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Bryozoans of the East Siberian Sea: history of research and current knowledge of diversity

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1. Introduction

The East Siberian Sea as well as other seas of Asian sector of the Arctic Ocean is an epicontinental sea. The East Siberian Sea is bounded by Wrangel Island on the east and by the New Siberian Islands Archipelago on the west (Figure 1). Owing to its shallow depth, which averages about 45m, and its location in high latitudes, the East Siberian Sea is characterized by severe environments. Ice covers the whole sea for eight months from early October to the beginning of July. During the hydrological summer (July to September) long-lived pack-ice covers up to 65% of the whole sea. Bottom topography is monotonous and slowly increases in depth toward the continental slope. Bottom sediments are mainly soft with clay, muddy-clay and fine sands occurring in most parts of the seabed. Well-sorted sands, pebbles and stones are mainly found in straits between the mainland and islands. 72% of the East Siberian Sea is less than 50m deep and around half is less than 30m. Permanent and tidal currents, and wind-induced waves provide water mixing between surface and bottom layers. As a result, water temperature is uniform in the whole water column in most parts of the area. Water temperature varies from 5˚C to 8˚C in southern areas to -1.5˚C in the northern part in summer time and from 0.5˚C to -1.8˚C in corresponding areas in winter. Salinity fluctuates from 18‰ in nearshore coastal areas, to 25.5‰ in the offshore areas and decreases between 2 and 8‰ in river mouths. Large variations in salinity are due to strong river discharge (around 10% of the whole value of fresh water discharge registered in the Arctic Seas) and to ice melting in spring

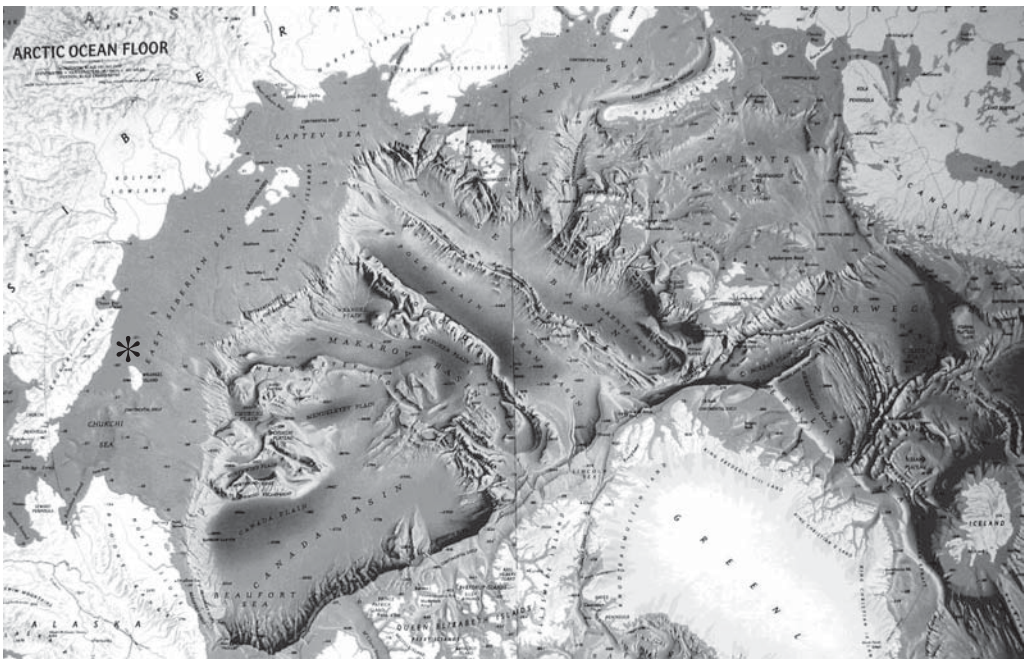

Figure 1. Map of the Arctic Basin and the East Siberian Sea location (*)

time (Dobrovolskiy and Zalogin 1982, Dudarev *et al*. 2006, Vetrov *et al*. 2008). These features of the environment should have a certain influence on the development of the benthic fauna.

