

**BLACK CORALS (ANTIPATHARIA) FROM THE CONTINENTAL SLOPE AND
ADJACENT SEAMOUNTS
OF THE NE ATLANTIC AND SW INDIAN OCEANS**

FINAL REPORT FOR THE 2016 MARINE ALLIANCE SCIENCE TECHNOLOGY
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(MASTS) VISITING FELLOWSHIP

Dr. Tina Molodtsova (MASTS Visiting Fellow)

P.P. Shirshov Institute of Oceanology RAS

36 Nakhimovsky prospekt

Moscow 117997 Russia

Dr. Bhavani Narayanaswamy (primary MASTS Visiting Fellow Host)

Scottish Association for Marine Science

Oban, Argyll PA37 1QA, UK

Dr. Alan Jamieson (MASTS Visiting Fellow Host)

Oceanlab, University of Aberdeen

Institute of Biological and Environmental Sciences

Newburgh, Aberdeenshire AB41 6AA

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SUMMARY

During a 35 day visit to MASTS institutions, we were able to summarize recent and historical collection of deep-sea black corals from continental slope and adjacent seamounts of the North-East Atlantic and Indian Ocean. These samples were collected during a number fishery and scientific expeditions and had been deposited in several research centers in Scotland, namely SAMS, the Zoological Museum at Aberdeen University, the National Museum of Scotland – Edinburgh. There was also an opportunity to look at recent material from the shelves and slope of the Rockall Bank, Rockall Trough and adjacent area collected by Marine Science Scotland on board *F/S Scotia*. Nine species of Black coral, including three species new for science were identified in the material studied. The family Tylopathidae had not been previously reported in the North Atlantic. Three species of the deep-sea soft corals of the genera *Anthomastus*, *Pseudoanthomastus* and *Heteropolypus* were reported in material from the same area. All three species were earlier reported from the Reykjanes Ridge. In the course of studying the black coral collection from the NMS we were able to locate and identify a type species of *Antipathes salicoides* (Summers, 1910) that was considered to be lost for almost a century. We plan to publish our results that were obtained during the course of the MASTS visit in two publications in peer-reviewed journals in 2016-2017. In addition we will present a poster with our preliminary results on black corals from the NE Atlantic at the International Symposium “Unique Marine Ecosystems: Modern Technologies of Exploration and Conservation for Future Generations” in August 2016.

INTRODUCTION

Black corals (Cnidaria: Anthozoa: Antipatharia) are a characteristic component of suspension-feeding fauna of seamounts and continental slopes. This group of deep-sea animals includes many habitat-forming species that host abundant associated fauna. Black corals are one of the major groups comprising so-called 'coral gardens' that are considered to be one of VME and can be easily damaged in trawling and dredging operation. Black corals are often found as by-catch in commercial trawls from seamount and banks, including Hatton Bank, Rockall Bank and the Celtic continental slope as well as from the deep-sea of the tropical zones of the Atlantic, Pacific and Indian Oceans.

Despite the fact that the north-eastern Atlantic can be considered as one of the most studied areas, the fauna of black corals in this region is still poorly known. The last account of the antipatharian fauna of the north-eastern Atlantic was mainly based on the literature data (Molodtsova, 2006) and the fauna has been estimated as 33 species from five families (Antipathidae, Aphanipathidae, Leiopathidae, Myriopathidae and Schizopathidae). However, this number is likely to be a under-estimate and the distribution pattern provided can be erroneous due to mis-identifications in the literature used (e.g. Roule, 1905, Hickson, 1906, Gravier, 1921, Grasshoff, 1981, 1985, 1989, Pasternak, 1985). This order would require a revision and many new species are to be described even in the North East Atlantic. Fauna of black corals from the Indian Ocean is even less studied and known mainly from publications of the XIX-beginning of XX century summarizing samples from Challenger, Valdivia and Investigator Expeditions. Some species are described very briefly and not properly illustrated. And the problem of identification became worse because often the type specimens are lost or not properly labeled. As all the antipatharians are under CITES regulations, they cannot be easily transported abroad for scientific research. The present study aims at describing or re-describing antipatharians species kept in MASTS Institutions, to produce a list of valid species names for specimens sampled during cruises where MASTS institutes participated, to update the list of currently known species in the north-eastern Atlantic and Indian Oceans and contribute to the study of cold water coral communities in the north-eastern Atlantic and Indian Ocean undertaken at MASTS institutions

OBJECTIVE FOR THE PROPOSED RESEARCH AND ACTIVITIES

Objective 1: To revise fauna of black corals of the Rockall Trough and adjacent area

Objective 2: To identify materials from the Indian Ocean deposited in MASTS institutions

Objective 3: To make descriptions of new species and re-descriptions of previously known species using modern taxonomic methods (SEM, light microscopy) and approaches.

ACTIVITIES AND ACHIEVEMENTS

1. Black corals of the NE Atlantic

Nine species of black corals (Antipatharia) were identified in recent and historical material studied from Rockall Bank, Rockall Trough and adjacent area of the continental slope (North Hebrides Terrace, Donegal slope and St Kilda Slope). Previously (Molodtsova, 2006) only four species of black corals were reported from the North Atlantic north of 52°N. Species reported belong to three families: Leiopathidae (1 species), Stylopathidae (1 species) and Schizopathidae (7 species). The family Stylopathidae had never been reported from the Northern Atlantic and represent a new species. Of seven schizopathids reported from the material studied, two were represented by new species. Also we documented findings of *Parantipathes larix*, previously reported exclusively from the Mediterranean Sea. This distribution cannot be regarded as a recent expansion of the southern fauna. *Parantipathes larix* was also documented in the historical collection of the Zoological Museum of the University of Aberdeen and namely this species has been seen in video footage filmed during Pisces III dive by John Wilson and George Colquhoun at Rockall Bank in 1973 (<http://lophelia.org/case-studies/pisces-and-rockall-bank/pisces-videos> (time 5:41-7:36)).

