	2.5	1.5	0.3	1.2	1.7	0.7	1.3	3.2	6.1	8.1	4.9	2.9	4.4	0.6	6.2
Lachlanella compressiostoma	0.1	×	0.3		0.3	0.2		0.1	0.5	0.1	1.0	0.9			×	1.0	1.0		0.1	0.1	0.1				0.5		0.1	
Laevidentalina bradyensis				0.1									0.2															
Laevidentalina filiformis														0.1												×		
Laevidentalina inflexa			0.3																									
Laevidentalina sidebottomi																												
Laevidentalina subemaciata																												
Laevidentalina subsoluta			0.3				×			0.1						0.3												
Laevidentalina spp.					0.1																							
Lagena annellatrachia	0.4			0.1		0.4			0.2		×	1.1			1.2	0.3	0.2											
Lagena dorbignyi	0.7	1.2								0.2	0.3		0.2															
Lagena gibbera																												
Lagena hispida									0.2																			
Lagena hispidula				0.1													0.2	0.2										
Lagena perlucida									0.2						0.1													
Lagena semistriata				0.1		0.2				0.5	0.5		0.2							0.3								

Appendix B.4c. Counting data of empty tests (+) of the benthic foraminifera in surface samples on the Sunda Shelf. Numbers are given in percentages of indiv./100 cc.

(+) species / station no. 18-	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323
Lagena stelligera	0.2																																0.1											0.3													
Lagena striata			0.2				0.4	0.1					0.5		0.2	0.3				0.1														0.3						x						0.5											
Lagena substriata	0.3	0.1															x		1.0								0.2	0.3		0.4				0.1										0.8											0.2		0.1
Lagena spp.		0.6									0.3												0.2			0.3	0.2	0.3							0.1		0.4			0.5						0.5				0.4	0.3		0.2				
Lamarckina scabra			0.1		0.1	1.0	0.2	0.2			0.3	0.6	0.6	0.2	0.5	0.8													0.1	x	x		0.2				0.1	x	0.1				0.1														
Lamarckina ventricosa				0.1	0.1		x	0.4			0.1				0.2		0.2												0.9			0.1	0.1	0.1																							
Laticarinina pauperata		0.4																				0.6	0.4		0.6	0.1	0.5	0.7																													
Lenticulina anaglypta			x	x	x	x			x	x		x																				x					x	x				x	x	x		x	x										
Lenticulina antillea								0.3		0.1		x		0.1			0.3												0.1																												
Lenticulina atlantica			1.1	0.2	0.3	1.3	0.6	0.8	1.7	2.2	0.4	0.7	0.1	0.2	0.5	0.2	0.5	1.4	0.1	0.3	0.3								0.7	0.9		0.1	0.1		x		0.6	0.1					0.5					0.2		0.8					0.5		0.1
Lenticulina calcar			0.9	1.0	0.8	1.4	0.1	0.8	1.6	0.6	2.3	2.0	1.1	4.0	0.8	0.9	1.9	0.7	1.1	2.3									0.3	0.8	1.0	0.3	0.4	0.3		0.7	1.5	0.8	0.5		x	0.4	0.1	0.3		0.2	0.1	0.3							0.2		
Lenticulina compressa				0.1								x																																													
Lenticulina convergens													0.5				0.7			0.1																																					
Lenticulina echinata			0.2		0.2	0.2	0.1	0.6	0.6	0.3	0.1	0.2	0.3	0.9				0.3	x										0.3	0.2	0.2						0.1	x	0.2									0.1									
Lenticulina gibba	0.2	0.4				0.2	x	0.3		0.3			0.3	0.1	0.7		x		0.3	0.2	1.3	0.7	0.3			0.5	0.3	1.4		0.4				0.1														0.1									
Lenticulina iota					x			x																													x																				
Lenticulina melvilli				0.1	0.1	0.1		0.1				x					0.1	0.3																	0.4																						
Lenticulina submamilligera			0.1	0.1	0.1			0.3	0.1		0.3	0.5	0.8	0.6	x	0.1	0.3			0.1	0.1								x	x	x						0.2		0.1	x	x		0.1														
Lenticulina suborbicularis			x								0.1	x		0.2				x		1.1										x	0.1	x	0.1						0.1		x							0.1									
Lenticulina thalmanni							0.1	0.1	0.1	0.1	0.3			0.0		0.1		x				0.2						0.2				x					0.1	0.1				x					0.1										
Lenticulina vortex			0.2		0.1	x		x																							0.1						0.1																				
Lenticulina sp. 1												x					0.2	0.1	x																																						
Lenticulina sp. 2				0.1	0.1												0.1													0.4		x		0.2					0.1																		
Lenticulina spp. (juv.)											0.3	0.2															0.2			0.4			0.1																								
Lenticulina spp.		0.1	0.5	0.7	1.1	0.1	0.4	0.2	0.3	x	0.1		0.3	2.3		0.1	0.3	0.4	x	0.5	0.1				0.2		0.2	0.1	0.4	0.1	0.4	0.7	0.1	0.1	x		0.7	0.2	0.2		0.5	0.2	0.1	0.1		0.1	0.7	0.5				x				0.2	
Lernella inflata																				0.3	0.1						0.2												0.1																		
Loxostomina mayori																																													x					0.4							
Marginulina glabra																			0.7			0.1																																			
