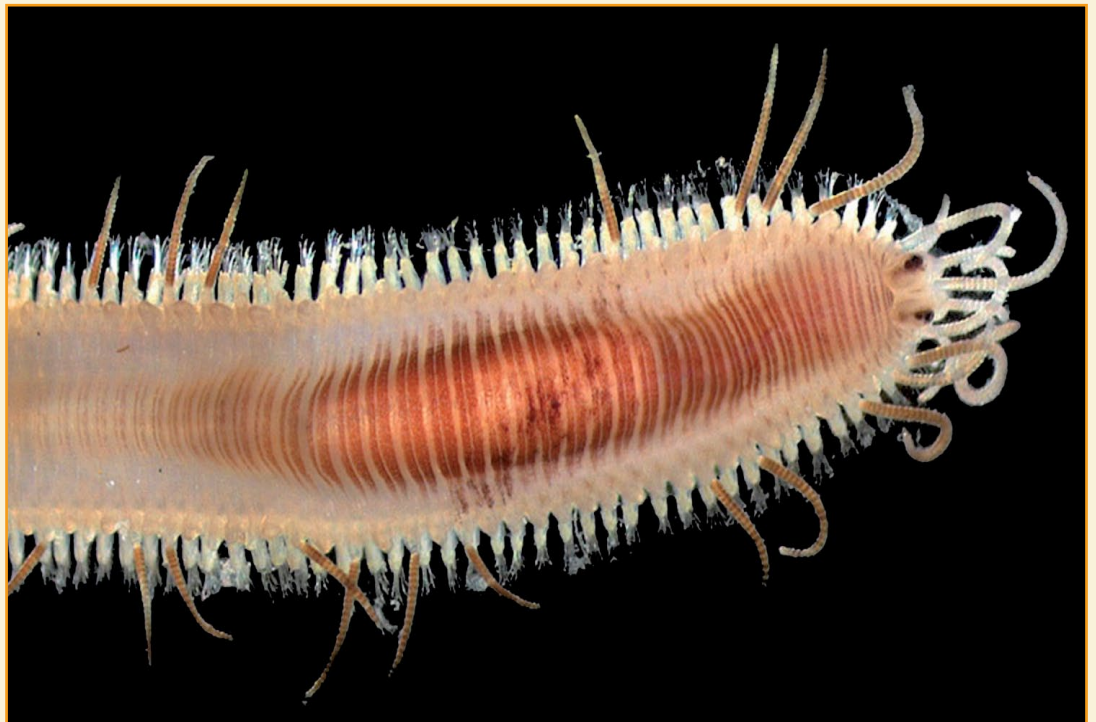


**A GUIDE TO**

# **POLYCHAETES (ANNELIDA)**

**in Qatar Marine Sediments**



**By**

**Najat Hussain Ahmed Al-Omari**





**A GUIDE TO**

# **POLYCHAETES**

# **(ANNELIDA)**

**in Qatar Marine Sediments**

**By**  
**Najat Hussain Ahmed Al-Omari**

© 2011 Environmental Studies Center - Qatar University  
- P.O.Box: 2713 - Doha, Qatar  
- Tel. (+974) 4403393 9  
- Fax: (+974) 44033940  
-Email: [esc@qu.edu.qa](mailto:esc@qu.edu.qa)  
-Web: [www.qu.edu.qa/offices/research/esc/](http://www.qu.edu.qa/offices/research/esc/)

All rights reserved. No part of this publication may be reproduced, stored in retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without the prior permission of the copyright owner.

First published 2011

WITH NO REFERENCE MATERIAL AVAILABLE I INCLUDED SIMILAR STRUCTURES FROM PLATES OR DRAWING AVAILABLE IN REFERENCES AND WEBSITES.THE SOURCE IS INDICATED THROUGHOUT.

SOME TIMES NO COMPARATIVE PLATE OR FIGURE COULD BE FOUND AND THE SPECIES ARE DESCRIBED UNDER THEIR GENERIC NAME AS SP.

THIS GUIDE IS INTENDED FOR USE AS A MANUAL AT THE E.S.CENTER BIOLOGY LABORATORY.IT IS HOPED THAT THE MANNUAL IN ITS PRESENT FORM WILL BE SENT TO KNOWN AUTHORITIES ON POLYCHEATES TO KINDLY AMEND AND ADVISE.  
PERHAPS THEN WITH CORRECTIONS AND ADVICE ON IMPROVEMENT A MORE CONCISE MANUAL WILL BE AVAILABLE.

THIS STUDY HAS BEEN CARRIED OUT WITH NO AVAILABILITY OF REFERENCES MATERIAL. I HAVE THEREFORE RESORTED TO AVAILABLE REFERENCES AND WEBSITES FOR COMPARATIVE MATERIAL. WHERE AS SUCH MATERIAL IS USED, THE SOURCE IS INCLUDED WITH IT.

NAJAT HUSSAIN A. AL OMARI  
QATAR UNIVERSITY - E.S.CENTER (2011)

*I am grateful for the generous and enthusiastic support given by Dr. Hassan Al-Derham, FR for Research at Q. U. and Dr. Mehsin Al-Ansi, Director of the E. S.Center. Sincere thanks to all those who helped in one way or another and encouraged the completion of this study.*  
*The Director of the E. S.Center and the author are most grateful to Dr. Judith Gobin of the University of The West Indies (Trinidad and Tobago), who kindly agreed to reviewe the Manuscript of this guide. Dr. Judith is a well-known scientist in Marine Polychaetes. Her detailed review helped tremendously in the upgrading and correction of the manuscript. Special thanks are due to Profes-sor Ekhlas Mohamed M. Abdel Bari (E. S.Center, Q.U.) for her valuable comments.*  
*My thanks are equally due to Mr. Khalid Al-Bakri who undertook the setting of the manuscript in the TnDesign format and to Mr. Ahmed Abdel Aziz for his continuous advice on scientific photography. This guide would not have been possible without their help. Last but not least my thanks are due to my husband, family and friends for their encouragement during the preparation of this book.*

*Najat Hussain A. Al-Omari  
E. S.Center - Qatar University*

## Foreword

Polychaetes, segmented bristle-bearing worms of the Class Polychaeta of the Phylum Annelida, are considered as some of the most abundant animals living in marine sediments. Though not often visually detectable, their presence may be indicated by casts or other signs. Some species live aggregated in colonies commonly protected inside tubes and these are referred to as tube worms. The difficulties encountered in identifying the polychaetes as well as minute marine organisms are well-known to marine biologists.

The E.S.Center undertakes annually numerous projects involving studies of biota of marine sediments. Samples are obtained by Van Veen Grab method as detailed in Material and Methods. The organisms are persevered in 70% alcohol. Voucher specimens are kept at the E.S.Cente Biology laboratory.

When enough samples were retrieved from marine sediments, it was decided at the Environmental Studies Center, Qatar University (E.S.Center, Q.U.) to provide a guide to use locally and perhaps in Gulf States. The guide is intended to help in the identification of a group of marine organisms that are numerous, evasive and with structures that require detailed microscopic examination.

Photography was completed at the E.S.Center, Multimedia Unit using a Zeiss 3D Microscope with high resolution, digital camera and two light sources.

All the species detailed in the guide are from Qatar Marine Zone (QMZ) and cover the species retrieved between 2005 to 2010.

This guide is intended for use as a manual at the E.S.Center biology laboratory to identify polycheates in sediments from Qatar Marine Zone.

Unfortunately, there was no reference material available in Qatar and no authority on polycheates to confirm identification. We therefore resorted to the use of information on specialized websites for comparative material. Throughout the source is indicated in the text. Focus was on providing clear detailed images to help in the identification of collected samples. Where no information is available, identification was limited to the generic level.