Benthic communities of the East Siberian Sea are among the most poorly studied in the Arctic (Zenkewich 1963, Sirenko *et al*. 2009). The Arctic Ocean environment is quite young and was formed after the last glaciation. Therefore re-colonization by species with an Atlantic and Pacific origin, and those that speciated in the Arctic, started about 14,000 years ago (Golikov and Skarlato 1989, Dunton 1992). Several factors had an impact on the formation of the benthic fauna in the Arctic Ocean and very important among them was an influence of water masses with different origins. It has been established that the northern parts of the Barents, Kara and Laptev Seas are affected by waters of the Atlantic Ocean, although its impact decreases from the west to the east (Denisov *et al*. 1993, Karpiy *et al*. 1994). The presence of species of Atlantic origin in the benthic fauna in those areas is a direct result of this influence (Golikov and Skarlato 1989). Therefore, the East Siberian Sea should also have been affected by Atlantic water and bryozoans with an Atlantic origin should be found in this Sea. Pacific waters penetrate to the East Siberian Sea via shallow channels of the Chukchi Sea and have an influence on the biotic development (Ushakov 1952, Grebmeier et al. 2006). The influence of both Atlantic and Pacific water masses on the formation of bryozoan faunas has been marked in the East Siberian Sea (Gontar and Denisenko 1989).

The first efforts to collect bryozoans were made by Swedish *Vega* expedition in 1878 which surveyed along the Siberian coast. At the beginning of the 20th century studies were

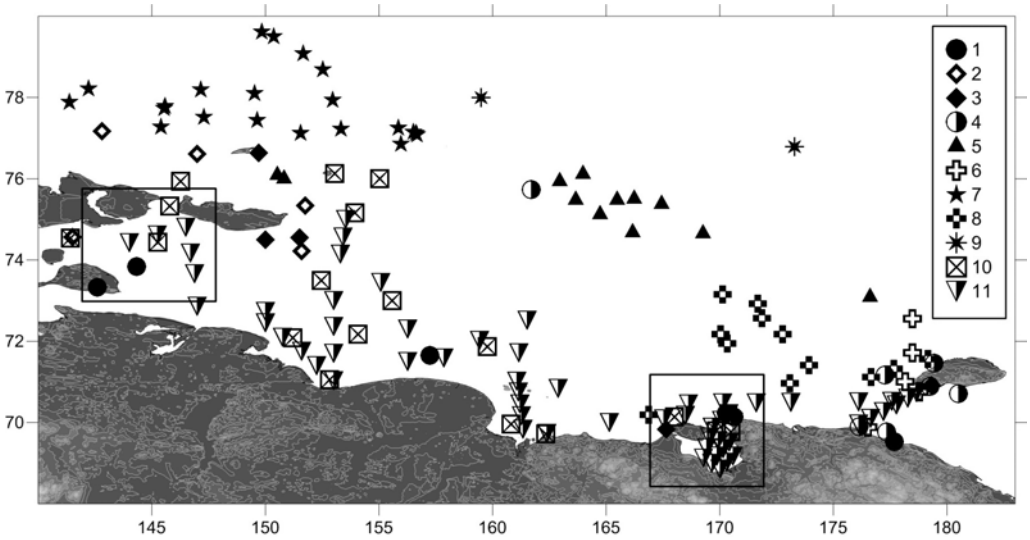

Figure 2. Map of station carried out in different cruises where bryozoans were found. 1 – Vega *stations (1878); 2 –* Zarja *stations (1901); 3-4 –* Taymyr *and* Waygach *stations (1913-1915); 5 – Maud stations; 6 –* Krasin *stations; 7 –* Sedov *stations; 8 –* Severny Polus *stations; 9-10 – North Pole 4 and North Pole -6; 11 –* Yakov Smirnitski *stations; 12 –* Ivan Kireev *stations. Squares – areas of ZIN diving expeditions.*

carried out mainly by Russian expeditions, while one expedition was initiated by Norway. In the middle and latter parts of the last century the Soviet Union conducted the biota study in the East Siberian Sea. In the middle of the 1990s and at the beginning of the 2000s two large Russian expeditions were organized to that basin (Figure 2).

This paper presents a brief historical review of bryozoan research undertaken in the East Siberian Sea and provides general information about bryozoan species richness in the East Siberian Sea.

