

A survey of the benthic coastal fauna of Surtsey, Iceland, in 1997

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ABSTRACT

During the period of 4th to 10th of July 1997, samples of benthic animals were collected by diving at Surtsey, South-Iceland, on three transects, east, south and west off the island, in the shore and on 5, 10, 15, 20, 25 and 30 meters depths.

Number of species was similar in the collection depths of the east and south transects, but at 15 and 25 meters depths number of species were somewhat lower off the west coast, than the east and south coasts. The species composition of the three transects was quite similar. The isopod, *Janiropsis breviremis* was only found off the south coast, whereas the gastropod *Patina pellucida* was only found off the east coast. Many of the species most frequently collected had wide depth distribution. The exception from this was the octocoral *Acyonium digitatum* that was only found below 15 m depth.

No new species was found in 1997 and not all of the species recorded in 1992 were found again in 1997. The total number of species was similar in 1997 as in 1992.

INTRODUCTION

The colonisation of marine organisms on the new land formed in the Surtsey eruption in 1963, has been followed ever since (Sigurdsson 2000). From the year of 1997 the author has been responsible for the marine invertebrate part of the investigation.

The geological development of the island of Surtsey has been spectacular. The erosion of the island due to wave-exposure is immense and the island has decreased considerably since its formation. The heaviest erosion occurs on the southern coast of the island, due to prevailing southerly winds and intense wave exposure. The most stable shores are on the eastern side of the island, where some parts of the cliffs have endured since 1984.

MATERIAL AND METHODS

During the period of 4th to 10th of July 1997, samples of benthic algae and animals were collected by diving, at the same time photographs were taken of the bottom in order to estimate the cover of the benthic biota. Originally the plan was to collect samples of flora and fauna, as well as taking photographs, on three transects, east, south and west,

Table 1. Number of species of marine animals found at each depth on each of the three transects investigated.

Depths (m)	Littoral	5	10	15	20	25	30
East	3	16	22	21	20	23	22
South	-	-	20	27	-	-	20
West	-	2	22	15	19	18	4

Table 2. Benthic animals from the intertidal and subtidal zone off the east coast of Surtsey in July 1997.

Depth (m)	Intert.	5	10	15	20	25	30
PORIFERA							
<i>Sycon ciliatum</i> (Fabr.)						X	
<i>Grantia compressa</i> (Fabr.)		X	X	X	X	X	X
SCYPHOZOA							
<i>Halichystus octoradiatus</i> (Lamarck)				X			
HYDROZOA							
ANTHOZOA							
<i>Alcyonium digitatum</i> L.					X	X	X
NEMERTEA							
POLYCHAETA							
BRYOZOA							
CIRRIPIEDIA							
<i>Balanus balanus</i> (L.)		X	X	X	X	X	X
<i>Balanus balanoides</i> (L.)	X						
<i>Balanus hammeri</i> (Ascanius)						X	
<i>Verruca stroemia</i> (Muller)						X	
ISOPODA							
<i>Idotea granulosa</i> Rathke		X	X	X	X		
<i>Idotea pelagica</i> Leach		X					
<i>Idotea neglecta</i> G. O. Sars		X	X	X			
<i>Janira maculosa</i> Leach			X	X			
<i>Munna kroyeri</i> Goodsir			X				
AMPHIPODA							
DECAPODA							
<i>Eupagurus bernhardus</i> L.							X
<i>Hyas coarctatus</i> Leach					X	X	X
PROSOBRANCHIA							
<i>Acmaea virginea</i> (Muller)			X				
<i>Acmea testudinialis</i> (Muller)				X	X		
<i>Buccinum undatum</i> (L.)				X		X	X
<i>Lacuna divaricata</i> (Fabr.)		X	X	X		X	
<i>Margarites groenlandicus</i> (Chemn.)				X		X	
<i>Margarites helicinus</i> (Fabr.)		X	X				
<i>Nassa incrassata</i> (Ström)		X	X	X	X	X	X
<i>Patina pellucida</i> (L.)		X	X				
NUDIBRANCHIA							
<i>Doto coronata</i> (Gmelin)				X	X		
<i>Archidoris pseudoargus</i> Rapp							X
LAMELLIBRANCHIA							
<i>Heteranomya squamula</i> L.			X		X	X	X
<i>Hiatella arctica</i> (L.)		X	X	X	X	X	X
<i>Kellia suborbicularis</i> (Mont.)							X
<i>Modiola phaesolina</i> (Phil.)							X
<i>Modiolaria discors</i> (L.)						X	
<i>Mytilus edulis</i> (L.)	X	X	X	X	X	X	X
ASTEROIDEA							
<i>Asterias rubens</i> L.		X	X	X	X	X	X
OPHIUROIDEA							
<i>Ophiopholis aculeata</i> (O. Fr. Muller)			X	X	X	X	X
ECHINOIDEA							
<i>Strongylocentrotus droebachiensis</i> (O. Fr. Muller)				X	X		
<i>Echinus esculentus</i> (L.)						X	X
ASCIDIACEA							
<i>Styela rustica</i> (L.)							X
<i>Halocynthia pyriformis</i> (Rathke)			X		X	X	
PISCES							
<i>Liparis montagui</i> (Donovan)						X	