## TABLE OF CONTENTS

S. No.	Description	Page No.
1.	1. Introductions	1
2.	2. Materials and Methods	1
3.	2.1 Polychaetes locations and Distribution In Q.M.Z.	2
4.	3. The Phylum Annelida	14
5.	3.1 Class Polychaeta [Marine Worms ]	14
6.	3.2 Body structuret in the Phylum Annelida	15
7.	3.3 Key features of Annelida	16
8.	4. How to identify polychate worms	18
9.	4.1 Importance of Polychaetes	21
10.	5. Polychaetes encountered in Qatar marine sediments	22
11.	Subclass Palpata:	22
12.	Order Aciculata:	22
13.	Family:Polynoidae	22
14.	Family:Sigalionidae	30
15.	Family: Chrysopetalidae	32
16.	Family : Acoetidae	34
17.	Family : Euphrosinidae	36
18.	Family : Amphinomidae	37
19.	Family : Aphroditidae	40
20.	Family : Phyllodocidae	41
21.	Family : Tomopteridae	44
22.	Family :Alciopidae	45
23.	Family : Pilargidiidae	46
24.	Family : Syllidae	47
25.	Family : Nephtyidae	54
26.	Family : Nereididae	58
27.	Family :Glyceridae	68
28.	Family : Goniadidae	74
29.	Family : Eunicidae	77

S. No.	Description	Page No.
30.	Family : Dorvilleidae	86
31.	Family :Onuphidae	89
32.	Family : Lumbrineridae	93
33.	Family: Oeonidae	98
34.	Family: Hesionidae	101
35.	Family: Spionidae	103
36.	Family: Magelonidae	112
37.	Family: Chaetopteridae	114
38.	Family: Poecilochaetidae	116
39.	Family: Cirratulidae	117
40.	Family: Heterospionidae	122
41.	Family: Orbiniidae	123
42.	Family: Opheliidae	124
43.	Family: Capitellidae	129
44.	Family: Cossuridae	133
45.	Family: Paraonidae	134
46.	Family: Maldanidae	137
47.	Family: Flabelligeridae	141
48.	Family: Pectinariidae	143
49.	Family: Sternaspidae	145
50.	Family: Oweniidae	147
51.	Family: Terebellidae	148
52.	Family: Ampharetidae	152
53.	Family: Trichobranchidae	156
54.	Family: Sabellariidae	
55.	Family: Sabellidae	158
56.	Family: Serpulidae	164
57.	Appendix	169
58.	Lineages of the Sedentary and Errant groups of the polychaetes	170
59.	Illustrated glossary of terms	172
60.	References	176

## 1. Introduction.:

Qatar is a small state attached to Saudi Arabia on its eastern shoreline. Qatar is a Peninsula surrounded by the Arabian Gulf waters and its only link to mainland Saudi Arabia is a mere 60 km away.

Generally, the Arabian Gulf waters are shallow and becoming shallower by continuous sedimentation. Mangrove forests are restricted to the northeastern coastline of Qatar. The coastline and intertidal zone varies from pure sands to rocky shorelines.

Sediment samples were from various projects undertaken by the environmental studies center. The marine sediment samples come from locations a mainly on the eastern side of Qatar in mostly shallow waters except for few locations at production stations the maximum depth of the Arabian sea is about 100m most deep, waters QMZ are about 30m Depth.

Moreover, the locations are from the vicinity of islands, sand bars, coral reefs and intertidal zones where water depth ranges between 4 to 10m [Figure1 and Table 1.].

## 2. Materials and Methods:

Sediment samples of the various projects were obtained by the Van Veen Grab method these are common by preserved in 5% formalin or are unpreserved and transported to the E.S.Center laboratories.

The sediments are sieved under running tap water using a 0.5mm mesh-size sieve. Larger organisms are hand picked while the rest of the sample is kept in labeled containers. The labels include the sample number, station and replicate. The content of each container is examined under a stereomicroscope. All individuals of the same species are separated and counted.

Identification is carried out to the species level using standard references. For uncommon taxa, guides for other regions are examined. However, if a specimen does not key out using the standard references, it is included in the list as <sp.> or <cf.> to the nearest taxon. Unknowns as listed as A - Z, under their major groups. Once the sediments were fully checked, they are then returned to their labeled containers.

The data of the encountered species taxonomic categories are then statistically analyzed. Representative samples are selected and documented by photography at the Multi-media unit. The content of the labeled sample are then topped up with preservative (70% alcohol) and stored.

2.1 Polychaetes Locations and Distribution in Q.M.Z:

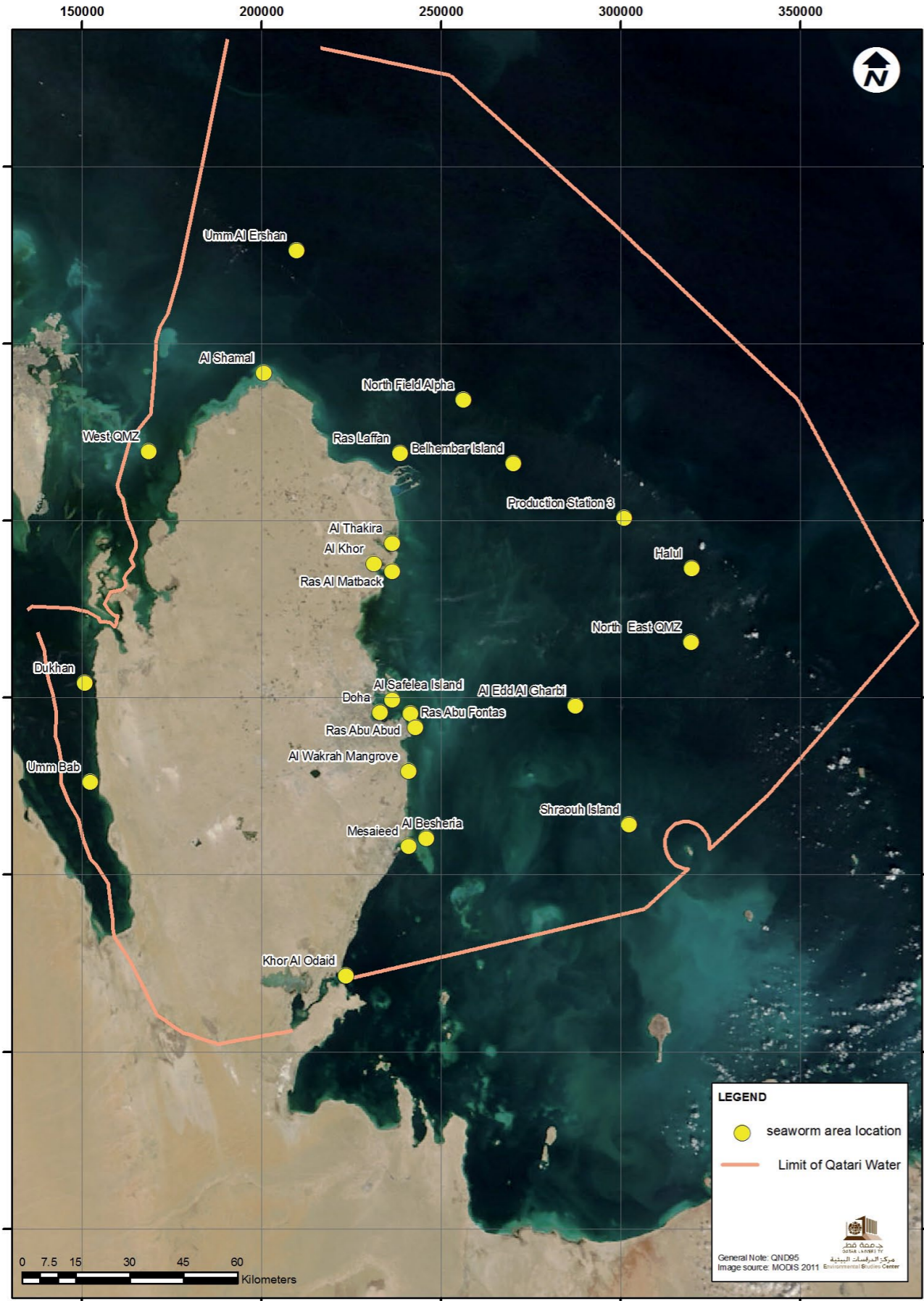


Figure 1. Map of the State of Qatar, with main locations indicated.