2. End of the 19th century: first records.

The Swedish zoologist Anton Stuxberg published the first information about bryozoans from the East Siberian Sea (Stuxberg 1883). This was based on his identifications made during the *Vega* (Figure 3) expeditions along the Siberian Coast that had been led by the Swedish explorer Adolf Erik Nordenskjöld. Stuxberg noted only two taxa: *Alcyonidium* sp. and *Flustra* sp. Surprisingly the most abundant species in the Sea *Eucratea loricata* L. was not recorded. The remaining specimens and samples from the *Vega* expedition were delivered to the Zoological Museum in Saint Petersburg where they were later identified by the famous Russian bryozoologist German A. Kluge. Samples were collected near the Siberian coast at 6 stations at depth range 2 to 8m (see Figure 2). Results of Kluge's identifications were published in 1929 (Kluge 1929) and the species list contains 13 species. Three species belonged to the Order Ctenostomata, 10 species to the Order Cheilostomata (Appendix).

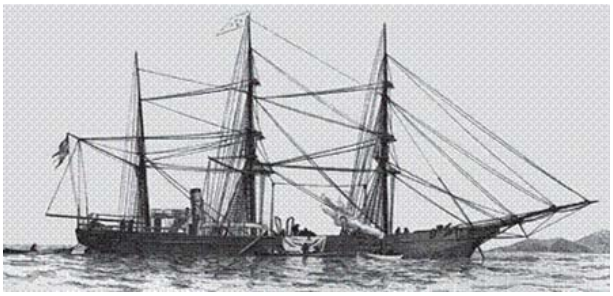

Figure 3 (top left). Vessel Vega.
Figure 4 (right). Schooner Zarja.
Figure 5 (bottom left). Vessels Waygach *and* Taymyr.

3. Beginning of the 20th century: more study and more information

Studies of bryozoan faunas in the area were made possible thanks to examinations of zoological samples collected during the Russian polar expedition on the schooner *Zarja* (Figure 4) under the leadership of Baron Eduard von Toll in 1901–1902 (he was to die during the expedition) and the First Hydrographic Russian expedition on two vessels *Waygach* and *Taymyr* (Figure 5) carried out under Captain Wilkitsky in 1913–1915. As well as resampling the 19th century locations, samples were taken at stations located mainly along the mainland coastline as well as the Wrangel and New Siberian Islands (see Figure 2). This material was also identified by G.A. Kluge (1929). He presented information about 44 species (Appendix) and five among them were new to science (*Dendrobeania levinseni*, *Escharella djumphnae*, *Myriapora orientalis*, *Rhamphostomella sibirica, Celleporina nordenskjoldi)*. In Kluge's list 4 species belonged to the Order Ctenostomata, 39 species to the Order Cheilostomata and 1 species to the Order Cyclostomata.

O. Nordgaard (1929) published a further list of bryozoans that had been collected during the Norwegian polar expeditions of the schooner *Maud* (1918–1925) (Figure 6) while it drifted in pack ice in the northern part of the East Siberian Sea (see Figure 2). Owing to the scientific efforts of this expedition he found 18 species at 12 stations and 4 species [(*Crisia eburnea* (L.), *Alcyonidium erectum* Andersson, *Escharella ventricosa*

Figure 6. Schooner Maud.

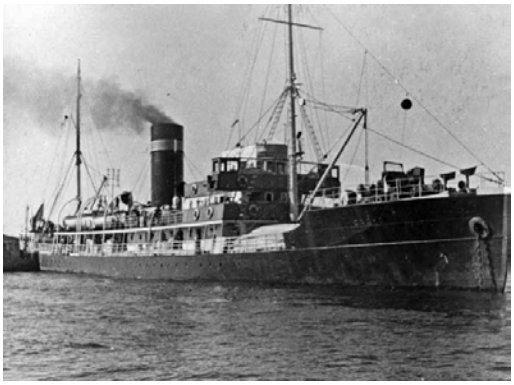

Figure 7. Icebreaker Sedov

(Hassall), *Rhamphostomella bilaminata* (Hincks)] were new records for the East Siberian Sea. *C. eburnea*, *T. gracilis* and *E. ventricosa* are common in the temperate waters of the Atlantic sector too. In total by the late 1920s 48 species were known for the East Siberian Sea.