Marginulina musai																			x									0.3																													
Marginulina obesa		0.1	0.2																																																						
Marginulina striata									0.4			x		0.3				0.1																					0.2								0.2										
Marginulina spp.						x	0.1	0.1				0.2			0.2		0.0				0.4	0.5				0.1	0.2											0.2									0.2										
Marginulinopsis philippinensis			0.1		0.1				0.1																					0.1																											
Marginulinopsis tenuis																	x		0.3																																						
Melonis affinis	0.3	2.7																1.1	0.2	1.8	0.2	1.2	1.1	1.2	0.6	1.8	1.7	1.7																													
Miliolinella subrotunda											0.3	0.2	0.6						x											0.7																											
Miliolinella spp.							0.2						0.3						0.1		0.1	0.1			0.4	0.3	0.2																														
Millettiana millettii												0.2																						0.2	0.2					3.2	1.1				6.7												
Mississippina chathamensis				0.3	0.7			0.1	0.7				0.3			0.7	x													0.4	0.3										0.3					0.2		0.2									
Neocassidulina abbreviata																		0.3																									0.2	0.4													
Neoconorbina tuberocapitata															0.2	0.9	x		0.4											0.7																											
Neoeponides auberii																	x																					0.2			0.3	0.2		0.1			0.2										
Neoeponides bradyi			0.2	0.2	0.1	0.1			0.3		0.2	0.2		0.3		0.1													x	x					0.1	0.1	0.1			x	x				0.1			x				0.1				0.1	
Neoeponides sp. 1																																		0.1	0.6																						0.1
Neolenticulina peregrina				0.4			0.3				0.3		0.8	0.6	0.8	0.6	x	x	0.7	1.0		0.4						0.3	0.3		0.6	0.3	0.1	0.1			0.2		1.2		0.3					0.2	0.2	0.4									
Neouvigerina ampullacea	0.2	0.1													0.2			0.3			1.3		1.8	0.3	0.4	0.5	0.3	0.5								0.3																					
Neouvigerina interrupta													0.5																			0.7							0.5	x	0.5																
Neouvigerina proboscidea			0.5	2.8	2.1	1.3	10.0	0.7	0.2		0.8	2.7				0.6	0.1		1.7									1.6	2.8	5.7	5.7	2.7	1.7	1.5	1.5		0.7	3.1	2.1	2.8	12.0	0.4	0.2	8.6		5.1	1.5	1.2		0.4	3.5	0.6	0.2	0.5	10.1	0.2	1.6
Nodophthalmidium simplex			0.7		0.5	0.4	0.4	0.2	0.1				x	0.3	x	0.9	0.3												0.4				0.1	0.3	0.3	0.1		0.4	1.0		x		0.2	1.7			0.3	0.5		0.4	0.6		0.5	0.3			
Nodosaria lamnulifera			0.2	0.2					x					x																																											
Nonion fabum				0.3														1.0																														0.2									
Nonion japonicum											0.6						1.2	x	1.8										0.3						0.1	0.3			0.5							0.2	0.2		0.7		0.3			0.3	0.5		
Nonion subturgidum				0.1						0.6	0.3						0.3	1.0													0.3		0.1				0.2			0.3	0.3				1.4								0.2				
Nonionoides grateloupi																											0.2																	0.1													
Nubeculina divaricata			0.3	0.2	1.0	0.3	0.1	0.5					0.1				0.2												0.9	0.8	0.1	0.6	0.3	2.1	1.8	1.5	0.7	0.7	1.6	0.3	0.2		0.5	0.8	4.5	1.1	0.4	0.1	2.9	1.8	2.3	1.7	1.7	4.8		2.9	1.2
Nummulopyrgo anomala																													0.3	0.4				0.1																							
Nummulopyrgo globulus					0.3		x	0.1		0.1		x	x		0.2	0.1			x		0.2	0.5	0.1		0.2	0.1					x	x				0.3	0.1	0.2		0.3	0.1		0.5	x	0.1	0.1							0.1	0.1	0.3	0.2	0.4
Nuttallides rugosus																				2.1	1.5	1.0	3.2	1.6	0.2			9.2																													
Oolina hexagona																0.3													0.6								0.2	0.2																			
Oolina squamosa				0.2				0.1									x	0.1															0.1								0.3																
Oolina spp.	0.2								0.2										0.3																																						
Operculina ex gr. ammonoides			1.9	2.6	2.2	0.7	0.1	2.1	3.4	3.3	0.3	0.1	0.6	0.3	0.5	1.2	4.1											0.1	0.6	0.8	0.9	0.5	0.1	2.5	2.4	7.2	0.3	1.0		0.5	0.3	1.8	1.5		2.1		0.5	0.6	0.1	2.2			0.2	x		1.5	
Operculina bartschi			x	x	x				x	x																						x			x	x							x														
Operculina sp. 1										x																										x														x						x	
Operculina sp. 2				1.5	0.1			0.1	0.3	0.4							0.7	0.4																1.5	1.6	1.4						0.4	0.1		0.1		x	0.1									
Operculina sp. 3																																													1.5					0.1						x	
Operculina sp. 4			0.1																																										0.1					0.1							
Operculina spp.									0.2	0.3		0.1					0.7																		0.1	0.1							x					x		0.8			x	x		0.2	