both in the shore and on 5, 10, 15, 20, 25 and 30 meters depths. It turned out to be impossible to take samples at all depth on each transect (Table 1). Sampling in the intertidal zone on the south and west shores had also to be abandoned, due to heavy surf. The 5, 20 and 25 meters stations of the south transect had to be left out due to heavy winds, and on the 30 meter station off the west coast little or no hard substrate could be found.

Samples were processed on-board of the

Table 3. Benthic animals from the subtidal zone off the south coast of Surtsey in July 1997.

Depth (m)	10	15	30
PORIFERA			
<i>Sycon ciliatum</i> (Fabr.)	X	X	X
<i>Grantia compressa</i> (Fabr.)	X	X	X
<i>Halichondria panicea</i> (Pallas)			X
HYDROZOA			
ANTHOZOA			
<i>Alcyonium digitatum</i> L.		X	X
POLYCHAETA			
BRYOZOA			
CIRRIPIEDIA			
<i>Verruca stroemia</i> (Muller)	X		
ISOPODA			
<i>Idotea granulosa</i> Rathke	X		
<i>Idotea pelagica</i> Leach	X		
<i>Idotea neglecta</i> G. O. Sars	X	X	
<i>Janira maculosa</i> Leach	X	X	
<i>Janiropsis breviremis</i> G. O. Sars		X	
AMPHIPODA			
DECAPODA			
<i>Hyas coarctatus</i> Leach	X	X	X
<i>Pandanus montagui</i> Leach			X
PYCNOGONIDA			
<i>Nymphon</i> sp.		X	
PROSOBRANCHIA			
<i>Lacuna divaricata</i> (Fabr.)	X	X	
<i>Margarites groenlandicus</i> (Chemn.)			X
<i>Margarites helicinus</i> (Fabr.)	X	X	
<i>Nassa incrassata</i> (Ström)	X		X
<i>Onoba striata</i> (Mont.)			X
NUDIBRANCHIA			
<i>Eubranhus pallidus</i> (Alder & Hancock)		X	
<i>Dendronotus frondosus</i> (Ascanius)		X	X
<i>Tergipes tergipes</i> (Forsk.)		X	
<i>Coryphella verrucosa</i> (M. Sars)		X	
<i>Onchidoris bilamellata</i> (L.)			X
<i>Doto coronata</i> (Gmelin)	X	X	X
LAMELLIBRANCHIA			
<i>Hiatella arctica</i> (L.)	X	X	X
<i>Modiola phaesolina</i> (Phil.)	X	X	
<i>Mytilus edulis</i> (L.)	X	X	X
ASTEROIDEA			
<i>Asterias rubens</i> L.		X	X
OPHIUROIDEA			
<i>Ophiopholis aculeata</i> (O. Fr. Muller)	X	X	X
ASCIDIACEA			
<i>Halocynthia pyriformis</i> (Rathke)		X	
PISCES			
<i>Cyclopterus lumpus</i> L.		X	

Table 4. Benthic animals from the subtidal zone off the west coast of Surtsey in July 1997.