4. Middle years of the 20th century: new records and new species

New data about the bryozoan fauna of this region appeared more than 20 years after Kluge (1929) and Nordgaard's (1929) publications. In 1946 G.P. Gorbunov published the list of species identified by G.A. Kluge. It was the result of his treatment of collections picked up on expeditions on the icebreakers *Sadko* and *Sedov* (1937–1938) (Figure 7) in the shelf area and continental slope of the Sea to the north from the New Siberian Islands Archipelago (see Figure 2). Eighty-nine bryozoan species were found in that sector of the Sea and 17 among them were new to science (Kluge 1946, 1955) (Appendix).

In a further publication, concerning the Chukchi Sea bryozoans fauna, Kluge (1952) presented results of his identifications of samples collected on the icebreaker *Krasin* (Figure 8) in 1935. The vessel worked in the western part of the Chukchi Sea and some stations were taken in the East Siberian Sea waters to the west from Wrangel Island (see Figure 2). Eight species of bryozoans were found at five stations near Wrangel Island and the mainland coastline: *Patinella verrucaria* (Fabricius), *Alcyonidium disciforme* Smitt, *Alcyonidium gelatinosum anderssoni* Abrikossov, *Eucratea loricata* (L.), *Carbasea carbasea* (Ellis and Solander), *Serratiflustra serrulata* (Busk), *Bugulopsis peachi* (Busk), *Rhamphostomella ovata* (Smitt). The subspecies *A. gelatinosum anderssoni* was a new record for the East Siberian Sea.

5. 1962: publishing the first summary results for this region of the Arctic

The most detailed species descriptions and complete species list for the East Siberian Sea was presented by G.A. Kluge in his monograph *Bryozoans of the northern seas of the*

Figure 8. Icebreaker Krasin.

Figure 9. Icebreaker Severny Polus.

USSR (Kluge 1962). In it he provided identification keys and diagnoses, species descriptions and summarized synonymies for all species found in the Eurasian and American sector of the Arctic available to him at the middle of 1950s. He gave information about geographical distribution, range of temperature and depth of species, and characterized preferred sediments and biotopes for each species. The monograph was published five years after his death thanks to efforts of his follower M. Gostilovskaya (and an edition in English appeared in 1975). Kluge's detailed investigation of bryozoan faunas resulted in a taxonomic count of 111 species and subspecies inhabiting the East Siberian Sea shelf area (Appendix). However, some species given in earlier publication (Gorbunov 1946) were not noted in his list (See Appendix). The material used for his studies was collected from various localities in the East Siberian Sea during five Russian and one Swedish expeditions between 1878 and 1946. Besides the expeditions listed above, Kluge identified some samples collected by the icebreaker *Severniy Poljus* (1946) (Figure 9) which was led by the Russian ichthyologist A.P. Andrijashev in the eastern part of the East Siberian Sea (see Figure 2).

6. Second half of the 20th century and the present time: large reviews and new approaches

In 1989 archival data of Zoological Institute of the USSR collected between 1878 and 1938 and literature information were analyzed by V. Gontar and N. Denisenko. This was presented in a large review (Gontar and Denisenko 1989) with synonymisation of some species. Biogeographical characteristics for all species were revised in comparison to Kluge's information (Kluge 1962). It was established that in the East Siberian Sea about 40% of bryozoan species are Arctic while 60% are boreal-arctic.

New information about bryozoans of the East Siberian Sea appeared in 1994 after study of samples collected in 1973. The material were taken during a voyage of the Zoological Institute of the Russian Academy of Sciences led by Professor A.N. Golikov to the shoals of the New Siberian Islands which undertook biological studies in the border of the East Siberian Sea and in the Laptev Sea (see Figure 2). Benthic samples were collected by scuba divers at several sections in coastal waters of the New Siberian Islands and the mainland. Ten bryozoans species of the twelve found during the expedition were noted for the East Siberian Sea waters (Appendix). The first quantitative data of bryozoans were presented for the study area (Gontar 1990).