Oridolsalis umbonatus	1.4	2.9			0.1	0.2	0.4		0.4		0.1	0.2	0.3	0.3	0.2		x	0.1		0.8	1.0	1.2	1.5	1.1	2.1	2.6	1.6	0.9											0.1					0.1													
Oridorsalis sp. 1	0.3																									0.3																															
Osangularia culter	0.2	0.6																				0.5	0.8	1.2	1.1	1.5	1.1	2.4																													
Paracassidulina minuta					0.1													0.1	0.4	0.2								0.8																													
Paracibicides endomica							0.1	0.5	0.4				0.8				0.2	0.1	x		0.2									1.1	2.1	0.3		0.3		x	0.2	1.7	1.2					1.2	2.1	1.0	0.5			2.4		0.4		0.3			0.2
Parafissurina lateralis		0.7															x										0.3																														
Parafissurina subventricosa	0.2	0.8			0.1									0.3								0.2			0.6	0.4	0.2	0.5																0.1													
Pararotalia sp. 1									0.2	0.6		0.4	0.3	0.6	0.5	0.6	6.1	6.1	5.2																							0.2															
Pararotalia sp. 2					0.1						0.5		0.5				2.5	0.3	2.2															0.1										0.4													
Parrelloides bradyi	2.1	2.6																			0.3	0.2	0.3	1.1	3.6	3.0	4.4	0.8																													
Planispirinella exigua			0.2		0.3				0.2	0.6																								0.1	0.2	0.3									3.7		0.2	0.1									
Planorbulinella larvata				x					0.1	x																								0.1	0.1	0.4	x						x														
Planularia californica				0.1	0.1	x	x				0.1			0.1	0.2	0.1	0.2	x	0.1											0.1																											

Appendix B.4c. Counting data of empty tests (+) of the benthic foraminifera in surface samples on the Sunda Shelf. Numbers are given in percentages of indiv./100 cc.

(+) species / station no. 18-	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295
Planularia gemmata			0.7	0.2	0.1	0.6	0.1	0.3	0.1		0.3	0.5	0.1	0.5	0.2	0.2	0.6		0.1										0.2
Planularia patens												0.2				0.3		0.1											
Planulina floridana					0.4	0.3		0.4	0.3	0.4									0.3			0.2	0.1					0.3	x
Planulina retia													0.6	0.1	x	0.1	x		x					0.2				0.8	
Planulina sp. 1																		0.5	0.4										
Polymorphina group		0.2														0.1				0.1									
Poroepistominella decoratiformis			1.6	1.4	1.9	1.6	0.5	2.5	3.7	4.1	2.8	1.2	1.1	1.8	0.2	0.6	0.3	0.6											0.5
Praeglobobulimina ovata	0.2		0.1		0.1		0.1	0.4	0.1		0.1	x	x	0.1	0.1				0.4	0.3	0.2			1.0		0.5			0.3
Praeglobobulimina spinescens																						0.1	0.2			0.1	0.2		
Proemassilina arenaria									x					0.1															
Proemassilina sp. 1																		3.3	0.2										
Pseudoeponides japonicus	0.2	0.4																		0.1	0.3	0.1		0.2		0.4	0.5		
Pseudoflintina laculata			x	0.3	0.1	0.1	0.1		0.1	0.1		0.1																	
Pseudoflintina triquetra						x																							x
Pseudohauerina orientalis				0.4																									
Pseudohelenina collinsi cf.												0.6																	
Pseudolachlanella artusoris					0.3	x				0.3						0.1		0.1											
Pseudolachlanella slitella			0.2	0.2	0.3	x	0.2											x										0.1	
Pseudonodosaria glanduliniformis														0.3	0.5				x				0.1						
Pseudononion granuloumbilicatum			0.1	0.1	0.1	x	x			0.3																			
Pseudoparrella exigua		0.4																		0.3									
Pseudorotalia indopacifica			0.1	x	0.1	0.6	0.1	x	0.3	0.2	x	0.1		x		0.1													
Pseudorotalia indopacifica (juv.)							x	0.5	0.3	0.2	0.3	0.1		0.1				0.1											
Pseudorotalia schroeteriana			x	x	0.7	0.1		0.3	x	0.4		0.3				x	0.3												
Pseudosolenina wiesneri		0.1																			0.2								
Pseudotriloculina lunata			0.1		0.1												0.2												
Pullenia bulloides	0.3	0.7																0.3	0.7	1.6	1.1	0.4	2.1	1.1	1.9	2.4	1.6	1.3	
Pullenia quadriloba		0.2																				0.1		0.6	0.2	0.9			
Pullenia quinqueloba	0.2	0.4			0.3		0.4				0.3	0.8	0.3		0.7	0.3			1.1	0.1	0.3		0.1		1.5		0.5	1.6	
Pullenia salisburyi		0.1															x				0.2	0.1		0.2		0.3	0.2		
Pullenia sp. 2																				0.1								0.1	
Pygmaeoseistron nebulosa																										0.4			
Pygmaeoseistron setigera																													
Pyramidulina catesbyi																													
Pyramidulina luzonensis			0.4	0.4	0.2	0.8	0.7		0.3	0.3		0.6	x	0.4	0.1	0.1	1.0	0.4											
Pyrgo bougainvillei														0.3			0.1												