Table 1. Polychaetes Distribution In Q.M.Z. :

ANNELIDA (Segmented worms)	LOCATIONS																							
	Al Besheria	Al-Khor	Al-Safeleah Island	Al-Shamal	Al-Thakera	Al-Wakrah Mangrove	Belhembar Island	Dukhan	Doha	Eda Al Garbi	Halul	Khor Al Odaid	Mesaieed	North east QMZ	North Field Alfa	Productionm Station 3	Ras Abu Abud	Ras -Abu Fontas	Ras Lafan	Ras- Matback	Shraouh Island	Umm Al- Ershan	Umm Bab QMZ	West QMZ
CLASS: POLYCHAETA																								
Euphrosine sp.								*		*														
Dorvillea sp.1	*			*					*		*		*			*	*	*	*		*			*
Protodorvillea egena	*			*				*	*		*	*	*				*	*	*			*		*
Protodorvillea sp.									*															
Schistomerigos cf. longicornis									*															
Schistomerigos rudolphi				*					*															
Hesiocaeca sp.1				*					*														*	
Hesiocaeca sp.2								*	*															
Hesiocaeca sp.3													*						*					
Hesiocaeca sp.4																		*						
cf. leocrates sp.								*																
Chloeia sp.1		*							*															
Chloeia sp.2									*															
Pseudeurythoe hirsuta									*		*	*	*	*	*		*	*	*		*		*	*
Pseudeurythoe sp.1		*							*	*		*	*	*	*		*	*		*	*		*	*
Afrogenia sp.1													*											
Afrogenia sp.2									*	*			*	*					*		*		*	*
Capitella capitata										*			*					*						
Capitella sp.																		*						
Dasybranchus caducus		*								*														
Dasybranchus sp.		*								*														
Notomastus cf. agassizii									*				*											
Notomastus latericeus	*	*						*	*	*	*	*	*	*	*			*	*	*	*	*		
Notomastus sp.1		*		*																				
Notomastus sp.2		*																						
Caulleriella alata									*			*						*	*					
Cirratulus sp.1		*																*	*					
Cirratulus sp.2		*																*	*					
Cirratulus sp.3									*			*												

4 | **Table 1. cont. :**

ANNELIDA (Segmented worms)	LOCATIONS															
	Al Besheria	Al-Khor	Al-Safeleah Island	Al-Shamal	Al-Thakera	Al-Wakrah Mangrove	Belhembar Island	Dukhan	Doha	Eda Al Garbi	Halul	Khor Al odaid	Mesaieed	North east QMZ	North Field Alfa	Productionn Station 3
CLASS: POLYCHAETA																
<i>Cirriformia tentaculata</i>	*	*		*					*	*		*	*		*	*
<i>Cirriformia</i> sp.1												*				
<i>Cirriformia</i> sp.2																
<i>Cirrophorus armatus</i>									*	*			*			
<i>Chaetozone</i> cf. <i>setosa</i>												*				
<i>Raricirrus</i> sp.	*						*		*		*	*				
<i>Chaetopterus variopedanus</i>									*							
<i>Mesochaetopterus minutus</i>																
<i>Cossura</i> sp.												*				
<i>Cossura logocirrata</i>		*										*				
<i>Apharyngtus</i> sp.1											*					
<i>Apharyngtus</i> sp.2										*			*			
<i>Eunice antennata</i>				*						*		*	*			
<i>Eunice aphroditois</i>																
<i>Eunice</i> cf. <i>Eunice</i>									*		*	*	*		*	*
<i>Eunice indica</i>				*			*				*		*		*	*
<i>Eunice</i> cf. <i>marovoi</i>									*							
<i>Eunice siliensis</i>				*											*	
<i>Eunice</i> sp.1								*	*					*	*	
<i>Eunice</i> sp.2														*		
<i>Eunice</i> sp.3									*			*	*			
<i>Eunice</i> sp.4															*	
<i>Eunice</i> sp.5									*							
<i>Lysidice collaris</i>				*					*					*		
<i>Lysidice ninetta</i>									*							
<i>Nematoneris unicornis</i>				*					*		*			*	*	*
<i>Marphysa bell</i>											*		*			
<i>Marphysa</i> cf. <i>macintoshi</i>									*							
<i>Marphysa (Macduffia) bonhardi</i>														*		

**Table 1. cont. :**

ANNELIDA (Segmented worms)	LOCATIONS															
	Al Besheria	Al-Khor	Al-Safeleah Island	Al-Shamal	Al-Thakera	Al-Wakrah Mangrove	Belhembar Island	Dukhan	Doha	Eda Al Garbi	Halul	Khor Al odaid	Mesaieed	North east QMZ	North Field Alfa	Productionn Station 3
CLASS: POLYCHAETA																
<i>Marphysa norvegica</i>																
<i>Marphysa</i> cf. <i>orstedii</i>												*				
<i>Marphysa vittata</i>												*				
<i>Marphysa</i> sp.1								*								
<i>Marphysa</i> sp.2																*
<i>Abyssoninae hibernica</i>																
<i>Lumbrinerides acuta</i>								*							*	
<i>lumbrineris bifurcata</i>		*														
<i>Lumbrineris debilis</i>																
<i>Lumbrineris fragilis</i>								*								
<i>Lumbrineris gracilis</i>	*							*	*	*	*	*	*	*	*	*
<i>Lumbrineris cf. lutei</i>																
<i>Lumbrineris cf. heteropoda</i>								*								
<i>Lumbrineris cf. lairelli</i>				*				*	*	*	*	*	*	*	*	*
<i>lumbrineris pettigrewi</i>								*	*	*	*	*	*	*	*	*
<i>Lumbrineris</i> sp.1	*	*		*				*	*	*	*	*	*	*	*	*
<i>Lumbrineris</i> sp.2								*	*	*	*	*	*	*	*	*
<i>Lumbrineris</i> sp.3								*	*	*	*	*	*	*	*	*
<i>Lumbrineris</i> sp.4								*	*	*	*	*	*	*	*	*
<i>Lumbrineris</i> sp.5													*			
<i>Lumbretopsis</i> sp.																
<i>Clymenella</i> sp.1				*				*	*	*	*	*	*	*	*	*
<i>Euclymene lumbricoides</i>	*							*	*	*	*	*	*	*	*	*
<i>Euclymene robusta</i>																*
<i>Euclymene</i> sp.1								*	*	*	*	*	*	*	*	*
<i>Euclymene</i> sp.2								*	*	*	*	*	*	*	*	*
<i>Maldane</i> cf. <i>sarsi</i>								*	*	*	*	*	*	*	*	*
<i>Maldane</i> sp.1								*	*	*	*	*	*	*	*	*
<i>Maldane</i> sp.2								*	*	*	*	*	*	*	*	*
<i>Maldane</i> sp.3			*													

ANNELIDA (Segmented worms)	LOCATIONS																						
	Al Besheria	Al-Khor	Al-Safeleah Island	Al-Shamal	Al-Thakera	Al-Wakrah Mangrove	Belhembarr Island	Dukhan Doha	Eda Al Garbi	Halul	Khor Al odaid	Mesaieed	North east QMZ	North Field Alfa	Productionm Station 3	Ras Abu Abud	Ras -Abu Fontas	Ras Lafan	Ras- Matback	Shraouh Island	Umm Al-Ershan	Umm Bab	West QMZ
CLASS: POLYCHAETA																							
Maldane sp.4												*											
Praxillella gracilis												*											
Arabella iricolor iricolor								*			*	*				*	*						*
Arabella portomutanus																							*
Arabella sp.1								*															
Arabella sp.2								*				*											
Arabella sp.3															*								
Diopatra chiliensis																							
Diopatra cuprea cuprea	*						*			*		*	*	*		*	*	*			*		
Diopatra sp.1				*								*		*									
Diopatra sp.2																							*
Diopatra sp.3								*															
Nothria sp.								*															
Onuphis emerita												*		*									
Onuphis sp.1												*				*							
Paradiopatra cf. quadricupsis																	*						
Paradiopatra sp.																	*						
Janua brasiliensis	*							*					*										
Janua (Fauveldora) kayi	*							*	*		*		*									*	
Spirorbis sp.	*							*	*			*				*	*	*				*	*
Owenia fusiformis							*			*						*	*			*			
Magelona alleni								*	*														
Magelona cincta			*					*	*			*		*	*	*	*	*		*			*
Magelona cf. heteropoda	*							*	*	*		*		*						*	*		
Magelona sp.1														*						*			
Magelona sp.2								*					*				*	*					
Amandia brevis							*	*	*				*				*	*					
Armandia intermedia	*	*	*			*	*	*	*	*		*	*	*		*	*	*	*	*	*		*
Armandia leptocirrus								*	*			*			*	*	*	*					