Further diving expeditions of the Zoological Institute of the USSR were held in the Chaun Bay of the East Siberian Sea (see Figure 2) in 1986. The expedition took samples along the sections at the coastal stations by scuba divers and used a small boat to collect material by grab and dredge on the central part of the bay. This material was identified by Gontar (1994). She found 22 taxa in the Chaun Bay and seven among them (*Electra crustulenta* (Borg), *Electra arctica* Powell, *Tegella anguloavicularis* Kluge, *Scrupocellaria arctica* (Busk), *Scrupocellaria scabra* (Van Beneden), *Smittina mucronata* (Smitt), and *Porella minuta* (Norman) were recorded for the East Siberian Sea for the first time (Appendix). Thus, the species list of bryozoans in the East Siberian Sea increased to 117 taxa. Some limited information about the ecology of bryozoans in the sea was also presented. According to Gontar's data bryozoans inhabit water to a depth of 75m and the highest species diversity occurred at the depth interval 35–45 m.

Marine expeditions to the East Siberian Sea recommenced in 1995 for the first time in 49 years, when new sampling of bryozoans was carried out on r/v *Yakov Smirnitskiy* (Figure 10A). The station distribution covered the western part of the sea and several stations were taken near the mainland in its southern part. Bryozoans were found at 16 stations. New samples of bryozoans were obtained on the r/v *Ivan Kireev* (Figure 10B) expedition to the southern part of the sea. Bryozoans were recovered from 60 stations of 66 stations sampled (see Figure 2). Qualitative as well as quantitative material was collected on both expeditions.

40 species were identified from 76 stations and seven among them (*Alcyonidium pachydermatum* Denisenko, *Bowerbankia composita* Kluge, *Securiflustra securifrons* (Pallas), *Tegella magnipora* Osburn, *Tegella arctica* (d'Orbigny), *Dendrobeania flustroides* (Levinsen), *Semibugula birulai* Kluge) were recorded for the first time in the

Figure 10. Research vessels Yakov Smirnitski *(A, top) and* Ivan Kireev *(B, bottom).*

East Siberian Sea.

Recent examination of the Zoological Institute collections showed that some samples kept at ZIN still remained to be identified. It was material from the icebreaker *Seveniy polus* (1946), in which 28 species including Kluge identifications were found and two species *Cystisella beringia* Kluge, *Bugulopsis beringia* Kluge, were recorded in the sea for the first time. In addition, 14 species and two first records (*Tricellaria ternata* (Ellis and Solander) and *Palmiskenia plana* (Hincks)) were identified in three samples collected by two Soviet expeditions on drifting ice-floes in the northern part of the sea (*North Pole – 4* and *North Pole – 6*) (Figure 2). In total 52 species were identified recently (Appendix).

In addition, a survey of literature revealed information about three species *Celleporina ventricosa* Lorenz, *Buffonellaria biaperta* (Michelin), *Stomachetosella pachystega (*Kluge) (Gontar 2001) which were not previously recorded in the East Siberian Sea.

Therefore the current knowledge of bryozoan diversity in the Chukchi Sea, taking into consideration new unpublished information, demonstrates higher levels of diversity than previously recorded. At the present time 138 bryozoan species in total have been recorded from the East Siberian Sea (24 Cyclostomata, 12 Ctenostomata, 102 Cheilostomata) (Appendix). Those species belong to 32 families and 63 genera.

Analysis of the biogeographical structure of the bryozoan fauna has shown the proportion among biogeographic groups has changed. Owing to the severe environment, boreal forms, which prefer breeding temperature above 8˚C, are absent in the Sea. The

proportion of arctic species is high but it decreased from 40% (Gontar and Denisenko 1989) to 38% due to our better present knowledge about species distribution and their habitat. The proportion of boreal-arctic species remains the same as indicated in an earlier publication (60%) (Gontar and Denisenko 1989), and a new category for the East Siberian Sea: subtropic-arctic forms (2%) was noted. Among boreal-arctic species 13% had an Atlantic origin and 10% were Pacific forms. The last fact indicates the influence of Atlantic and Pacific waters had on the developing bryozoan fauna in the East Siberian Sea.

Comparing the presented data about bryozoans species diversity in the East Siberian Sea with bryozoan diversity in the other Arctic seas, areas demonstrated the relative paucity of the East Siberian Sea bryozoan fauna (Table 1). However, taking into account that the northern part of the Sea remains poorly studied we expect that the actual species diversity of bryozoans is higher than known at present. Additional taxonomic revision of many taxa with the use of a scanning microscope can change our view about species diversity of bryozoans in the Arctic area.