Pyrgo depressa	0.2	0.1	0.2				0.2	0.1			0.6	x		0.1	0.3	0.2	0.3	x	0.1	0.2	0.3	0.1	0.2	0.8		0.3	0.2		x
Pyrgo murrhina	0.2																						0.6		0.2	0.3	0.8		
Pyrgo nasuta	0.3																		0.3		0.1		0.5	0.8		0.1			x
Pyrgo pacifica				0.1														0.1								0.3			
Pyrgo sarsi		0.2	0.1	0.3	0.3	0.1		0.1	0.3			x	x		x	0.1	0.5												x
Pyrgo serrata							0.1																						
Pyrgo sp. 1					0.4									0.6															0.6
Pyrgo sp. 2	1.0																									0.3			
Pyrgo spp.	0.3					x	0.1	0.3					0.1		0.2	0.1	x												
Pyrgoella tenuiaperta			1.1	0.2	0.3	x	0.7	0.4	0.1	0.5	0.3	x	0.3	0.1	0.3	0.1	0.1												0.1
Pyrulina angusta																							0.2						
Quinqueloculina adiazeta																													
Quinqueloculina akneriana																		0.4			0.2				0.2	0.1			
Quinqueloculina auberiana		0.2	0.5	0.2		0.5	0.5	1.1	1.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1		x											0.3
Quinqueloculina bicarinata			0.5	0.4	0.1	0.2	0.1	0.3		0.1		x		0.3															0.3
Quinqueloculina collumnosa			0.1			0.2	0.2	0.3	0.1	0.3	0.4	0.2		0.1															
Quinqueloculina fichteliana										0.1																			
Quinqueloculina laevigata				0.1									0.3				0.1		x	0.3									
Quinqueloculina lamarckiana			0.2	1.3	1.1	0.3	0.7	0.5	2.0	0.2	0.3		1.0	0.1	1.3	0.1	1.3	0.4	0.3					0.4		0.3	0.5		0.4
Q. philippinensis ex gr.			0.1	0.3	0.3	0.3			0.4	0.1	0.1	0.1	0.6			0.1	0.2	x											
Q. pseudoreticulata				0.1	0.2	0.2			0.1	0.1																			
Qu. quinquecarinata																	x												
Quinqueloculina sagamiensis			0.2			x			x	x		0.1																	
Quinqueloculina seminulum	0.5	0.2	3.3	2.9	1.4	3.2	1.7	2.0	1.2	3.4	1.4	x	0.3	1.1			1.1	2.4	x										1.7
Quinqueloculina tropicalis							0.1												x										
Quinqueloculina venusta	0.2														0.2														
Quinqueloculina sp. 1															0.1		x												
Quinqueloculina spp.		0.1	0.2	1.4	1.3	0.2	0.5	0.6	1.3	0.1	0.3	x	0.4	0.1			0.2	0.2	3.8	1.4	0.2			0.2			0.2	0.5	0.4
Ramulina angusta							0.1			0.1			0.8		0.5	0.3	0.7			0.6									0.6
Ramulina globulifera			0.2	0.2	0.1	x	0.4		0.1		0.3	0.1	0.6	0.6	0.8	0.1	0.7		0.1	0.9									0.1
Reussella pulchra					0.3	0.3	0.2	0.2																					
Reussella spinulosa			0.5	1.0	0.4		0.1	0.1	0.7	0.3	0.5	0.4	0.3	0.3	0.2	0.9	0.3	0.3	0.4										1.1
Robertina tasmanica																0.3	0.1												
Robertinoides wiesneri				0.2			0.4	0.1				0.2			0.2				x	0.1		0.1							
Rosalina globularis			0.2	0.2	0.3		0.5	0.1		0.3		0.8	0.3	0.8	1.2		0.1	0.1	0.3	0.1									1.7
Rosalina vilardeboana						0.2							0.5				x	x		0.3									
Rosalina sp. 1																	x	0.4	x										
Rosalina spp.																	0.1		x										
Sagrina zanzibarica																	0.1	0.1		0.3									
Saidovina amygdalaeformis			0.9	0.2	0.5	0.6	0.2	0.6	1.1	0.8	0.8	0.3	x		0.5		0.2	0.1											0.9
Saidovina subangularis																		x	x										
Saintclairoides toreutus							0.3	0.3	0.2			0.6	0.3	0.6	0.8	0.9	0.3		x										
Saracenaria altifrons					0.1		0.1								x	0.6	x		x	0.5	0.1							0.3	x
Saracenaria angularis													0.3						x										
Saracenaria italica			0.1			0.1	x			0.1	0.1			0.1					x	0.1		0.1							

(+) species / station no. 18-	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323
Planularia gemmata	x	0.1	0.3			0.1		0.1	x	0.5				0.1	x		0.1	0.2	0.2									
Planularia patens																												
Planulina floridana	0.2	0.1	0.1	0.4	0.1				x				x	0.3	x												0.4	
Planulina retia																												
Planulina sp. 1																												
Polymorphina group						0.1								0.1														
Poroepistominella decoratiformis	0.9	1.7	0.9	1.3	0.6	0.8	0.6	0.8	0.2	0.1		0.1	0.5	1.4	x		0.4	1.2	1.1	0.4	0.1	0.1	1.2	0.5	0.7		0.4	0.8
Praeglobobulimina ovata	x			0.1																								
Praeglobobulimina spinescens																												
Proemassilina arenaria						x																						
Proemassilina sp. 1																												
Pseudoeponides japonicus																												
Pseudoflintina laculata			x	x				x											0.1									
Pseudoflintina triquetra				0.1																						x		
Pseudohauerina orientalis					0.1	0.1										0.6												
Pseudohelenina collinsi cf.																												