ANNELIDA (Segmented worms)	LOCATIONS																							
	Al Besheria	Al-Khor	Al-Safeleah Island	Al-Shamal	Al-Thakera	Al-Wakrah Mangrove	Belhembarr Island	Dukhan	Doha	Eda Al Garbi	Halul	Khor Al odayd	Mesaieed	North east QMZ	North Field Alfa	Productionm Station 3	Ras Abu Abud	Ras -Abu Fontas	Ras Lafan	Ras-Matback	Shraouh Island	Umm Al-Ershan	Umm Bab	Weast QMZ
CLASS: POLYCHAETA																								
Armandia sp.1	*	*											*											
Armandia sp.2														*										
Armandia sp.3								*						*										
Ophelia cf. bicornis							*				*						*	*				*		
Ophelia rullieri																		*						
Ophelina cf. cylindricaudata	*								*															
Ophelina acuminata	*																	*						
Ophelina sp.									*		*						*	*						
Leodamus sp.1	*		*	*					*		*		*				*	*				*	*	*
Scolarica capensis																		*						
Scoloplos armiger														*				*						
Scoloplos chevalier																		*						
Acoetes melanonota														*									*	
Polydontes cf. melanonota													*											
Chrysopetalum debile	*	*					*		*		*		*	*	*		*	*	*	*	*	*	*	*
Chrysopetalum sp.														*							*			
Paleanotus debile													*						*					
Paleanotus sp.								*				*	*					*						
Glycera cf. amboinensis													*					*	*					
Glycera alba									*	*			*					*	*					
Glycera tesselata				*					*	*			*		*			*	*			*		*
Glycera cf. macintoshi	*																							
Glycera sp.1		*		*					*	*	*		*						*			*		
Glycera sp.2	*								*		*							*	*			*	*	*
Glycera sp.3																*								
Glycinde gurjanovae							*																	
Glycinde wireni																								
Goniadopsis incerta	*			*			*	*	*				*		*		*	*	*		*			*
Hemipodus sp.								*	*								*	*						

Table 1. cont. :

ANNEPIDA (Segmented worms)	LOCATIONS																
	Al Besheria	Al-Khor	Al-Safelela Island	Al-Shamal	Al-Thakera	Al-Wakrah Mangrove	Belhembarr Island	Dukhan	Doha	Eda Al Garbi	Halul	Khor Al odaid	Mesaieed	North east QMZ	North Field Alfa	Productionn Station 3	Ras Abu Abud
CLASS: POLYCHAETA																	
<i>Goniada emerita</i>	*	*							*				*	*			
<i>Goniada maculata</i>																	
<i>Goniada</i> sp.1			*														
<i>Goniada</i> sp.2												*					
<i>Aglaophamus</i> sp.																	
<i>Nephtys californiensis</i>																	*
<i>Nephtys cornuta</i>	*								*	*		*	*	*	*	*	*
<i>Nephtys tulearensis</i>			*				*		*	*		*	*				*
<i>Nephtys</i> cf. <i>trissophyllus</i>									*								
<i>Nephtys verrilli</i>													*				
<i>Ceratonereis burmensis</i>																	
<i>Ceratonereis erythraensis</i>				*				*	*	*		*	*	*	*	*	*
<i>Ceratonereis</i> sp.													*				
<i>Nereis denhamensis</i>												*	*				
<i>Nereis</i> sp.1													*				
<i>Nicon</i> sp.													*				
<i>Perinereis</i> cf. <i>albuhitensis</i>																	
<i>Perinereis nigropunctata</i>	*			*				*	*	*	*	*	*	*	*	*	*
<i>Perinereis nuntia</i>				*									*				*
<i>Perinereis</i> sp.1							*	*	*	*		*	*	*	*	*	*
<i>Platynereis</i> cf. <i>dumerilii</i>														*			
<i>Platynereis pulchella</i>				*				*	*	*						*	*
<i>Platynereis</i> sp.1	*							*	*	*			*			*	
<i>Platynereis</i> sp.2				*									*				
<i>Pseudonereis</i> sp.1		*															
<i>Eulalia mustela</i>									*								
<i>Eulalia</i> sp.									*								
<i>Eumida sanguinea</i>	*		*	*				*	*				*			*	*
<i>Eumida</i> sp.				*													

Table 1. cont. :

ANNEPIDA (Segmented worms)	LOCATIONS																
	Al Besheria	Al-Khor	Al-Safelela Island	Al-Shamal	Al-Thakera	Al-Wakrah Mangrove	Belhembarr Island	Dukhan	Doha	Eda Al Garbi	Halul	Khor Al odaid	Mesaieed	North east QMZ	North Field Alfa	Productionn Station 3	Ras Abu Abud
CLASS: POLYCHAETA																	
<i>Eteone foliosa</i>															*		*
<i>Eteone</i> cf. <i>picta</i>		*															
<i>Eteone</i> cf. <i>spetsbergensis</i>								*									
<i>Nereiphylla castanea</i>	*	*	*	*		*			*	*			*	*	*	*	*
<i>Phyllodoce</i> sp.1													*				
<i>Phyllodoce</i> sp.2								*					*				
<i>Phyllodoce</i> sp.3														*			
<i>Phyllodoce</i> sp.4							*						*				
<i>Sigambra parva</i>	*						*		*		*				*	*	*
<i>Sigambra</i> cf. <i>bassi</i>											*						
<i>Euphionella</i> sp.				*													
<i>Gatya</i> cf. <i>cirrhopa</i>				*													
<i>Harmothoe dictyophora</i>	*						*		*	*	*	*	*	*	*	*	*
<i>Harmothoe</i> sp.1															*		
<i>Harmothoe</i> sp.2													*	*	*	*	*
<i>Lepidonotus carinulatus</i>													*	*	*	*	*
<i>Lepidonotus tenuisetosus</i>				*									*	*	*	*	*
<i>Lepidonotus</i> sp.1	*	*	*	*	*			*	*	*	*	*	*	*	*	*	*
<i>Paralepidonotus ampulliferus</i>		*		*					*	*			*	*	*	*	*
<i>Paralepidonotus</i> sp.1													*				
<i>Paralepidonotus</i> sp.2									*								
<i>Polynoe</i> cf. <i>magnipalpa</i>							*						*	*	*	*	*
<i>Polynoe</i> sp.1													*	*	*	*	*
<i>Polynoe</i> sp.2													*	*	*	*	*
<i>Polynoe</i> sp.3													*	*	*	*	*
<i>Polynoe</i> sp.4													*	*	*	*	*
<i>Polyaunoa</i> cf. <i>dubia</i>													*	*	*	*	*
<i>Polyaunoa</i> sp.1													*	*	*	*	*
<i>Euthlenessa</i> sp.1	*																

Table 1. cont. :

