

Studies of the Subtidal Fauna of Surtsey in 1968

By

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The infauna of the subtidal slope of Surtsey was sampled on 12–14 August 1968.

Majority of the samples were obtained by means of the 0.1 m² Smith-McIntyre quantitative bottom sampler. The rectangular dredge was also used in some cases.

The sampling was carried out on four transects to the north, east, south and west of the island. The sampling depths were usually about 30 m, 40 m, 60 m, 80 m, 100 m and 120 m. In most cases two grab hauls were taken at each station. After the sediment samples had been removed the samples were shifted through a sieve with a mesh of 2 mm. The residual was preserved in alcohol.

THE BOTTOM

In May 1967 the bottom south of Surtsey was found to be rocky while all the other parts of the slope were covered by a layer of gravel (Nicolaisen, Surtsey Research Progress Report IV, 1968). The gravel originated from the eruption which started in August 1966.

In August 1969 the gravel layer had disappeared. The rocky bottom of the slope was now in most places found to be covered by a sand layer of varying thickness. This was reflected in the quantity of sediment which the grab brought up. Sometimes the grab was empty or contained a few stones only. Most often, however, it had caught a quantity of sand. The amount was usually about 1 litre or less, but frequently it was as much as 4 litres or more.

Grain size analyses have been carried out on one sample from the north slope and one from the south slope both of which were taken at a depth of 80 m. Their respective median grain

sizes were 300 microns and 170 microns. The major part of the grains were lava fragments.

THE INFAUNA

The following list shows, for each station, the number of individuals of the species which have been found in the grab hauls. Almost all the animals found belong to species which inhabit sediment bottoms. For each station the number of grab samples which have been lumped together is shown. Also the approximate sediment content of each grab sample is given.

Due to the nature of the bottom, many of the grab hauls collected a low quantity of bottom substrate and, therefore, the density of those animals, which are large enough to be retained by a 2 mm sieve, tends to be underestimated. There is no quantitative sampler that works effectively on a bottom such as that of the Surtsey slope, but in contrast to the dredge the grab at least gives some idea of the density of animals.

THE NORTHERN TRANSECT

30 m 3 samples

Substrate content: 10 litres, 3 stones, almost empty. No animals.

40 m. 3 samples

Substrate content: ½ litre, almost empty, almost empty.

Pisces:

Ammodytes lancea 1

60 m. 3 samples

Substrate content: ½ litre, ½ litre, empty.

Crustacea:

Amphipod sp. 1

80 m. 2 samples		<i>Echinodermata:</i>	
Substrate content: 1 litre, 1 litre		<i>Ophiura affinis</i>	7
<i>Polychaeta:</i>		<i>Echinocardium flavescens</i>	2
<i>Spio filicornis</i>	4	<i>Pisces:</i>	
<i>Capitella capitata</i>	6	<i>Pleuronectidae</i> sp.	1
<i>Echinodermata:</i>		Unidentified:	a fragment
<i>Ophiura affinis</i>	1		
		80 m. 2 samples	
100 m. 3 samples		Substrate content: 1 litre, 1 litre.	
Substrate content: 1 litre, 1½ litre, 1½ litre.		<i>Polychaeta:</i>	
<i>Polychaeta:</i>		<i>Goniada maculata</i>	4
<i>Stenelais filamentosus</i>	1	<i>Spio filicornis</i>	1
<i>Goniada maculata</i>	1	<i>Ammotrypane aulogaster</i>	1
<i>Eteone longa</i>	1	<i>Capitella capitata</i>	2
<i>Nephtys longosetosa</i>	1	<i>Owenia fusiformis</i>	7
<i>Scoloplos armiger</i>	2	<i>Pectinaria koreni</i>	1
<i>Spio filicornis</i>	2	<i>Mollusca:</i>	
<i>Ammotrypane aulogaster</i>	3	<i>Buccinum undatum</i>	1
<i>Capitella capitata</i>	1	<i>Cardium echinatum</i>	1
<i>Owenia fusiformis</i>	16	<i>Abra prismatica</i>	3
<i>Pectinaria koreni</i>	6	<i>Echinodermata:</i>	
<i>Crustacea:</i>		<i>Ophiura affinis</i>	14
<i>Hippomedon denticulatus</i>	2	<i>Echinocardium flavescens</i>	2
<i>Mollusca:</i>			
<i>Abra nitida</i>	1	95–105 m. 3 samples	
<i>Abra prismatica</i>	7	Substrate content: 2½ litres, 3½ litres, not known.	
<i>Echinodermata:</i>		<i>Nemertini:</i>	
<i>Ophiura affinis</i>	4	Unidentified sp.	1
<i>Ophiura</i> sp. (<i>albida</i> ?)	3	<i>Polychaeta:</i>	
<i>Echinocardium flavescens</i>	2	<i>Harmothoe</i> sp.	1
		<i>Stenelais filamentosus</i>	1
THE EASTERN TRANSECT		<i>Anaitides groenlandica</i>	2
30 m. 2 samples		<i>Castalia punctata</i>	1
Substrate content: empty, empty.		<i>Scoloplos armiger</i>	3
No animals.		<i>Spio filicornis</i>	2
		<i>Polydora antennata</i>	a few individuals
40 m. 1 sample		<i>Ammotrypane aulogaster</i>	7
Substrate content: ¼ litre.		<i>Capitella capitata</i>	10
<i>Polychaeta:</i>		<i>Owenia fusiformis</i>	10
<i>Owenia fusiformis</i>	2	<i>Pectinaria koreni</i>	1
<i>Mollusca:</i>		<i>Terebellidae</i> sp.	1
<i>Abra prismatica</i>	1	Unidentified <i>Polychaeta</i>	some fragments
		<i>Mollusca:</i>	
60 m. 2 samples		<i>Cardium echinatum</i>	2
Substrate content: 4 litres, 4–5 litres.		<i>Cyprina islandica</i>	1
<i>Polychaeta:</i>		<i>Macoma calcarea</i>	1
<i>Goniada maculata</i>	1	<i>Abra prismatica</i>	8
<i>Spio filicornis</i>	5	<i>Echinodermata:</i>	
<i>Ammotrypane</i> sp.	1	<i>Ophiura affinis</i>	11
<i>Capitella capitata</i>	1	<i>Echinocardium flavescens</i>	2
<i>Owenia fusiformis</i>	2	<i>Cucumaria</i> sp.	2