Pseudolachlanella artusoris					0.1		0.3	0.2						0.1	x												0.2	
Pseudolachlanella slitella																												
Pseudonodosaria glanduliniformis																												
Pseudononion granuloumbilicatum																												
Pseudoparrella exigua																												
Pseudorotalia indopacifica		0.1	0.2		x	x	0.2	0.1	0.2	0.3	x		0.1	0.3	x	x	0.1	0.1	0.6	0.4	0.1	0.4	0.8	1.3	0.1	0.1	0.2	0.2
Pseudorotalia indopacifica (juv.)	0.1	0.4	0.2	0.3	0.2	0.1	0.1	0.7	0.3	0.2	x	0.1	0.2	0.4	x		0.4	0.7	0.5	0.2	0.3		0.2	0.6	0.1	0.1	0.3	0.6
Pseudorotalia schroeteriana		x	x	x	0.3	0.3	0.3	0.4	x	0.1	x	0.1	0.6	1.1	x	0.1	0.1	0.4	0.5	0.6	0.4	0.3	0.6	0.6	0.1	0.2	0.9	0.8
Pseudosolenina wiesneri																												
Pseudotriloculina lunata																												
Pullenia bulloides																												
Pullenia quadriloba																												0.1
Pullenia quinqueloba	0.7			0.3	0.1			0.4		0.5	0.5	0.3			0.3		0.5											
Pullenia salisburyi																												
Pullenia sp. 2																												
Pygmaeoseistron nebulosa																												
Pygmaeoseistron setigera																	0.2							0.2				
Pyramidulina catesbyi																												0.4
Pyramidulina luzonensis	0.4	0.3		0.1	0.1						x	0.3			0.3						x		0.4					
Pyrgo bougainvillei																												
Pyrgo depressa	0.4		x		0.1		0.1	0.1	0.5	0.2	0.1	0.3	x	0.1	0.4													
Pyrgo murrhina																												
Pyrgo nasuta																												
Pyrgo pacifica																												
Pyrgo sarsi		x			0.1	0.1	0.2		x				0.4				0.1	0.1	0.1		x	0.6						
Pyrgo serrata														0.1														
Pyrgo sp. 1	0.4			0.3	0.2						0.3		0.2				0.2				0.8							
Pyrgo sp. 2																												
Pyrgo spp.	0.7			0.1	0.1			0.2	0.2		1.0	0.3											0.1					
Pyrgoella tenuiaperta	x	x	0.7	0.5	0.6		0.1	0.4	1.0	1.2	1.3	0.6	0.4	0.2	0.6	0.1	0.6	0.2		0.8		0.3		0.3	0.3		1.0	
Pyrulina angusta																												
Quinqueloculina adiazeta											x																	
Quinqueloculina akneriana																												
Quinqueloculina auberiana	x	0.2	x	0.2		0.1	0.1		0.3	0.3	0.3	0.7	0.6	0.2	x		0.4	0.3	0.2	0.1	x	0.1	0.4	0.3	0.3	0.9	0.5	0.5
Quinqueloculina bicarinata		x	x		0.4		0.1			0.1	0.3	x	0.7	0.1			0.1	0.3	0.2		x	0.1	0.1	0.2	x	x	0.2	
Quinqueloculina collumnosa	x		0.1		0.1							x			x	0.3				0.3								
Quinqueloculina fichteliana		x	0.3	0.1	0.1	0.1	x	0.1											x	0.2			0.1				0.1	
Quinqueloculina laevigata							0.3	0.4	0.4							0.3								0.5	0.6		0.6	0.3
Quinqueloculina lamarckiana	0.4	0.1	x	0.5	0.1	0.1	0.2	0.4	0.5	0.6	0.1			0.5	0.6			0.6	1.3			0.3				0.2		
Q. philippinensis ex gr.		0.4	0.3	0.9	0.2	0.2	0.2	0.4		0.1	0.8	0.1	0.7	0.7	x	0.1	0.2	0.1	0.3	0.9	0.5	0.4	0.2	0.8	0.2	0.1	0.6	0.1
Q. pseudoreticulata		x						x	x						x					0.2	0.3	x	0.3	0.1	0.2		0.1	0.1
Qu. quinquecarinata													0.4										0.2					
Quinqueloculina sagamiensis								0.1		x		0.1	0.1				0.1	0.1			0.1	x	x					
Quinqueloculina seminulum	0.1	3.2	6.4	5.3	4.6	5.4	3.1	5.3	4.0	0.8	2.0	2.0	3.5	3.3	1.9	1.7	1.2	2.9	5.2	7.3	6.9	3.7	3.5	3.4	8.0	3.1	5.4	1.8
Quinqueloculina tropicalis			0.3						0.2																			0.2
Quinqueloculina venusta									0.2																			
