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Gelatinous zooplankton on the Mid-Atlantic Ridge

Distribution patterns of trawl-collected planktonic cnidarians

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The Mid-Atlantic Ridge (MAR) between 40°N (Azores) and 63°N (Iceland) is the largest topographic feature in the North Atlantic Ocean. However, the fauna and ecological significance of mid-ocean ridges has remained poorly understood. This is especially true for the morphologically fragile gelatinous fauna, which has been poorly studied due to methodological constraints.

From 4 June to 5 August 2004 the G.O. Sars expedition along the northern Mid-Atlantic Ridge was a major field study initiative under the MAR-ECO project (www.mar-eco.no), a field project under the Census of Marine Life. An extensive sampling program for pelagic fauna was performed, using a suite of nets, trawls, UVP and ROV observations. Here we present the composition, abundance and vertical distribution of medusae and siphonophores collected with pelagic midwater trawls along the northern Mid-Atlantic Ridge (MAR) June 2004.

Methods

Depth stratified sampling from 18 positions from Iceland to the Azores (~60-44°N, 25-35°W) from 0 to 2500 m.

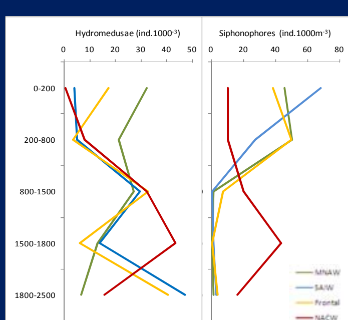
Three different midwater trawls: Egersund trawl (vertical opening 90-180 m, mesh size 50 mm), Aakratrawl (opening 20-35 m, mesh size 22 mm) and Macrozooplankton trawl (40 m^2 mouth opening, mesh size 3 mm). Only the Macrozooplankton trawl were used for quantification of densities. Enumeration of calycophoran and physonect siphonophores were made according to Pugh (1984).

Results

A total of 49 species or genera of planktonic cnidarians and one ctenophore genus were identified (15 hydromedusae, 31 siphonophores, 3 scyphomedusae).The large-scale distribution of cnidarians along the MAR was related to the dominant major masses in the area. The main divergence occurred at the SPF and several species were confined to the region south of the SPF.

Hydromedusae

The hydromedusae were numerically dominated by *Aegina grimaldi*, *Halicreas minimum* and *Colobonema sericeum* and *Chromatonema rubrum* which had a wide geographical range. The vertical diistributions showed a maximum (mainly of *Aegina grimaldi*) at mid-water depth (500-1500 m). In addition, elevated abundances were observed in the deepest near-bottom layer in the SAIW and Frontal region. This peak was dominated by *Halicreas minimum.*



Siphonophores

The most numerous siphonophores were *Chuniphyes multidentata, Vogtia pentacantha* and *Rosacea* sp. Highest densities were observed in the upper layers (0-200 m) in the northern regions (MNAW, SAIW and Frontal), while in the NACW peak densities of siphonophores was observed in the 1500-1800 m strata.

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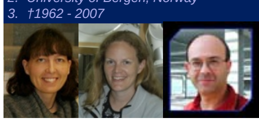
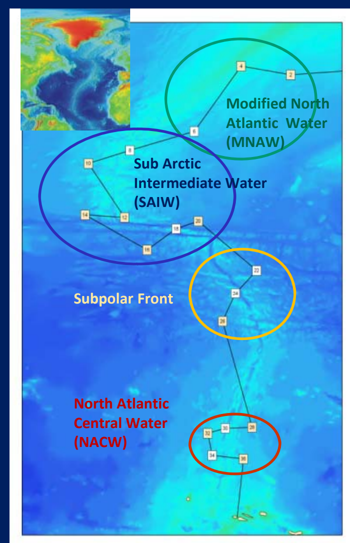
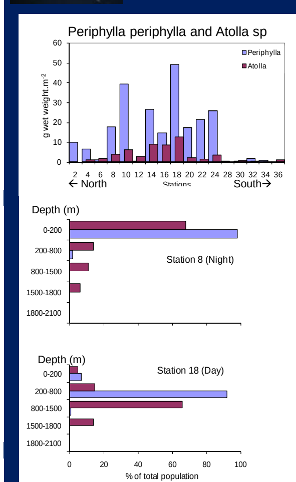




Numbers/1000 m2	Region MNAW	SAIW	Frontal	NACW
Hydroidomedusae				
Colobonema sericeum	51	52	162	148
Aeginura grimaldi	54	687	506	274
Chromatonema rubrum	2	29	52	24
Halicreas minimum	82	1414	1888	310
Halicreas sp			1654	
Bythotiaridae	10		11	
Aglantha digitale	57	92	442	
Pandeidae		5		
Pantachogon haeckeli		131	30	8
Solimissus sp		21		
Solimissus incisa		17	12	15
Halitrephes maasi			7	17
Cunina duplicata			11	
Modeeria rotunda			44	
Crossota alba			7	**
Aegina citrea				8
Sibogita geometrica				9
Siphonophora				
Chuniphyes multidentata	250	112	422	643
Halistemma sp	1	2		4
Vogtia pentacantha	11	13	8	14
Vogtia spinosa	5			3
Nectadamas diomedeae	5		*	8
Nectopyramis thetis	2			10
Rosacea sp	20		73	66
Physophora sp	1	1		1
Praya dubia	5			*
Lensia conoidea	16			
Vogtia sp	6			
Clausophyes galeata		5		
Clausophyes moserae			13	
Vogtia glabra			36	
Physonect indet.			21	
Bargmannia sp				2
Maresearsia praeclara				12
Chelophyes appendiculata				11
Hippopodius hippopus				5
Ceratocymba leuckarti				11
Ceratosymba sagittata				*
Abylopsis tetragona				10
Amphicaryon acaule				10
Diphyes dispar				10
Bassia bassensis				10
Ceratocymba sp				44
Clausophyes sp				1
Nectopyramis natans				17
Nectopyramis sp				8
Agalma sp				3
Abyla sp				8
Scyphozoa				
Periphylla periphylla	151	108	287	138
Atolla sp	109	91	80	42
Pelagia noctiluca				8

Hydrography

Three main water masses were identified in the survey area : Modified North Atlantic Water (MNAW) in the northern part, Sub Arctic Intermediate Water (SAIW) south of 56°N, and North Atlantic Central Water (NACW) south of 48°N. The SAIW and NACW are separated by the Sub Polar Front (SPF), a broad frontal region.



Scyphozoan medusae

The most important contributors to the cnidarians biomass (WW) north of the Subpolar Front was the scyphomedusan *Periphylla periphylla* and *Atolla* sp. The vertical distributions of *P. periphylla* and *Atolla* were deeper at day than at night. The bulk of the *Atolla* population usually resided deeper in the water column than *P. periphylla.*

Are trawls suitable for sampling jellies?

The pelagic trawls will certainly underestimate the general abundance of fragile gelatinous zooplankton. However, due to the large sampling volume ,rare (e.g physonects, hippopodiids and prayids) and large species, such as scyphozoan medusae, and larger hydromedusae (*e.g. Solimissus incise* and *Colobonema sericeum*) are more frequently caught in trawls than in small plankton nets. Each sampling method, such as nets (Hosia et al, 2008), ROV (Youngbluth et al 2008) and UVP (Stemmann et al, 2008) will bias different components of the gelatinous fauna. Combined, the data will provide a more comprehensive picture of the gelatinous fauna of the Mid-Atlantic Ridge.

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Pugh, P. (1984). Progress in Oceanography 13: 461-489
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