Table 1. Current knowledge about species richness of the bryozoan fauna in the Eurasian seas of the Arctic

Sea or area	Number of species	Reference
Bering Sea	214	Grischenko (2002)
Chukchi Sea	197	Denisenko and Kuklinski (2008) with some additions from Gontar (2010)[1]
East Siberian Sea	**137**	**Present study**
Laptev Sea	170	Gontar (2004)
Kara Sea	186	Gontar and Denisenko (1989)
Barents Sea	284	Denisenko (1990) with additions from Denisenko (1996, 2009) and Gontar (1996)

1. V.I. Gontar in her 2010 publication presented information not only about bryozoans found in geographical boundaries of the Chukchi Sea but in the Arctic basin opposite the sea and did not summarize their synonymy. According to her information 232 bryozoan species inhabit the Chukchi Sea.

Further research of bryozoan faunas should be directed to clarify the formation of the faunas in the Arctic and to analyse the patterns of colonization by this group in the East Siberian Sea. Besides that, publication of information about bryozoan ecology and biomass distribution is planned.

7. Acknowledgements

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Appendix

*Current knowledge of East Siberian Sea bryozoan species diversity. 1' species collected during "Vega" expedition(1878-1879), 1" – bryozoan species new to science, **1** (bold marked) – first records in the Sea, * - species identified from recently collected samples and Zoological Institute collection (icebreaker "Severny Polus" (1946), two drifting "Northern Pole" expeditions (1954, 1956)*

1: Kluge, 1929; *Vega, Zaja, Taymyr, Waygach*; **2:** Nordgaard, 1929; *Maud*; **3:** Kluge, 1946, 1955; Gorbunov, 1946; *Sadko, Sedov*; **4:** Kluge, 1952; *Krasin*; **5:** Kluge, 1962; **6:** Gontar, 1990 - New Siberian Islands (East Siberian sea sector); **7:** Gontar, 1994 - Chaun Bay; **8:** Gontar, 2001; **9:** Recent identifications*

Species	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Alcyonidium pachydermatum Denisenko, 1996									**1**
Alcyonidium diaphanum (Lamouroux, 1813)	**1'**		1		1		1		
Alcyonidium disciforme Smitt, 1872	**1**		1	1	1	1	1	1	1
Alcyonidium erectum Andersson, 1902		**1**	1		1			1	
Alcyonidium gelatinosum anderssoni Abrikossov, 1932				**1**	1			1	1
Alcyonidium mamillatum Alder, 1857					**1**			1	
Alcyonidium mytili Dalyell, 1847	**1**				1			1	
Alcyonidium radicellatum Kluge, 1946			**1"**		1			1	
Alcyonidium sp.									**1'**
Amphiblestrum septentrionalis (Kluge, 1906)			**1**		1			1	
Arctonula arctica (M. Sars, 1851)	**1**		1		1	1	1	1	1
Bidenkapia spitsbergensis (Bidenkap, 1897)			**1**		1			1	1
Bowerbankia arctica Busk, 1880			**1**		1			1	
Bowerbankia composita Kluge, 1952									**1**
Buffonellaria biaperta Michelin, 1841-1842								**1**	
Bugulopsis beringia (Kluge, 1955)									**1**
Buskia nitens Alder, 1857	**1'**				1			1	
Callopora craticula (Alder, 1857)	**1**	1			1		1	1	1
Callopora lata (Kluge, 1907)					**1**			1	1
Callopora lineata (L., 1767)	**1**		1		1			1	1
Callopora smitti Kluge, 1946			**1"**		1			1	
Callopora weslawski Kuklinski & Taylor, 2005			**1**		1			1	
Carbasea carbasea (Ellis & Solander, 1886)	**1'**	1	1	1	1	1	1	1	1

