



BENTHIC MOLLUSCS OF KONGSFJORDEN (SVALBARD)

INTRODUCTION

Molluscs are an ecologically important component of Svalbard coastal communities (Różycki, unpubl. data, Stempniewicz 1990). Polish studies on the Svalbard molluscs have been continuously going on since 1977. To date, works summarizing research on bivalves (Różycki 1987) and gastropods (Różycki 1989) inhabiting waters off the mid- and south-west Svalbard coasts up to 77°40' N have been published.

The available literature lacks data on biology of the Kongsfjorden waters. The work presented is a continuation of studies on composition and distribution of molluscs in the coastal waters of Svalbard and covers an area not studied before.

MATERIALS

Kongsfjorden is located on the west coast of Svalbard at the latitude of 79°N. Samples were collected within 4-6 August 1988 from 10 stations, using a rectangular (80 × 30 cm) dredge and a Petersen grab (31 × 35 cm). Grab samples (3 per station) were taken at 6 of the 10 stations. Station and sample data are shown in Table 1. Fig. 1 shows location of the stations.

RESULTS AND DISCUSSION

The samples collected were found to contain 39 molluscan taxa: 1 species of chitons, 12 species of gastropods, and 26 bivalve species (Table 2). Two gastropods, *Turbonilla interrupta* and *Philine quadrata* as well as one bivalve, *Poromya granulata*, proved new to the Svalbard waters. Results of earlier works and the author's own data show the Svalbard waters to be inhabited by 61 gastropod and 71 bivalve species (Różycki 1990).

In Kongsfjorden, each station houses an average of 7.6 mollusc species, a value close to the overall average for the coastal waters of Svalbard (Różycki, unpubl. data).

The species richness of molluscan assemblages in Kongsfjorden is determined primarily by bivalves. They were recorded at every station, while gastropods were missing from 4 stations, chitons being present in a Station 7 sample only. In terms of frequency of occurrence, 6 bivalve species are most important (Table 3). The maximum frequency for gastropods is 20%.

Number of species present at a station was found to range from 1 (Station 10) to 15 (Station 3). The species-poorest molluscan assemblages were recorded at Stations 10 (1 bivalve) and 12 (1 bivalve and 2 gastropods). Both stations are shallow (to 5 m depth), located in the inner part of the fiord and have a hard rocky bottom with sporadic occurrences of *Laminaria saccharina* Lam.

The species-richest assemblages were revealed at Station 3 with 15 species (14 bivalves and 1 gastropod) and at Station 1 with 12 species (8 bivalves and 4 gastropods). Stations located centrally in the fiord (1, 2 and 3) and those at the fiord mouth (7 and 8) showed a high species richness. It is supposed that species richness of the molluscan assemblages is related to hydrology rather than to such factors as depth or sediment type.

The quantitative data are scant, but may be of interest as such information from Svalbard is still rare.

The quantitative (grab) samples yielded 2 gastropod and 13 bivalve species. A total of 96 molluscan individuals (3 specimens of gastropods and 93 individuals of bivalves) were collected. *Yoldiella lenticula* (46.8%) and *Thyasira ferruginea* (16.6%) were the dominant species.

Number of species in grab samples ranged from 1 (Station 6) to 8 (Station 3). Biomass and density of molluscs at stations was found to vary within 0.85-11.94 g m⁻² and 46.0-358.8 ind. m⁻², respectively. The quantitative data are presented in Table 4. For comparison, data of Gulliksen et al. (1985) allowed to calculate the mean densities of 27 mollusc species in Raudfjorden and Van Mijenfjorden to be about 16 ind. m⁻² and 14.8 ind. m⁻², respectively. Density of the bivalve *Liocyma fluctuosa* (Gould, 1841) in an arctic estuary of Nottinghambukta was found to reach 187 ind. m⁻² (Różycki and Gruszczyński, in press).

In terms of zoogeography, the Kongsfjorden molluscan fauna is dominated by arctic species (59.9%), arctic-boreal, boreal-arctic, and boreal and cosmopolitan species making up 21.6%, 16.2%, and 2.7%, respectively. The primarily arctic nature of the assemblages is evident.

The Kongsfjorden waters should be classified with the Svalbard Arctic Province. Studies on distribution of molluscs (Różycki 1990) showed the presence of an intermediate faunistic province of the west coast of Svalbard reaching to 77°40' N.