Quinqueloculina sp. 1				1.6	0.3		0.3	0.4	0.2	0.1	0.3	0.1		0.2	x	0.3	0.2		0.1	0.4		0.7	0.2			0.5	0.1	0.2
Quinqueloculina spp.	0.7	0.3	0.3	0.1	0.8	0.8	1.2	0.9	0.7	1.1	0.5	0.9	0.7	1.0	0.4	1.7	0.5	0.7	0.6	0.5	0.9	1.2	0.7	2.8	0.4	1.2	0.9	0.6
Ramulina angusta	x	0.1																										
Ramulina globulifera	0.1		x		0.1					0.1																		
Reussella pulchra	2.1	0.3									0.5								0.2	0.3	0.4							
Reussella spinulosa	1.4		0.7	0.6	2.1	0.4	0.9				0.8		0.4	0.3	0.5	##		0.6	0.2	0.3	1.3	0.3		0.2	1.3		1.0	
Robertina tasmanica																												
Robertinoides wiesneri			0.3			0.1	0.1				x			0.1														
Rosalina globularis	1.1	0.3	0.7							0.7					0.1	0.6	0.5	0.2		0.3								
Rosalina vilardeboana				0.1						0.2					0.1													
Rosalina sp. 1															0.1												0.4	
Rosalina spp.										0.2		0.3					0.5											
Sagrina zanzibarica									0.2																			
Saidovina amygdalaeformis	0.3	0.5	0.4	0.3	0.3	0.3	0.1	0.5	0.5	0.4	0.1	0.7	0.1	0.6	0.5	0.3	1.0	0.6	0.7		0.1	0.1	0.3	0.2		0.1		0.8
Saidovina subangularis																												
Saintclairoides toreutus	1.1			0.1	0.2			0.2				0.3																
Saracenaria altifrons					0.1																							
Saracenaria angularis				0.1																								
Saracenaria italica	0.4																											

Appendix B.4c. Counting data of empty tests (+) of the benthic foraminifera in surface samples on the Sunda Shelf. Numbers are given in percentages of indiv./100 cc.

(+) species / station no. 18-	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295
Seabrookia pellucida														0.3	0.5														0.3
Sigmoilinita asperula			1.2	1.1	0.3	1.0	0.6	0.2		0.6	0.3				0.7		0.2	0.1											
Sigmoilopsis carinata				0.5								0.6	1.2	1.7	1.7	0.6			x	0.6									
Sigmoilopsis moyi																				0.3								0.1	
Sigmoilopsis orientalis			0.1		0.1	0.1			0.4	0.1		0.1								0.2	0.1								
Sigmoilopsis schlumbergeri	0.7	1.2																		0.3	0.3	1.0	0.9	2.2	1.7	1.8	0.9	1.2	
Sigmopyrgo vespertilio																				0.1	0.1		0.2						
Siphogenerina raphana											0.8	0.7	0.1	0.3	0.8	1.1	3.7												
Siphogenerina striatula																	0.1	6.0											
Siphonaperta crassatina				0.2		0.1				0.1								0.3											
Siphonaperta spp.			0.1			0.7	0.1		0.3	0.1		0.8			0.8	0.3	2.0												
Siphonina bradyana													x	0.2				0.3	1.1	0.8	0.5								x
Siphonina tubulosa			0.3	0.3	0.5	0.2		0.5	0.1		0.4	0.5	0.5	0.8	1.0	2.9	0.9	1.5	0.3										0.6
Sorites marginalis																													
Sphaeroidina bulloides		0.4	0.2		0.1	0.3		0.7	0.4		0.6		0.3	0.1	0.3		0.1	0.2	2.1	0.6	0.2	1.3	0.2	0.4		0.5	0.3	2.0	0.9
Spiroloculina communis			2.8	1.8	1.4	1.2	2.4	1.2	1.0	0.6	2.1	0.3	3.6	0.2	1.7	1.1		0.4	0.4										2.8
Spiroloculina depressa			0.1				x	0.1						0.1				0.1											
Spiroloculina excisa			0.4		0.3	0.3	0.1	0.3	x	0.1			0.2				1.6	x	x										
Spiroloculina eximia																													
Spiroloculina manifesta			0.4	0.5	1.1	0.1	0.3	0.6	0.3	0.6		0.8	0.5	1.2	0.7	0.4	0.7												1.4
Spiroloculina regularis cf.			0.1		0.1				0.1	0.1																			
Spiroloculina robusta cf.				0.1				0.1																					
Spiroloculina scrobiculata			0.2			0.1	0.1								0.2														0.1
Spiroloculina spp.																													