Species	1	2	3	4	5	6	7	8	9
Carbasea nordenskjoldi Kluge, 1929	**1"**		1		1			1	1
Cauloramphus cymbaeformis (Hincks,1877)	**1**		1		1			1	1
Celleporella hyalina (L.,1767)	**1**		1		1		1	1	1
Celleporina incrassata (Lamarck, 1856)					**1**			1	
Celleporina nordenskjoldi Kluge, 1929	**1"**	1	1		1			1	
Celleporina ventricosa Lorenz,1886								**1**	
Cheiloporina sincera (Smitt, 1868)	**1**	1	1		1			1	1
Cribrilina spiculifera Kluge, 1955			**1**		1			1	
Cribrilina spitzbergensis Norman, 1903					**1**			1	
Cribrilina watersi Andersson, 1902			**1**		1			1	
Crisia eburnea (L., 1758)		**1**			1			1	
Crisia eburneodenticulata Smitt in Busk, 1875			**1**		1			1	
Crisia klugei (Ryland, 1967)			**1**		1			1	
Cystisella bicornis Osburn, 1952									**1**
Cystisella fragilis (Levinsen, 1914)	**1**				1			1	1
Cystisella saccata Busk, 1856	**1**				1	1		1	1
Dendrobeania flustroides (Packard, 1863)									**1**
Dendrobeania levinseni (Kluge, 1929)	**1**		1		1				1
Diplosolen obelia arctica Waters, 1900	**1**		1		1			1	1
Electra arctica Powell, 1968							**1**		
Electra crustulenta Borg, 1831							**1**		
Entalophoroecia deflexa (Couch, 1842)			**1**		1			1	
Escharella abyssicola (Norman, 1869)			**1**						1
Escharella djumphnae Kluge 1929	**1',"**		1		1				1
Escharella immersa (Fleming, 1828)			**1**		1			1	
Escharella indivisa Levinsen, 1916			**1**		1			1	
Escharella levinseni Hayward, 1994					**1**			1	
Escharella macrodonta Levinsen, 1916			**1**		1				
Escharella ventricosa (Hassall, 1842)		**1**			1	1	1	1	1
Escharoides bidenkapi (Kluge, 1946)			**1"**		1			1	
Escharoides jacksoni (Waters, 1900)	**1**		1		1	1	1	1	
Escharoides monstruosa (Kluge, 1946)			**1"**		1				
Eucratea loricata (L.,1758)	**1'**	1	1	1	1	1	1	1	1
Eucratea loricata arctica (Kluge, 1915)	**1**		1		1			1	1
Eucratea loricata cornuta (Osburn, 1932)					**1**	1		1	1
Fasciculiporoides americana (d'Orbigny, 1853)			**1**		1			1	
Filicrisia smitti (Kluge, 1946)			**1"**		1			1	
Hippoporina harmsworthi (Waters, 1900)	**1**				1			1	
Hippoporina reticulatopunctata (Hincks, 1877)	**1**	1			1			1	
Hornera lichenoides (L., 1758)					**1**			1	1
Idmidronea atlantica (Forbes in Johnston, 1847)			**1**		1				
Idmidronea atlantica gracillima Busk, 1875					**1**			1	
Idmonea tumida (Smitt, 1872)			**1**		1			1	
Idmoneoides arctoflabellaris (Kluge, 1946)			**1"**		1			1	
Infundibulipora lucernaria (M. Sars, 1851)			**1**		1			1	
Kinetoskias arborescens Danielssen, 1868	**1**	1	1		1			1	1
Kinetoskias smitti Danielssen, 1868			**1**		1			1	
Lepralioides nordlandica (Nordgaard, 1905)			**1**		1			1	
Myriapora orientalis (Kluge, 1929)	**1"**				1			1	
Myriapora subgracilis (d'Orbigny, 1852)	**1**		1		1	1		1	
Myriozoella crustacea (Smitt, 1868)	**1**	1			1			1	
Notoplites smitti (Norman, 1868)			**1**						
Palmiskenea bicornis (Busk, 1859)			**1**						
Palmiskenea skenei tridens (Busk, 1856)			**1**						
Palmiskenia plana (Hincks, 1888)			**1**						1
Palmiskenia plana (Hincks, 1888)			**1**		1			1	