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STRESZCZENIE

Przedstawiono faunę mięczaków Kongsfjorden, na 39 oznaczonych taksonów 3 to gatunki nowe dla rejonu Svalbardu: *Turbonilla interrupta* i *Philine quadrata* (Gastropoda) oraz *Poromya granulata* (Bivalvia).

Dominującymi wśród mięczaków są małże, występowały one w próbach ze wszystkich stacji. Dla 6-ciu gatunków małży wskaźnik frekwencji (F%) jest wyższy jak 30%, podczas gdy dla ślimaków nie przewyższa wartości 20%. Zróżnicowanie liczby gatunków na poszczególnych stacjach w Kongsfjorden jest wynikiem odmienności warunków hydrologicznych w poszczególnych partiach fiordu.

Pod względem zoogeograficznym wody Kongsfjorden należy zaliczyć do svalbardzkiej prowincji arktycznej (dominują tu arktyczne i arktyczno-borealne formy mięczaków).

Tab. 1. Characteristic of benthic stations and material sampled in Kongsfjorden

St. no.	Depth (m)	Substrate	no. of species		
			POL	GAS	BIV ^{1/}
1	129	red mud	-	4	8
2	151	red mud	-	2	6
3	115	red mud	-	1	14
4	70	mud	-	-	7
5	44	mud	-	-	7
6	50	mud	-	-	6
7	79	stones	1	5	2
8	2.5	stones+ laminarians	-	-	9
10	5	stones	-	-	1
12	5	stones+ laminarians	-	2	1

^{1/} Polyplacophora, Gastropoda, Bivalvia

Tab. 2. Check-list of Molluscs of Kongsfjorden

Taxon	Kongs- fjorden ^{1/}	Zoogeographi- cal status ^{2/}
POLYPLACOPHORA		
<i>Tonicella marmorea</i> (Fabricius, 1730)	+	b-A
GASTROPODA		
<i>Margarites groenlandicus</i> (Gmelin, 1791)	+	A-b, cp
<i>Littorina saxatilis</i> Olivi, 1792	+	1A, Atl.
<i>Onoba mighelsi</i> (Stimpson, 1851)	+	b-A
<i>Nucella lapillus</i> (Linné, 1758)	+	b, wd, Atl.
<i>Buccinum hydrophanum</i> Hancock, 1846	+	A-b, Atl.
<i>Buccinum scalariforme</i> Müller, 1842	+	A, cp
<i>Buccinum undatum</i> Linné, 1758	+	1A, Atl.
<i>Colus latericeus</i> (Müller, 1842)	+	A, Atl.(?)
<i>Oenopota</i> spp.	+	
<i>Turbonilla interrupta</i> (Totten, 1835)	+	b-A, cp(?)
<i>Retusa obtusa</i> (Montagu, 1803)	+	1A, Atl.
<i>Philine quadrata</i> (Wood, 1838)	+	1A, cp(?)
BIVALVIA		
<i>Nuculoma corticata</i> (Müller, 1842)	+	b-A, Atl.
<i>Nuculoma tenuis</i> (Montagu, 1803)	+	A-b, wd
<i>Nuculana minuta</i> (Müller, 1776)	+	A-b, cp, Atl.
<i>Nuculana pernula</i> (Müller, 1779)	+	A-b, cp, Atl.
<i>Portlandia arctica</i> (Gray, 1824)	+	hA, cp, Atl.
<i>Yoldia hyperborea</i> Torell, 1859	+	A, cp, Pac.
<i>Yoldiella fraterna</i> Verrill et Bush, 1898	+	1A, cp, Atl.
<i>Yoldiella intermedia</i> (M. Sars, 1865)	+	hA
<i>Yoldiella lenticula</i> (Müller, 1842)	+	A, cp, Atl.
<i>Batharca glacialis</i> (Gray, 1824)	+	A, Atl.
<i>Arctiula groenlandica</i> (Sowerby, 1842)	+	hA, Atl.
<i>Chlamys islandica</i> (Müller, 1776)	+	A, cp, wd
<i>Axinopsida orbiculata</i> (G.O. Sars, 1878)	+	A-b, Pac.
<i>Thyasira flexuosa</i> (Montagu, 1803)	+	b-A
<i>Thyasira ferruginea</i> (Forbes, 1851)	+	A-b
<i>Thyasira gouldi</i> (Philippi, 1845)	+	pA, cp(?)
<i>Diplodonta torelli</i> Jeffreys, 1876	+	1A
<i>Astarte montagui</i> (Dillwyn, 1817)	+	A-b, cp, Atl.
<i>Ciliatocardium ciliatum</i> (Fabricius, 1780)	+	A, cp, Pac.
<i>Serripes groenlandicus</i> (Bruguière, 1798)	+	A, cp, Pac.
<i>Macoma loveni</i> Jensen, 1904	+	hA, Atl.
<i>Macoma moesta</i> (Deshayes, 1854)	+	1A, cp, Pac.
<i>Kellyella miliaris</i> (Philippi, 1844)	+	b-A(?), cp(?)
<i>Hiatella arctica</i> (Linné, 1767)	+	cos, Pac.
<i>Poromya granulata</i> (Nyst et Westendorp, 1839)	+	1A, cp(?)
<i>Cuspidaria sub torta</i> (M. Sars, 1859)	+	A, Atl.