ANNELEIDA (Segmented worms)	LOCATIONS															
	Al Besheria	Al-Khor	Al-Safeleah Island	Al-Shamal	Al-Thakera	Al-Wakrah Mangrove	Belhembar Island	Dukhan	Doha	Eda Al Garbi	Halul	Khor Al odaid	Mesaieed	North east QMZ	North Field Alfa	Productionn Station 3
CLASS: POLYCHAETA																
<i>Euthalenessa</i> sp.2	*															
<i>Psammolyce</i> sp.																
<i>Thalenessa</i> sp.1																
<i>Thalenessa</i> sp.2								*								
<i>Vanadis</i> cf. <i>longissima</i>											*					
Cf. <i>Cirrotyllis</i> sp.									*	*		*				
<i>Exogone verugera</i>	*	*		*					*	*		*	*	*		*
<i>Exogone</i> sp.									*	*		*	*			*
<i>Sphaerostyllis</i> sp.				*												
<i>Syllides</i> sp.1				*					*	*						
<i>Syllides</i> sp.2		*	*	*	*		*	*	*	*	*	*	*	*	*	*
<i>Syllis cornuta</i>	*	*	*	*	*		*	*	*	*	*	*	*	*	*	*
<i>Syllis gigantea</i>							*	*	*	*	*	*	*	*	*	*
<i>Syllis gracilis</i>	*			*			*	*	*	*		*	*	*	*	*
<i>Syllis</i> sp.1				*	*				*	*		*	*	*	*	*
<i>Syllis variegata</i>									*	*		*	*	*	*	*
<i>Typosyllis</i> sp.1		*														
<i>Typosyllis</i> sp.2		*														
<i>Typosyllis</i> sp.3		*							*	*						
<i>Typosyllis</i> sp.4						*		*	*	*						
<i>Typosyllis zebra</i>										*		*	*	*	*	*
<i>Tomopteris</i> sp.				*												*
<i>Amphigena mediterranea</i>										*						
<i>Branchiomma</i> cf. <i>violacea</i>													*			
<i>Chone fauveli</i>									*	*						
cf. <i>Paradiatyphone</i> sp.									*	*						
<i>Dasyphone</i> sp.												*				
cf. <i>Calcisabella</i> sp.														*		
<i>Euchone analis</i>														*		

Table 1. cont. :

ANNELEIDA (Segmented worms)	LOCATIONS															
	Al Besheria	Al-Khor	Al-Safeleah Island	Al-Shamal	Al-Thakera	Al-Wakrah Mangrove	Belhembar Island	Dukhan	Doha	Eda Al Garbi	Halul	Khor Al odaid	Mesaieed	North east QMZ	North Field Alfa	Productionn Station 3
CLASS: POLYCHAETA																
<i>Jasmineira elegans</i>	*		*	*		*	*		*				*			*
<i>Sabella fusca</i>	*			*					*				*		*	
<i>Sabellastarte</i> sp.									*							*
<i>Lygdamis giardi</i>															*	
<i>Sabellaria</i> sp.																
<i>Ficopomatus enigmaticus</i>																
<i>Hydroides</i> cf. <i>cruciger</i>																
<i>Hydroides elegans</i>		*														
<i>Hydroides</i> sp.1													*			
<i>Hydroides</i> sp.2									*							
<i>Serpula</i> cf. <i>concharum</i>																
<i>Serpula</i> cf. <i>narconensis</i>									*							
<i>Spirobranchus dendropoma</i>									*							
<i>Spirobranchus</i> sp.1													*			
<i>Spirobranchus</i> sp.2														*		
<i>Vermilopsis</i> sp.													*			
<i>Sternaspis scutata</i>												*	*			
<i>Heterospio</i> cf. <i>sinica</i>														*		
<i>Poecilochaetus tropicus</i>									*							
<i>Poecilochaetus serpens</i>				*			*		*			*			*	*
<i>Aonides paucibranchiata</i>	*															*
<i>Minuspio cirrifera</i>	*															
<i>Polydora</i> cf. <i>socialis</i>			*	*							*					
<i>Polydora</i> sp.1				*					*		*					
<i>Polydora</i> sp.2									*							
<i>Polydora</i> sp.3													*			
<i>Prionospio banyulensis</i>									*							*
<i>Prionospio</i> cf. <i>cornuta</i>								*	*		*					*
<i>Prionospio</i> cf. <i>multibranchiata</i>									*							*
<i>Prionospio fallax</i>																



### 3.The Phylum Annelida

The annelids, collectively called Annelida (from Latin *anellus* «little ring»), are of about 15,000 recognized species found in most wet environments( terrestrial freshwater and marine) and some are parasitic or mutualistic forms.The Annelida are grouped in three classes :Earthworms and freshwater worms (Oligochaetes), leeches (Hirudineans), and the marine worms (Polychaetes). The annelids vary in size from few millimeters to over 3 meters (the Seep tube worm *Lamellibrachia luymesii* can reach lengths of over 3 m .

Polychaetes to which the greatest number of taxa belong, live in protected habitats such as mud, sand, and rock crevices, as well as in and among other invertebrate animals, such as sponges. Many live in tubes which they secrete around themselves.

#### 3.1 Class Polychaeta in marine worms

Common names denoting members of the Class Polychaeta include: Lugworms, clam worms, bristle worms, fire worms, palolo worms, sea mice, feather duster worms, etc...



*Chloeia* sp.

The name polychaeta (**poly** = **many**, **chaeta** = **bristle**) is indicative of the appearance of the worms. The polychaetes are the most diverse and comprise the highest number of species of the Phylum Annelida, with over 8,000 recorded species. They are abundant from the intertidal zone to depths of over (5,000 m) 16,405 ft. They range in length from less than 2 mm (1/8 in.) to more than 3 m (9 ft), but mostly fall within the range 5-10 cm (2 to 4 in.) in length. Polychaetes colors are often brilliant, and some species are iridescent.

Being mostly marine animals they occupy ecologically different habitats. They are accordingly divided into two groups: the Errantia and the Sedentaria [depending on whether or not they live sedentary lives in holes or live more active lives]. Therefore habitat distinction is a useful mean criteria for classification.

The Errantia have well developed heads, complex parapodia (enabling them to swim), and are often dorsoventrally flattened. Proposal as to their lineages are given in Figures (50 ) and (51 ) in the Appendix pages 170 and 171.

Most polychaetes are unisexual (males or females), some are sequential hermaphrodites (one sex first changing to the other sex). Reproduction is often accompanied by the production of special modified reproductive segments [which may, or may not, become independent of the parent worm before mating] but are eliminated during or immediately after the release of the male and female gametes.

Up-to-date, there are two Subclasses : Subclass **Palpata** and Subclass **Scolecida**.

The Subclass **Palpata** (including 2 orders, 7 suborders (including 2 uncertain orders) with 3 and 4 families respectively. The 5 distinct suborders are:

**Suborder Eunicidae** (10 families), **Suborder Pyllodocidae** (28 families), **Suborder Sabellidae** (7 families), **Suborder Spionidae** (8 families) and **Suborder Terebellidae** with (13 families).

The Subclass **Scolecida** includes 13 families; In all, a total of 79 families are taxonomically valid [Table 2]

#### 3.2 Body structure in the Phylum Annelida

In the Phylum Annelida the body is metamerically segmented. All major systems [excretory, circulatory, reproductive and nervous] are repeated in each segment with the gut being the only exception. Each segment is separated from its neighbour by vertical mesenteries and a longitudinal mesentery running from the mouth of the animal to the anus [top to bottom]. Metamerism not only increases the efficiency of burrowing but also enable the sophisticated movement of separate segments, independent of others. The need for greater control over these movements in turn led to a more highly developed nervous system [Figure 2] .