THE SOUTHERN TRANSECT

30 m

Substrate content: Grab empty each time.
No animals.

40—45 m

Substrate content: Grab empty each time.
No animals.

60 m. 1 sample

Substrate content: 1 litre.

Polychaeta:

<i>Stenelais filamentosus</i>	1
<i>Spio filicornis</i>	1
<i>Polydora antennata</i>	some individuals
<i>Owenia fusiformis</i>	1

Mollusca:

<i>Cardium echinatum</i>	1
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Unidentified:

1

80 m. 2 samples

Substrate content: 1/2 litre, 1/4 litre.

Polychaeta:

<i>Nerine cirratulus</i>	1
<i>Ammotrypane aulogaster</i>	5
<i>Owenia fusiformis</i>	4
<i>Pectinaria koreni</i>	1
<i>Lanice conchilega</i>	2

Echinodermata:

<i>Ophiura affinis</i>	2
<i>Echinocardium flavescens</i>	1

95—100 m. 2 samples

Substrate content: 1/4 litre, 1/4 litre.

Polychaeta:

<i>Harmothoe</i> sp.	4
<i>Anaitides groenlandica</i>	1
<i>Polydora antennata</i>	some individuals
<i>Owenia fusiformis</i>	4

Mollusca:

<i>Spisula elliptica</i>	3
<i>Abra prismatica</i>	5

Echinodermata:

<i>Ophiura affinis</i>	2
<i>Echinocardium flavescens</i>	1

120 m. 2 samples

Substrate content: 1/4 litre, 1/4 litre.

Polychaeta:

<i>Nephtys hombergi</i>	1
<i>Polydora antennata</i>	some individuals

Owenia fusiformis 3

Thelepus cincinnatus 1

Ditrupea arietina 1

Mollusca:

Macoma calcarea 1

Abra prismatica 1

Echinodermata:

Amphiura sp. 1

Unidentified: 1

125 m. 2 samples

Substrate content: 1/4 litre, almost empty.

Polychaeta:

Stenelais filamentosus 1

Nephtys sp. 1

Polydora antennata
some individuals

Ammotrypane aulogaster 1

Owenia fusiformis 2

Mollusca:

Cyprina islandica 1

Abra nitida 2

Echinodermata:

Amphiura filiformis 1

Echinocardium flavescens 3

THE WESTERN TRANSECT

30 m. 2 samples

Substrate content: 4.5 litres, a little sand.

Polychaeta:

Spio filicornis 11

Polydora antennata
a few individuals

Spiophanes bombyx 3

Capitella capitata 2

Owenia fusiformis
some fragments

Pectinaria koreni 6

Mollusca:

Abra prismatica 3

Echinodermata:

Echinocardium flavescens 1

40 m. 2 samples

Substrate content: 4 litres, 1 litre.

Polychaeta:

Spio filicornis 2

Spionidae sp. a fragment

Ammotrypane aulogaster 1

Capitella capitata 27

Pectinaria koreni 4

Lanice conchilega 3

Polychaeta two fragments

<i>Crustacea:</i>			<i>Polydora antennata</i>	
	<i>Cheraphilus neglecta</i>	1		several individuals
<i>Mollusca:</i>			<i>Ammotrypane aulogaster</i>	4
	<i>Spisula elliptica</i>	1	<i>Pectinaria koreni</i>	9
<i>Echinodermata:</i>			<i>Ditrupe arietina</i>	1
	<i>Ophiura affinis</i>	2	<i>Polychaeta</i> sp.	a fragment
	<i>Echinocardium flavescens</i>	2	<i>Mollusca:</i>	
Unidentified:		2	<i>Cardium echinatum</i>	1
			<i>Cyprina islandica</i>	1
60 m. 2 samples			<i>Spisula elliptica</i>	1
Substrate content: 3 litres, 0.5 litre.			<i>Macoma calcarea</i>	3
<i>Polychaeta:</i>			<i>Abra nitida</i>	4
	<i>Goniada maculata</i>	1	<i>Abra prismatica</i>	12
	<i>Nephtys caeca</i>	1	<i>Echinodermata:</i>	
	<i>Scoloplos armiger</i>	1	<i>Ophiura affinis</i>	8
	<i>Spio filicornis</i>	20	<i>Ophiura</i> sp. (<i>albida?</i>)	10
	<i>Capitella capitata</i>	2	<i>Echinocardium flavescens</i>	4
	<i>Pectinaria koreni</i>	14		
	<i>Lanice conchilega</i>	2	120 m. 2 samples	
<i>Mollusca:</i>			Substrate content: ¼ litre, almost empty.	
	<i>Abra prismatica</i>	1	<i>Polychaeta:</i>	
<i>Echinodermata:</i>			<i>Goniada maculata</i>	1
	<i>Ophiura affinis</i>	1	<i>Anaitides groenlandica</i>	2
			<i>Scoloplos armiger</i>	6
			<i>Polydora antennata</i>	
76–80 m. 2 samples				several individuals
Substrate content: 1 litre, ¼ litre.			<i>Diplocirrus glaucus</i>	5
<i>Polychaeta:</i>			<i>Owenia fusiformis</i>	2
	<i>Stenelais filamentosus</i>	3	<i>Ditrupe arietina</i>	2
	<i>Anaitides groenlandica</i>	1	<i>Polychaeta</i>	some fragments
	<i>Scoloplos armiger</i>	4	<i>Mollusca:</i>	
	<i>Spio filicornis</i>	1	<i>Abra nitida</i>	1
	<i>Nerine cirratulus</i>	1	<i>Echinodermata:</i>	
	<i>Polydora antennata</i>		<i>Ophiura affinis</i>	3
		some individuals	<i>Echinocardium flavescens</i>	1
	<i>Cirratulidae</i> sp.	1	Unidentified:	some fragments
	<i>Ammotrypane aulogaster</i>	2		
	<i>Capitella capitata</i>	3		
	<i>Owenia fusiformis</i>	1		
	<i>Pectinaria koreni</i>	2		
	<i>Polychaeta</i> sp.	some fragments		
<i>Mollusca:</i>				
	<i>Cyprina islandica</i>	1		
	<i>Abra prismatica</i>	3		
<i>Echinodermata:</i>				
	<i>Ophiura affinis</i>	3		
	<i>Echinocardium flavescens</i>	1		
100 m. 2 samples				
Substrate content: 1 litre, ¼ litre				
<i>Polychaeta:</i>				
	<i>Pholoe minuta</i>	2		
	<i>Stenelais filamentosus</i>	2		
	<i>Goniada maculata</i>	1		
	<i>Scoloplos armiger</i>	9		

ADDITIONAL OBSERVATIONS

All individuals of the infauna species found in the grab samples were small as the following examples show.

Pectinaria koreni, which was found to be one of the most common polychaete species, had an average body length of 0.8 cm and the size range was 0.2–1.2 cm.

Abra prismatica, the most common bivalve, had an average length of 0.5 cm and the size range was 0.3–0.9 cm.

The brittle star *Ophiura affinis* had an average dish diameter of 0.2 cm and the diameter varied between 0.1 and 0.3 cm.

The small size of the animals indicates that they were less than a year old at the time of collection. Many have probably settled in the spring and summer of 1968.

EPIFAUNA SPECIES

Three grab samples from the southern slope which have not been included in the previous list contained epifauna species only. These are listed below.

Hydroidea:

Tubularia larynx
an unidentified species

Polychaeta:

Harmothoe sp.
Pomatoceros triqueter
Hydroides norvegica
some unidentified fragments

Bryozoa:

7–8 species

Crustacea:

Verruca stroemia
Balanus sp.

Bivalvia:

Hiatella striata
Hetanomia sp.

CONCLUSIONS

Previously, it has been shown (Nicolaisen, op. cit.) that several infauna species had invaded the sand of the subtidal slope of Surtsey in August 1966. In May 1967 it was found that the infauna had been destroyed by the gravel originating from the latest eruption on Surtsey.

It appears from the present report that the gravel had disappeared in August 1969 and

where the slope was covered with sand it had been invaded by several infauna species. This fauna was very similar to the one present on the slopes in August 1966. The identified species have all been reported previously from Icelandic waters.

The 1968 survey together with the surveys of previous years has shown that the sediment on the subtidal slopes of Surtsey is very much on the move. The slopes are steep and therefore wave action, especially during the winter storms, will remove large quantities of sediment. As yet, no individuals belonging to infauna species have been found which could be said with certainty to have an age of one year or more.

At the present it is unknown whether or not infauna species will be able to establish themselves more permanently in the very unstable environment of the Surtsey subtidal slopes.

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