Spirophthalmidium acutimargo																					0.1	0.6		0.4					
Spirophthalmidium concava			0.2		0.1			0.1			0.3				0.2	0.3													0.3
Spirosigmoilina bradyi													0.3		0.2		x												0.8
Spirosigmoilina parri											0.3																		
Spirosigmoilina pusilla							0.1										0.1		x	0.8	0.1								
Spirosigmoilina tenuis	0.9	1.1			0.1														0.3	0.1		0.7	0.4	0.4	1.1	0.3		0.3	
Spirosigmoilina spp.																								0.2			0.3		
Tretomphaloides concinnus																													
Trifarina bradyi																		0.1	0.7										
Triloculina affinis																					0.1								
Triloculina elliptica																								0.7					
Triloculina marshallana													0.5				0.1						0.2					0.3	
Triloculina pentagonalis cf.																													
Triloculina tricarinata	0.2		1.0	0.6	1.1	0.5	0.8	0.9	0.6	0.8	0.9	0.1	0.6	1.1	0.8	0.8	0.7	0.7	0.1	1.1	0.1						0.3		0.3
Triloculina trigonula																	x		x										
Triloculinella californica					0.1			0.2	0.2	0.3	0.1	0.4	1.3	1.1	1.2		0.1		x										0.6
Triloculinella pilasensis															0.2		0.2												1.1
Triloculinella pseudooblonga cf.				0.1	0.2									0.8	1.2			0.1											
Triloculinella robusta			0.5	0.4	0.1	0.3	0.4	0.1			1.3	0.4																	0.1
Triloculinella sp. 1						x								0.3															
Triloculinella spp.																	0.2												
Trimosina multispinata																													
Uvigerina auberiana ex gr.	0.9	0.4																		8.2	10.3	14.5	8.8	6.8	4.2	2.4	0.5	7.2	0.8
Uvigerina bassensis cf.																			1.9										
Uvigerina canariensis cf.							0.1					0.2				0.3	0.2		0.7	1.4									0.6
Uvigerina dirupta																			0.7	0.8	0.1	0.4	1.7	1.3	1.7	0.7		0.8	
Uvigerina hispida		0.1																				0.4	0.9	2.0	0.8	0.3	1.2	1.0	
Uvigerina peregrina																		x	0.3	1.9		0.5	2.5	3.8	3.2	1.1	0.2	1.0	
Uvigerina schwageri type 1 & 2			2.0	1.4	1.7	4.4	0.7	3.3	1.5	4.3	1.7	3.4	3.0	5.3	1.8	2.0	2.3	0.1	0.1										1.5
Uvigerina schwageri type 3			0.1				x					0.1						0.1											0.1
Uvigerina sp. 1					0.3		0.4	0.2	0.6		1.7																		0.6
Uvigerina spp.																	0.1				0.1								
Vaginulina subelegans				0.1																0.3	0.2								
Vaginulinopsis sublegumen					0.1		x							0.3					0.4										
Vaginulinopsis sp. 1			0.2	0.2				0.2								0.3													
Valvulineria minuta	0.2				0.1						0.3			0.3			x	0.4	0.3				0.2	0.4	0.4	0.1			
∑ of species present in single station	0.5			0.2		x	0.1				0.3	x					x	0.6	1.4	2.3	0.8	0.4	0.2		0.4	0.3	0.6	1.8	0.3
unidentified calcareous forams													0.3		1.0	0.3	0.1		0.3		0.2	0.2							0.3
∑ - of tests in 100 cc	584.0	800.5	25958.0	69287.0	95403.0	76367.0	62099.0	201706.7	92914.6	182964.0	24936.0	67156.0	24616.0	5698.0	6436.0	20311.1	6431.6	35221.8	13227.5	2048.4	1731.9	1173.1	2711.4	848.8	669.9	1069.4	902.7	1564.0	11392.0

(+) species / station no. 18-	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323
Seabrookia pellucida				0.4						0.2							0.7											
Sigmoilinita asperula	0.4				0.3			0.2	1.0										0.4		0.4						0.4	
Sigmoilopsis carinata																												
Sigmoilopsis moyi																												
Sigmoilopsis orientalis		x				0.1	0.1	0.4	0.1	0.1	0.2			0.3	x		0.4	0.3	0.3	0.2					0.1		0.1	0.4
Sigmoilopsis schlumbergeri																												
Sigmopyrgo vespertilio																												
Siphogenerina raphana																												
Siphogenerina striatula																												
Siphonaperta crassatina		0.1	0.1	0.4				3.0	0.3	0.6		0.3		0.7		0.3				0.2	0.6		0.6		0.2	0.1	1.1	
Siphonaperta spp.		x	0.2	0.2	0.1		0.3	0.2		0.4	0.1			0.2	0.1	0.1	0.7	0.3	0.1		1.8		0.4	0.5		1.1	1.2	
Siphonina bradyana																												
Siphonina tubulosa	0.8	0.6	0.7		0.2	0.1	1.5	0.4		0.2			0.7	0.2	0.1		0.2		0.5					0.2				