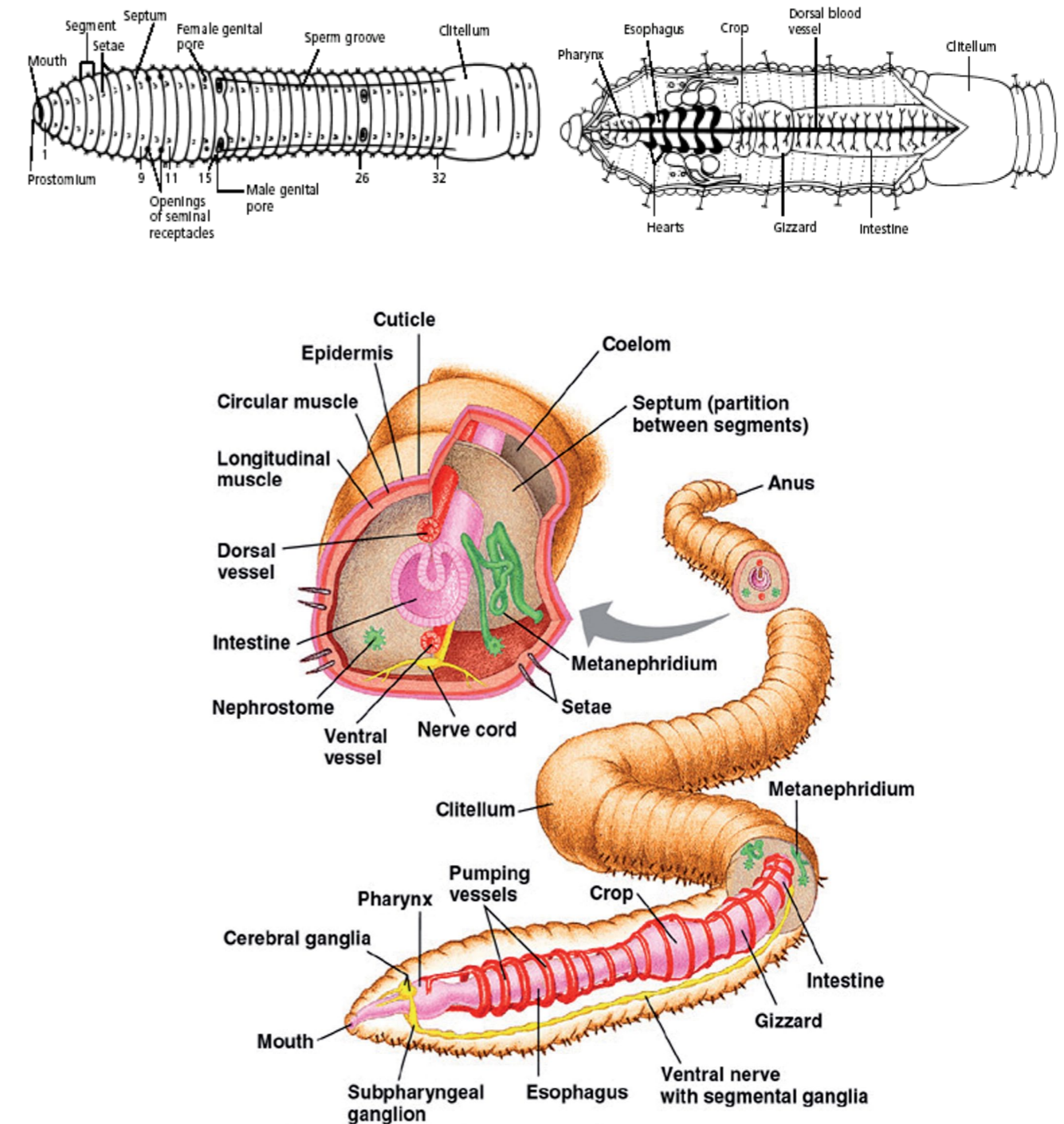


Figure 2. External morphology and internal anatomy of an annelid showing main body organs and segments.

Source:<http://instruct1.cit.cornell.edu/courses/biog105/labs/inverts/annelida.html>

3.3 Key features on Annelida

There are 10 key features that characterize the Annelida.

- Body metamerically segmented; symmetry bilateral.
- Body wall with outer circular and inner longitudinal muscle layers; outer transparent moist cuticle secreted by epithelium.
- Chitinous setae (absent in leeches), often present on fleshy appendages called parapodia.
- Coelom well developed and divided by septa (except in leeches); coelomic fluid supplies turgidity and acts as a hydrostatic skeleton.
- Blood system closed and segmentally arranged.
- Digestive system complete and not metamerically arranged.
- Respiratory gas exchange through skin, gills or parapodia.
- Excretory system typically a pair of nephridia for each metamere.
- Nervous and sensory systems present.
- Hermaphroditic or separate sexes; asexual reproduction by budding in some.

These include body structure [internal and external organs and various systems] and reproduction.[For an illustrated guide to the main characters of polychaetes consult page (172 ) to (175 ) in the Appendix].

Table 2. A list of the accepted families of the Class Polychaeta \*

<b>Class : Polychaeta</b> <b>Subclass: Palpata</b> <b>Order : Aciculata</b> <b>Suborder uncertain</b> Family <a href="#">Aberrantidae</a> Family <a href="#">Nerillidae</a> Family <a href="#">Spintheridae</a>  <b>Suborder Eunicida</b> Family <a href="#">Amphinomidae</a> Family <a href="#">Diurodrilidae</a> Family <a href="#">Dorvilleidae</a> Family <a href="#">Eunicidae</a> Family <a href="#">Euphrosinidae</a> Family <a href="#">Hartmaniellidae</a> Family <a href="#">Histriobdellidae</a> Family <a href="#">Lumbrineridae</a> Family <a href="#">Oeonidae</a> Family <a href="#">Onuphidae</a>  <b>Suborder Phyllodocida</b> Family <a href="#">Acoetidae</a> Family <a href="#">Alciopidae</a> Family <a href="#">Aphroditidae</a> Family <a href="#">Chrysopetalidae</a> Family <a href="#">Eulepethidae</a> Family <a href="#">Glyceridae</a> Family <a href="#">Goniadidae</a> Family <a href="#">Hesionidae</a> Family <a href="#">Ichthyotomidae</a> Family <a href="#">Iospilidae</a> Family <a href="#">Lacydoniidae</a> Family <a href="#">Lopadorhynchidae</a> Family <a href="#">Myzostomatidae</a> Family <a href="#">Nautillienellidae</a> Family <a href="#">Nephtyidae</a> Family <a href="#">Nereididae</a> Family <a href="#">Paralacydoniidae</a>	Family <a href="#">Pholoidae</a> Family <a href="#">Phyllodocidae</a> Family <a href="#">Pilargidae</a> Family <a href="#">Pisionidae</a> Family <a href="#">Polynoidae</a> Family <a href="#">Pontodoridae</a> Family <a href="#">Sigalionidae</a> Family <a href="#">Sphaeodoridae</a> Family <a href="#">Syllidae</a> Family <a href="#">Typhloscolecidae</a> Family <a href="#">Tomopteridae</a>  <b>Order Canalipalpata</b> <b>Suborder uncertain</b> Family <a href="#">Polygordiidae</a> Family <a href="#">Protodrilidae</a> Family <a href="#">Protodriloididae</a> Family <a href="#">Saccociridae</a>  <b>Suborder Sabellida</b> Family <a href="#">Oweniidae</a> Family <a href="#">Siboglinidae</a> Family <a href="#">Serpulidae</a> Family <a href="#">Sabellidae</a> Family <a href="#">Sabellariidae</a> Family <a href="#">Sternaspidae</a> Family <a href="#">Spirorbidae</a>  <b>Suborder Spionida</b> Family <a href="#">Apistobranchidae</a> Family <a href="#">Chaetopteridae</a> Family <a href="#">Longosomatidae</a> Family <a href="#">Magelonidae</a> Family <a href="#">Poecilochaetidae</a> Family <a href="#">Spionidae</a> Family <a href="#">Trochochaetidae</a> Family <a href="#">Uncispionidae</a>	<b>Suborder Terebellida</b> Family <a href="#">Acrocirridae</a> Family <a href="#">Alvinellidae</a> Family <a href="#">Ampharetidae</a> Family <a href="#">Cirratulidae</a> Family <a href="#">Ctenodrilidae</a> Family <a href="#">Fauveliopsidae</a> Family <a href="#">Flabelligeridae</a> Family <a href="#">Pectinariidae</a> Family <a href="#">Poeobiidae</a> Family <a href="#">Sternaspidae</a> Family <a href="#">Terebellidae</a> Family <a href="#">Trichobranchidae</a> <b>Subclass Scolecida</b> Family <a href="#">Aeolosomatidae</a> Family <a href="#">Arenicolidae</a> Family <a href="#">Capitellidae</a> Family <a href="#">Cossunidae</a> Family <a href="#">Maldanidae</a> Family <a href="#">Ophelidae</a> Family <a href="#">Orbiniidae</a> Family <a href="#">Paraonidae</a> Family <a href="#">Parergodrilidae</a> Family <a href="#">Potamodrilidae</a> Family <a href="#">Psammodrillidae</a> Family <a href="#">Questidae</a> Family <a href="#">Scalibregmatidae</a> Family <a href="#">Sipunculidea</a> Family <a href="#">Sipunculidea</a> Family <a href="#">Sipunculidea</a>
---	--	---

\* Source: <http://en.wikipedia.org/wiki/Polychaeta/>

4. How to identify polychaete worms

Table 3. Main diagnostic features of the head of polychaete worms and species falling within each group:

★ Species encountered in local marine sediments samples.