Depth (m)	5	10	15	20	25	30
PORIFERA						
<i>Grantia compressa</i> (Fabr.)		X	X	X	X	
<i>Sycon ciliatum</i> (Fabr.)		X	X	X	X	
SCYPHOZOA						
<i>Halichystus octoradiatus</i> (Lamarck)	X					
HYDROZOA						
ANTHOZOA						
<i>Alcyonium digitatum</i> L.				X	X	
POLYCHAETA						
BRYOZOA						
CIRRIPIEDIA						
<i>Balanus balanus</i> (L.)		X			X	
<i>Verruca stroemia</i> (Muller)			X		X	
ISOPODA						
<i>Idotea granulosa</i> Rathke		X	X		X	
<i>Idotea pelagica</i> Leach		X				
<i>Idotea neglecta</i> G. O. Sars	X	X				
<i>Janira maculosa</i> Leach	X	X	X		X	
AMPHIPODA						
DECAPODA						
<i>Hyas coarctatus</i> Leach				X		
PROSOBRANCHIA						
<i>Acmaea virginea</i> (Muller)		X		X		
<i>Buccinum undatum</i> (L.)				X		
<i>Gibbula tumida</i> (Mont.)					X	
<i>Lacuna divaricata</i> (Fabr.)		X	X			
<i>Margarites groenlandicus</i> (Chemn.)			X			
<i>Margarites helicinus</i> (Fabr.)		X			X	
<i>Nassa incrassata</i> (Ström)		X		X	X	
NUDIBRANCHIA						
<i>Coryphella verrucosa</i> (M. Sars)				X		
<i>Onchidoris bilamellata</i> (L.)		X				
<i>Onchidoris muricata</i> (Muller)	X					
<i>Ancula cristata</i> (Alder)			X			
<i>Doto pinnatifida</i> (Montagu)	X	X	X	X	X	
<i>Eubranhus pallidus</i> (Alder & Hancock)					X	
LAMELLIBRANCHIA						
<i>Chlamys fusio</i> (L.)					X	
<i>Hiatella arctica</i> (L.)		X	X	X		
<i>Mytilus edulis</i> (L.)		X	X	X		
ASTEROIDEA						
<i>Asterias rubens</i> L.				X		
OPHIUROIDEA						
<i>Ophiopholis aculeata</i> (O. Fr. Muller)		X	X	X	X	
ECHINOIDEA						
<i>Strongylocentrotus droebachiensis</i> (O. Fr. Muller)				X		

research vessel, identified to species or species groups and preserved in iso-propanol. Invertebrates belonging to the following groups were identified to species; porifera, isopoda, cirri-
 pedia, gastropoda, lamellibranchiata, echinoder-
 mata and ascidiacea. Animal groups like amp-
 hipods, nudibranchs, hydroids, bryozoans, pygno-
 gonids and polychaetes are undergoing more
 thorough identification work. Identification of

several species is under revision and hence these
 are not represented at the species level.

RESULTS

Intertidal zone

Only three species were found on the rocks in
 the intertidal zone on the east coast of Surtsey:
 the barnacle *Balanus balanoides*, the polychaete
Pomatoceros sp. and the edible mussel *Mytilus*
edulis. The individuals found were all young-of-
 the-year.

Subtidal zone

The most frequently recorded invertebrates
 on 5-30 m depth range were the poriferan
Grantia compressa, the edible mussel, the bivalve
Hiatella arctica, the ophiurid *Ophiopholis aculeata*
 and the sea-star *Asterias rubens*, which occurred
 on almost all depths on the three transects.
 Other frequently recorded animals were; the
 isopods *Idotea granulosa* and *I. neglecta*, the
 poriferan *Sycon ciliatum*, gastropods *Margarites*
groenlandicus and *M. helicinus*, and *Nassa incrassata*.
 The octocoral *Alcyonium digitatum* was com-
 mon too, especially in the deeper parts of the
 area.

Number of species was similar in the collec-
 tion depths of the east and south transects, but
 at 15 and 25 meters depths number of species
 were somewhat lower off the west coast, than the
 east and south coast (Table 1).

The species composition of the three tran-
 sects was quite similar, the same species being
 the most frequently recorded (Table 2, 3 and 4).
 The isopod, *Janiropsis breviremis* was only found
 off the south coast, whereas the gastropod
Patina pellucida off the eastern coast only.

Many of the species most frequently collected
 had wide depth-distribution and were found on
 depths from 10 to 30 meters (Table 2, 3 and 4).
 The exception from this was the octocoral
Alcyonium digitatum that was most frequently
 recorded in the deeper part of the subtidal area
 and only found below 15 m depth.

DISCUSSION

No new species was found in 1997 and not all
 of the species recorded by Sigurdsson (2000)
 were found again in 1997. The number of
 species seems to be similar as five years ago, as
 far as is comparable.

The further enrichment of the marine subti-
 dal algae and invertebrates community off

Surtsey is hard to foresee occurring the next decades. The constant erosion of the shores must have pronounced influences on the settlement and development of the marine biota. Unstable substrate must retard the succession of the community and make it rather stochastic.

ACKNOWLEDGEMENTS

Collection of marine-invertebrates was carried out in close co-operation with the scientists investigating the marine algae. Dr Karl Gunnarsson and Dr Sigurdur Jónsson are thanked for the helpfulness, in carrying out this research. Also was mag. scient. Adalsteinn Sigurdsson very helpful, assisting the author in taking care of the collected animals. The skipper Mr Gudmundur Bjarnason and crew of the

r/v Árne Friðriksson RE-100, did a good job helping this sampling operation in 1997 to be accomplished.

Dr Anton Galan identified some of the isopods collected (see Galan 2000).

The Icelandic Democracy Fund (1994-1999) sponsored the research and The Marine Research Institute lent r/v Árne Friðriksson with crew for the operations at sea. This is highly appreciated.

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