Sorites marginalis								x								1.2												
Sphaeroidina bulloides	0.1	x	1.4	0.5		0.5	1.1	0.1	0.8	0.5	1.0	0.8		0.4	0.8		0.4	0.1	0.3	0.2	x	0.3				x	0.2	0.2
Spiroloculina communis	1.4	0.2	1.1	0.9	0.9			0.1	0.1	0.1		0.0	0.3	0.3	0.4	x		0.2	0.1	0.1	0.5	0.9	0.6	0.5	1.1	0.3	0.5	0.8
Spiroloculina depressa								0.1				x						0.2										
Spiroloculina excisa	0.1	1.9	0.1	0.3		0.1	0.4	0.7	0.2	1.6	0.1	2.6	0.2	0.3	x		0.4	0.2	0.2	0.3	0.1	0.1	0.2		0.1		0.2	0.1
Spiroloculina eximia				0.1							0.3	0.3	x									0.3						
Spiroloculina manifesta	2.5	2.4	0.7	0.2	0.6	0.9	0.3	0.7	2.7	3.5	3.6	1.5		0.2	1.4	1.2	1.4	0.3	1.1	1.2		0.9	0.6	0.9	0.3	x	0.2	
Spiroloculina regularis cf.					0.2																							
Spiroloculina robusta cf.							x																					
Spiroloculina scrobiculata								0.2	x				0.2		0.1	x	0.5				0.4	0.3		0.5	0.1			
Spiroloculina spp.							0.3					0.5		0.2	0.1	0.3						0.3			0.3		0.2	
Spirophthalmidium acutimargo																												
Spirophthalmidium concava			0.3			0.3	0.3		0.2	0.7	3.1	0.3	0.1	0.1	0.3		0.5		0.2	0.3	0.6	0.6	0.3		x	0.2	0.4	0.1
Spirosigmoilina bradyi																1.2												
Spirosigmoilina parri					0.1										0.1													
Spirosigmoilina pusilla														0.2	0.4													
Spirosigmoilina tenuis																												
Spirosigmoilina spp.	0.4														0.3											0.2		
Tretomphaloides concinnus											2.8				0.1	0.6												
Trifarina bradyi																												
Triloculina affinis																0.7												
Triloculina elliptica											0.3												0.2					
Triloculina marshallana																												
Triloculina pentagonalis cf.					0.1											0.4				0.3					x		0.2	
Triloculina tricarinata	x	0.7	0.4	0.9	0.5	0.3	0.2	0.6	0.6	0.6	2.2	1.1	0.5	0.4	0.7	0.6	0.8	0.6		1.9	0.5	0.3	0.5	0.1	0.2	0.3	0.7	0.3
Triloculina trigonula																												
Triloculinella californica	0.7	0.3		0.3	0.8		0.3			0.5	3.1	1.9		0.6	1.2		1.4	0.5		0.3		0.6	0.2	0.5	1.6	0.2	0.2	0.2
Triloculinella pilasensis			0.3		0.2	0.2	x				1.1			0.1		0.3	0.2	0.2		0.2			0.7					
Triloculinella pseudooblonga cf.					0.1	0.2										0.3										0.2		
Triloculinella robusta				0.6	0.3		0.3		0.4						0.1					0.1								
Triloculinella sp. 1						0.2			x		0.5	0.3				0.1					x						0.2	
Triloculinella spp.	0.4										0.3				0.3	0.3												
Trimosina multispinata									0.2							0.3								0.2				
Uvigerina auberiana ex gr.												0.3		2.6														
Uvigerina bassensis cf.																												
Uvigerina canariensis cf.	0.4		x																									
Uvigerina dirupta																												
Uvigerina hispida																												
Uvigerina peregrina																												
Uvigerina schwageri type 1 & 2	2.6	1.3	0.3	0.8		0.2		0.9	0.7	1.0		x			0.1		0.1	0.1	0.6									
Uvigerina schwageri type 3																												
Uvigerina sp. 1								0.2	0.8	0.7		0.3																
Uvigerina spp.																												
Vaginulina subelegans			0.3																									
Vaginulinopsis sublegumen																												
Vaginulinopsis sp. 1		x																0.1	0.2									
Valvulineria minuta																												
∑ of species present in single station	0.7					0.1	0.1								0.5	1.9	0.2				0.4		0.2					
unidentified calcareous forams		0.6	0.1	0.1	0.1	0.2	0.6	0.1		0.2	0.3	0.3	0.1	0.6		1.2	0.5	0.3	0.1			0.7	0.2	0.1	0.3		0.2	1.3
∑ - of tests in 100 cc	17978.0	42848.0	149236.0	197636.0	56661.0	119146.0	86392.0	236072.0	32991.0	6780.0	4168.0	23482.0	233947.0	127929.0	187399.0	10681.0	26587.0	42339.0	113817.0	9632.0	64897.0	22001.0	34623.0	27680.0	24165.0	27895.0	64458.0	57471.0

Appendix B.4c. Counting data of empty tests (+) of the benthic foraminifera in surface samples on the Sunda Shelf. Numbers are given in percentages of indiv./100 cc.