DIAGNOSTIC CHARACTERS Head and Jaws	SUBORDER	FAMILIES	SPECIES*
Head with one pair of flexible grooved feeding tentacles, without jaws. Anterior segments often with a pair of gills.	Spionida, a group of tube- or burrow-dwelling surface particle pickers. Found mostly on soft shores or subtidally. Few of this group live on rocky shores.	Family Magelonidae	Magelona cincta
		Family Poecilochaetidae	Poecilochaetus serpens
		Family Spionidae	Polydora sp. Prionospio pinnata Scolelepis squamata
Head with many pairs of flexible feeding tentacles, without jaws.	Terebellida, a group of tube-dwelling particle pickers. Found mostly on soft shores, or in sediment subtidally, and some are common in rock crevices.	Family Ampharetidae	Ampheictis cf. gunneri
		Family Cirratulidae	Cirriformia tentaculata Melinna palmata
Head usually with a terminal funnel-like fan of inflexible tentacles, without jaws.	Sabellida, a group of tube-dwelling particle filterers. Some of this group live in colonial groups on rocky shores, some on soft shores and most live subtidally.	Family Serpulidae	Hydroides elegans
		Family Sabellidae	Jasmineira elegans Pomatoleios sp. Sabella fusca

DIAGNOSTIC CHARACTERS	SUBORDER	FAMILIES	SPECIES
Head with chitinous jaws, usually (not found in Glyceridae, Goniadidae) also conspicuous eyes, and short sensory tentacles. Jaws up to two pincer-like pairs terminal on extensible proboscis. Each segment usually without a pair of gills	Phyllodocida, common surface-wandering food graspers; some group are well-adapted to living in rock crevices.	Family: Acoetidae	Polydortes cf. melanotus
		Family Chrysopetalidae	Chrysopetalum debile
		Family Glyceridae	Glycera alba Glycera tessellata Goniadopsis incerta
		Family Goniadidae	Goniada emerita
		Family Nephtyidae	Nephtys tulearensis Nephtys sp.
		Family Nereididae	Ceratonereis erythraensis Perinereis nigropunctata Perinereis nuntia Platynereis pulchella
		Family Phyllodocidae	Eteone foliosa Eumida sanguinea Nereiphylla castanea
		Family Pilargidae	Sigambra parva
		Family Polynoidae	Harmothoe dictyophora Lepidontus tenuisetosus Paralepidonotus ampulliferus
		Family: Sigalionidae	Gattyana cf. cirrhosa Neurosetae composite
		Family Syllidae	Exogone sp. Syllis cornuta Syllis gracilis Syllis variegata Typosyllis sp.
		Family Tomopteridae	Tomopteris sp.

DIAGNOSTIC CHARACTERS	SUBORDER	FAMILIES	SPECIES
<b>Head</b> with chitinous jaws, conspicuous eyes, and short sensory tentacles. <b>Jaws</b> only one pincer-like pair, barely extensible, but grouped with other toothed plates. Midbody segments often with pairs of gills.	<b>Eunicida</b> , burrowing food graspers, mostly subtidal, in sediments or on rocks and coral. Few are well-adapted to rock crevices. Few soft shores species.	Family <b>Amphinomidae</b> Family <b>Dorvilleidae</b> Family <b>Eunicidae</b>   Family <b>Lumbrineridae</b>  Family <b>Oeonidae</b> Family <b>Onuphidae</b>	<i>Chloeia</i> sp. <i>Dorvillea</i> sp.  <i>Eunice antennata</i> <i>Eunice sicilensis</i> <i>Lysidice coliaris</i> <i>Nematonereis unicornis</i> <i>Schistomerigos rudolphi</i>  <i>Lumbrinereis gracilis</i> <i>Lumbrinereis</i> cf. <i>latreilli</i>  <i>Arabella iricolor iricolor</i>  <i>Diopatra cuprea cuprea</i>

Source : <http://instruct1.cit.cornell.edu/courses/biog105/labs/inverts/annelida.html>

4.1 Importance of Polychaetes

Previously polychaetes were dismissed as a group with little interest in them. However with more focus at present on environmental issues, more and more scientists are looking into organisms that can be used as bioindicators. Recent studies have shown polychaetes as most valuable for the detection of pollution and its status.

Amain reason why Polychaetes are very useful organisms for monitoring the marine environment is because they are readily available, easy to sample, available ommercially and easy to maintain. They respond quickly to changes in environmental conditions. The ability to monitor different phases in the recovery of disturbed sites is possible because the different species of polychaetes appear after the cessation of the impact. Equally the presence and absence of specific polychaetes in sediments provides an **indicator of the condition and health of the benthic environment** as they are the dominant microfauna within the fine sediments.

Large numbers of the families **Capitellidae** and **Spionidae** found to the exclusion of others have been accepted widely as pollution indicators.

Further Polychaetes are in direct contact with the water column and the sediments of their environment thus **showing sensitivity to anthropogenic compounds which is expressed through changes in their reproduction, growth and mortality** hey thus play an important role in biomonitoring the marine environmental quality **being monitors for toxic materials and pollution indicators**.

Being abundant, having a short life cycle and covering a wide range size, polychaetes from the **families Nereidae and Dorvilleidae are suitable for assessing the toxicity of sediments**.They are good monitors of the presence and bioac cumulation potential of anthropogenic .

Some of the polychaetes are known to be economically important. Both the adult and larvae of the family Nereida has been reported to be food for many economically important fishes.They are also used as bait for recreational fishing. Since the polychaetes are the main food supply of many commercial fishes, **they also serve as an important factor in the evaluation of fishing grounds**.

5. The Polychaetes encountered in Qatar marine sediments

Subclass Palpata  
Order Aciculata

FAMILY: Polynoidae (Polynoid worms)

Worms with scales present over part or all over their body. The prostomium has 1-3 antennae and a pair of palps; 2 pairs of tentacular cirri. Eversible pharynx with 2 pairs of jaws. All setae are simple, often barred. Neurosetae may be bi-dentate [Figure 3]. There are nineteen species been record in Qatar marine sediment. [*Harmothoe dictyophora* (Grube, 1878), *Harmothoe* sp.1 and *Harmothoe* sp.2 and *Harmothoe* sp.3 (Plate 1 A & B), *Lepidonotus tenuisetosus* (Gravier, 1901), *L. carinulatus* (Grube, 1876) and *L. sp.* (Plate 2 A & B), *Paralepidonotus ampuliferus* (Grube, 1878), *Paralepidonotus* sp.1 and *Paralepidonotus* sp.2 (Plate 3), *Gattyana* cf. *cirrhusa* (Pallas, 1766) (Plate 4), *Polynoe* cf. *magnipalpa* McIntosh, 1885, *Polynoe* sp.1, *Polynoe* sp.2, *Polynoe* sp.3 and *Polynoe* sp.4 (Plate 5 & 6), *Polyeunoa* cf. *dubia* Hartmann-Schröder, 1965, *Polyeunoa* sp. and *Euphionella* sp. (Plate 7)].