^{1/} total grab and dredge samples

^{2/} cos - cosmopolite species

b - boreal species

b-A - boreal-Arctic species

A-b - Arctic-boreal species

A - Arctic species

hA - high-Arctic species

1A - low-Arctic species

pA - par-Arctic species

cp - circumpolar

Atl. - Atlantic

Pac. - Pacific

wd - widely distributed

Tab. 3. The most prominent species of bivalve molluscs of Kongsfjorden

T a x o n	Frequency (%)
<i>Nuculoma corticata</i>	40
<i>Nuculoma tenuis</i>	50
<i>Nuculana pernula</i>	60
<i>Yoldiella lenticula</i>	50
<i>Arctinula groenlandica</i>	30
<i>Thyasira flexuosa</i>	40

1/ only dredge samples

Tab. 4. Quantitative data of molluscs fauna in Kongsfjorden

no. of station	no. of species		biomass (g/m ²)	density (indiv./m ²)
	GAS	BIV		
1	1	6	5.35	101.2
2	1	3	11.94	92.0
3	-	8	7.58	358.8
4	-	2	1.42	46.0
5	-	4	0.85	119.6
6	-	1	10.25	165.6

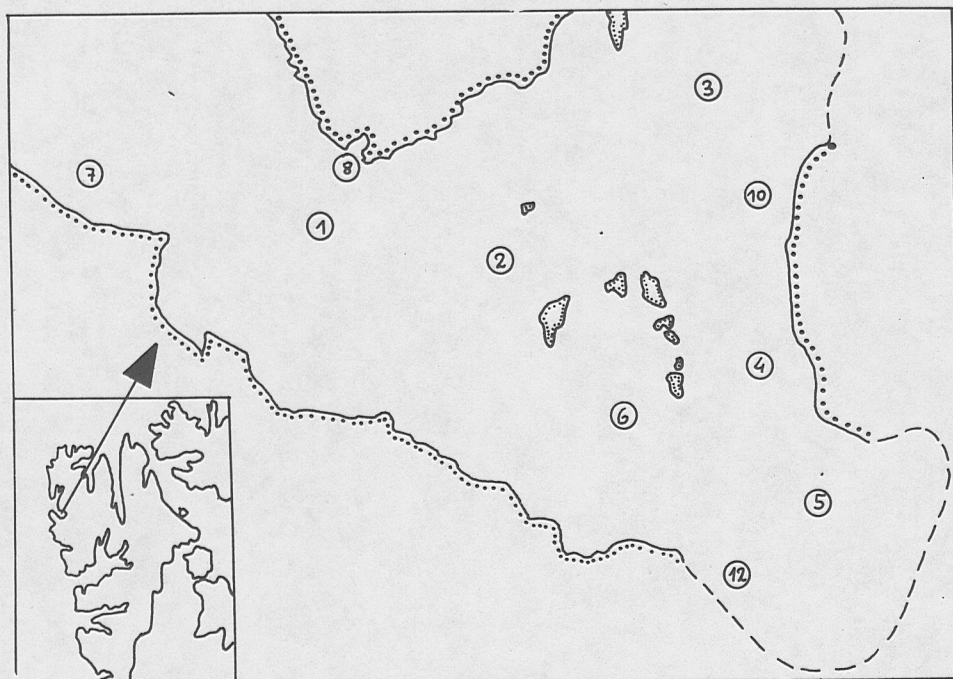


Fig. 1. The geographical position of Kongsfjorden and distribution of sampling stations