Species	1	2	3	4	5	6	7	8	9
Parasmittina jeffreysii (Norman, 1903)	**1**		1		1			1	1
Patinella verrucaria (Fabricius, 1780)	**1**		1	1	1			1	
Phidolopora elongata (Smitt,1868)			1		1			1	
Porella acutirostris Smitt, 1868			1		1			1	
Porella compressa (Sowerby, 1806)	**1**		1		1			1	
Porella minuta (Norman, 1869)							**1**		
Porella proboscidea (Hincks, 1888)					**1**			1	
Posterula sarsi (Smitt, 1868)	**1**		1		1			1	
Proboscina fecunda Kluge, 1962					**1**			1	
Pseudoflustra anderssoni Kluge, 1946			**1**"		1			1	
Pseudoflustra birulai Kluge, 1929			**1**		1			1	1
Pseudoflustra hincksi Kluge, 1915			**1**		1			1	1
Pseudoflustra sinuosa (Andersson, 1902)			**1**		1			1	1
Pseudoflustra solida (Stimpson, 1854)	**1**	1	1		1			1	1
Ragionula rosacea (Busk, 1856)					**1**			1	
Rhamphonotus gorbunovi Kluge, 1946			**1**"		1			1	1
Rhamphostomella sibirica Kluge, 1929	**1**"		1		1			1	1
Rhamphostomella bilaminata (Hincks, 1968)		**1**			1				1
Rhamphostomella costata Lorenz, 1886	**1**	1	1		1		1	1	1
Rhamphostomella cristata Hincks, 1889	**1**	1			1				
Rhamphostomella ovata (Smitt, 1868)	**1**			1	1			1	
Rhamphostomella scarba (Fabricius, 1780)	**1**		1		1			1	
Sarsiflustra abyssicola (G. Sars, 1872)			**1**		1				1
Scrupocellaria arctica (?) (Busk, 1855)							**1**		
Scrupocellaria minor (Kluge, 1915)			**1**		1				
Scrupocellaria scabra (Van Beneden, 1848)							**1**		
Scrupocellaria scabra paenulata forma *orientalis* Kluge, 1955			**1**"		1			1	
Securiflustra securifrons (Pallas,1766)									**1**
Semibugula birulai Kluge, 1929									**1**
Septentriopora karasi Kuklinski & Taylor, 2007	**1**		1		1			1	1
Serratiflustra serrulata (Busk,1880)	**1**'	1	1	1	1		**1**	1	1
Smittina glaciata (Waters, 1900)			**1**						
Smittina majuscula (Smitt, 1868)			**1**		1			1	
Smittina mucronata (Smitt, 1868)							**1**		
Smittina smitti (Kirchenpauer, 1874)			**1**		1			1	
Stigmatoechos arctica (Kluge, 1946)			**1**"		1				
Stomachetosella cruenta (Busk, 1854)			**1**		1			1	
Stomachetosella pachystega (Kluge, 1929)								**1**	
Tegella retroversa (Kluge 1952)			**1**"		1			1	
Tegella anguloavicularis Kluge, 1952							**1**		
Tegella arctica (d'Orbigny, 1850)									**1**
Tegella armifera (Hincks)	**1**	1	1		1	1	1	1	1
Tegella armiferoides Kluge, 1955			**1**		1		1	1	
Tegella magnipora Osburn, 1950									**1**
Terminoflustra membranaceotruncata (Smitt, 1868)	**1**'		1		1	1	1	1	1
Tricellaria gracilis (Van Beneden, 1848)	**1**	1	1		1			1	
Tricellaria peachi (Busk,1851)	**1**		1	1	1			1	1
Tricellaria ternata (Ellis & Solander, 1786)									**1**
Tubulipora borgi Kluge, 1946			**1**"		1			1	
Tubulipora eminens Kluge, 1955			**1**"		1			1	
Tubulipora flabellaris (Fabricius, 1780)			**1**		1			1	
Tubulipora fruticosa Kluge, 1946			**1**"		1			1	
Tubulipora minuta (Kluge, 1915)					**1**			1	
Tubulipora nordgaardi Kluge, 1946			**1**"		1			1	
Tubulipora soluta Kluge, 1946			**1**"		1			1	
Tubulipora ventricosa Busk, 1875			**1**		1			1	

Species	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Turbicellepora nodulosa (Lorenz, 1886)			**1**		1			1	**1**
Turbicellepora canaliculata Busk, 1886					1			1	
Uschakovia gorbunovi Kluge, 1946			**1**"		1			1	
Total	32	18	89	8	111	11	21	103	52