	Our data	Molodtsova, 2006
SCHIZOPATHIDAE		
<i>Parantipathes larix</i>	Rockall Bank 187-800 m	Questionable determination (Thomson, 1907)
<i>Parantipathes hirondelle</i>	Rockall Bank, Rosemary Bank 335-975	Not recorded north of 52°N
<i>Parantipathes n.sp.1</i>	Rockall Bank 295-380	-
<i>Parantipathes sp. 2</i>	Donegal slope, St Kilda slope 1590-1720 m	
<i>Stauropathes punctata</i>	Donegal slope 1790 m	
<i>Stauropathes arctica</i>	Donegal slope, Rockall Trough 1000-1875	Reykjanes Ridge 1535-1750 m
<i>Bathypathes robusta</i>	Rockall Trough	
STYLOPATHIDAE		
<i>Tylopathes n.sp.</i>	Rockall Bank 370-380 m	
LEIOPATHIDAE		

<i>Leiopathes cf. expansa</i>	North Hebrides Terrace, Hatton-Rockall Basin 1160- 200 m	Not recorded north of 52°N
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2. Deep-sea soft corals of the genera *Anthomastus*, *Pseudoanthomastus* and *Heteropolypus* in the North-East Atlantic

Because of the availability of material we were able to revise material on three deep-sea soft corals that were previously reported as *Anthomastus grandiflorus*. However, these were recently shown to represent three different genera: *Anthomastus*, *Pseudoanthomastus* and *Heteropolypus* (Molodtsova, 2013). We were able to determine all the material to species level *Anthomastus gyratus* Molodtsova, 2013, *Pseudoanthomastus agaricus* (Studer, 1890) and *Heteropolypus sol* Molodtsova, 2013. All three species were previously reported from Reykjanes Ridge and *H. sol* was also reported from the Bay of Biscay. These findings seriously expand distribution range of all three species. No material of *Anthomastus grandiflorus* was identified in samples available that makes to be questionable the reports of this species in the North-East Atlantic. We assume that this data has to be published as separate paper in 2017.

3. Black corals of the Indian Ocean

In the course of visit to National Zoological Museum in Edinburgh we were able to locate previously overlooked historical collection collected in the SW Indian Ocean and donated to Museum by Prof. Thomson. Based on the data from the original publication (Summers, 1910) we were able to identify in the material a type specimen of *Antipathes salicoides*, that was considered to be lost for almost a century. This finding has great value for black coral taxonomy and the species needs to be re-described at the modern taxonomical level.

4. Seminar lectures

During the course of the MASTS visit, Dr. Tina Molodtsova gave two seminar lectures

1. When visiting the historical collection of the Zoological museum of Aberdeen University, Dr. Tina Molodtsova gave a seminar lecture in Marine Scotland Science called “Black corals of the North-East Atlantic: why do we care”

2. Whilst based at SAMS, Dr. Tina Molodtsova gave a seminar lecture “Black corals in the deep-sea: case study for the North-East Atlantic”. This second seminar was recorded by UHI and can be seen by any person interested.

Future prospects

We plan to publish our results from the work undertaken during the MASTS Fellowship in two peer-reviewed journals. Two manuscripts are now in preparation:

1. *Parantipathes* in the North-East Atlantic
2. Soft mushroom corals of the Rockall Bank and Rockall Trough

We are going to present our preliminary data on the black corals as a poster at the International Symposium “Unique Marine Ecosystems: Modern Technologies of Exploration and Conservation for Future Generations” (August 4-7 2016 Vladivostok, Russia). New species found in the area will be described during the next 12 months.

Abstract for poster:

Black corals from topographic highs found in the Rockall Trough and the adjacent continental slope

Tina N. Molodtsova¹, Jim Drewery², Bhavani E. Narayanaswamy³, Temir Britayev⁴

¹P.P. Shirshov Institute of Oceanology RAS, Moscow, Russia

² Marine Scotland Science, United Kingdom

³Scottish Association for Marine Science, Scottish Marine Institute, Oban, United Kingdom

⁴A.N. Severtsov Institute of Ecology and Evolution RAS, Moscow, Russia

Black corals (Antipatharia: Anthozoa) are an important and rich component of the suspension feeding fauna of the North-East Atlantic seamounts, banks and carbonate mounds. They often play host to a rich and diverse associated fauna. Until recently black corals were only sporadically reported from higher latitudes of the North Atlantic. In February 2016, a Marine Alliance for Science and Technology for Scotland Deep Sea Forum Fellowship awarded to TM, resulted in us being able to study and summarize the collection of black corals (Antipatharia). These had mostly been collected from Rockall Bank, the Hebridean Shelf as well as Rosemary Bank Seamount and also included a large historical collection from the North Atlantic. A representative collection from the depth range 187-2000 m included 10 species from six genera of black corals of the families Antipathidae, Cladopathidae, Leiopathidae, Stylopathidae and Schizopathidae, and these agree well with results obtained earlier for Hatton Bank. A full list of

black corals of the area based on material studied has now been compiled. In addition for the first time, symbiotic scale-worms (Annelida, Polynoidae) were reported from colonies of the black corals, *Stauropathes arctica* and *Parantipathes larix*

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