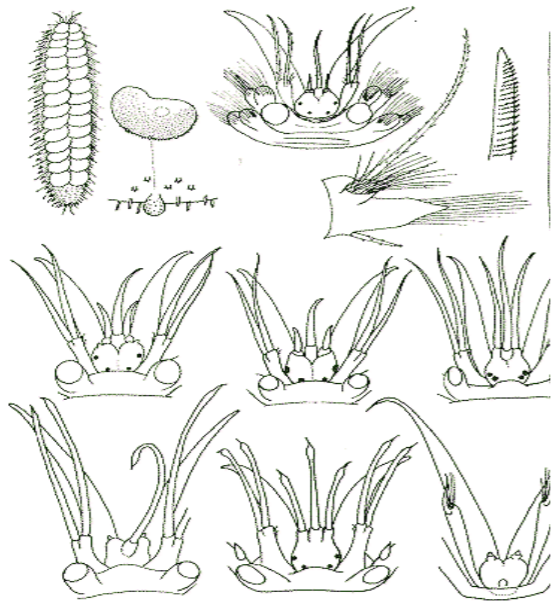


Figure 3. Details of structure of a polynoid worm.  
Source: <http://www.nhm.ac.uk/> , <http://personal.cityu.edu.hk/~bhworm/sedentary/photo.htm>

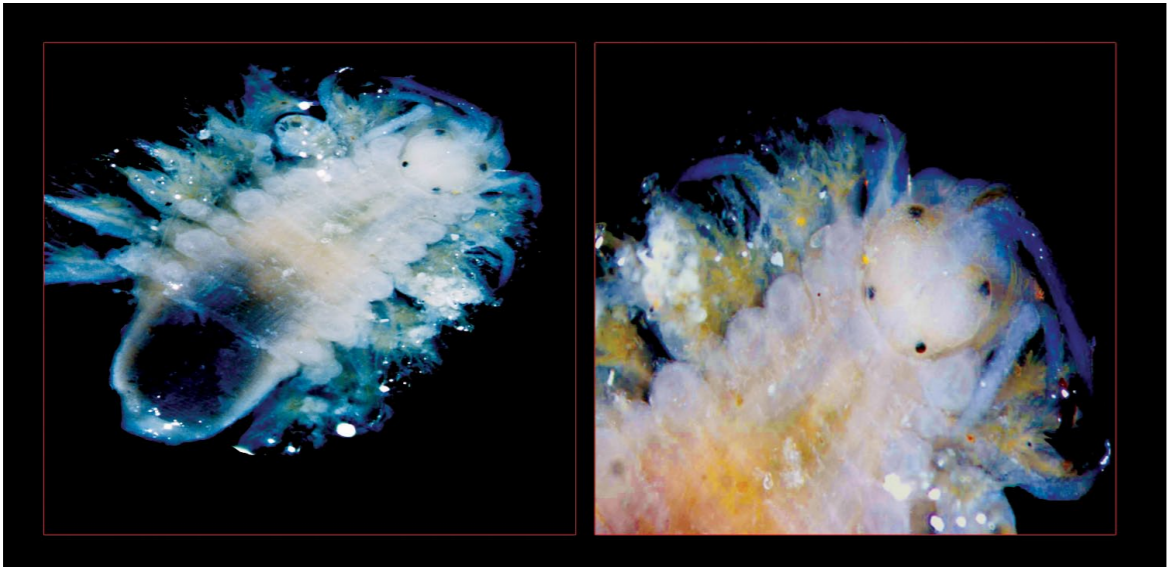
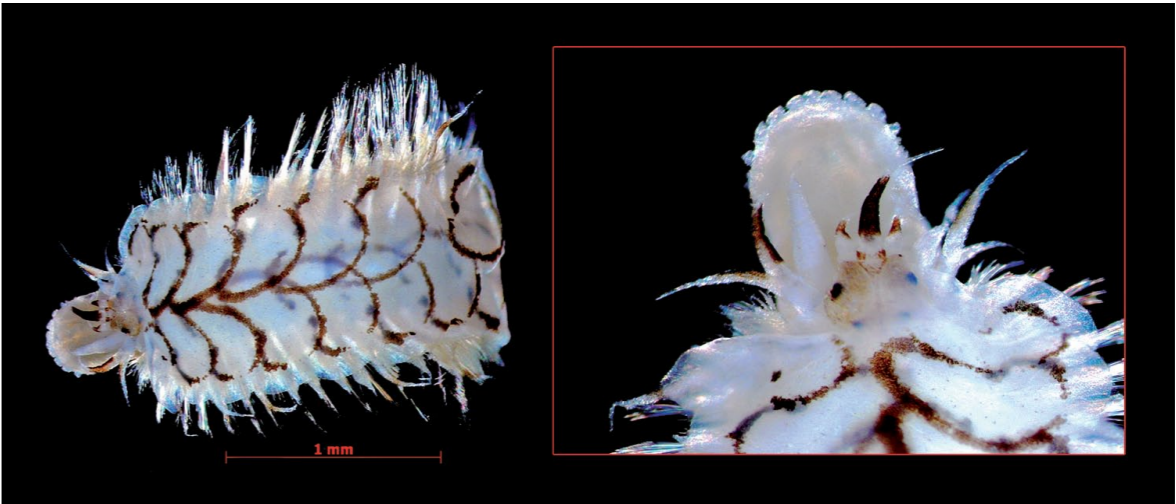


Plate 1A. *Harmothoe dictyophora* (Grube, 1878) retrieved from Qatar marine sediments.



*Harmothoe* sp.1

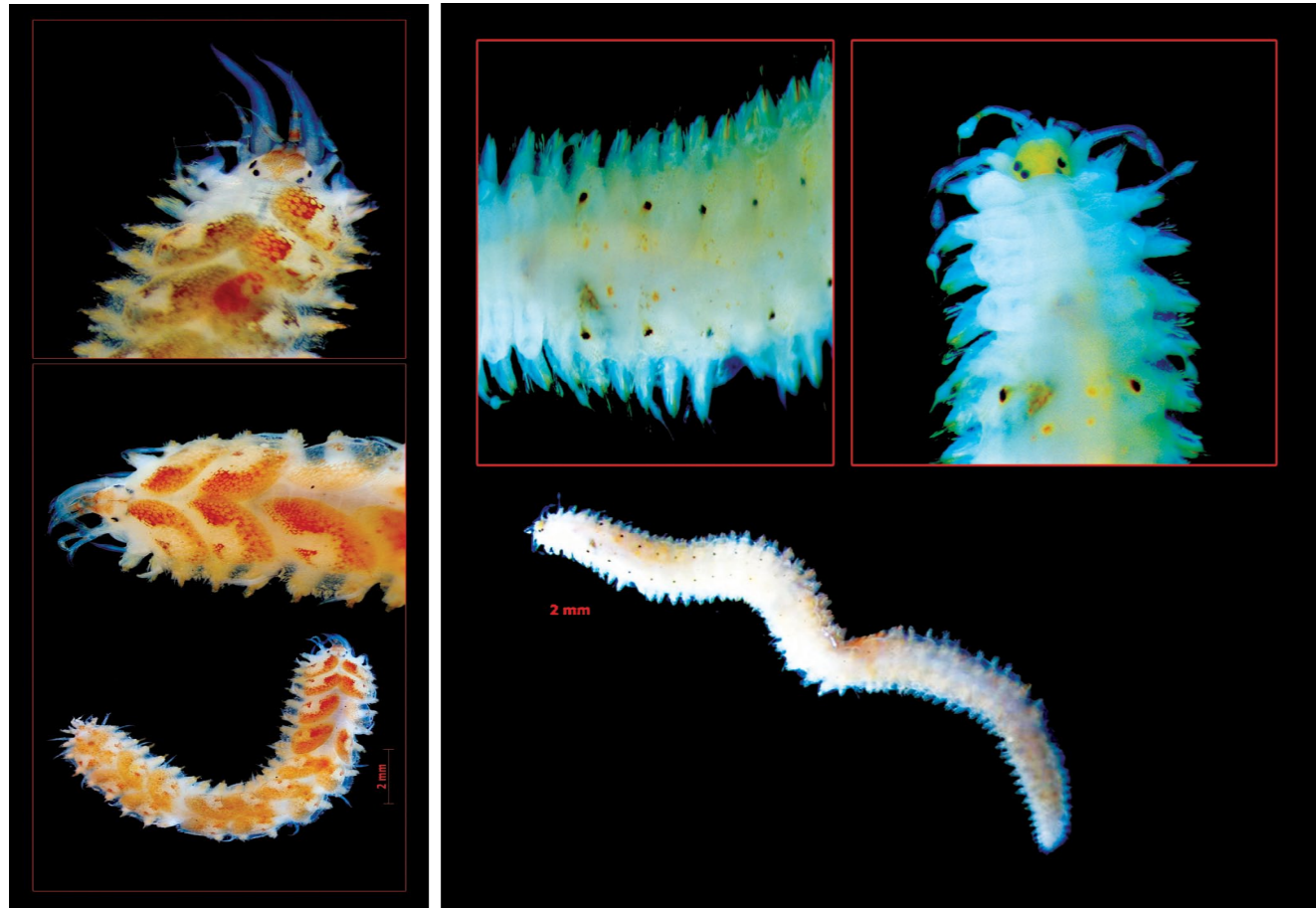
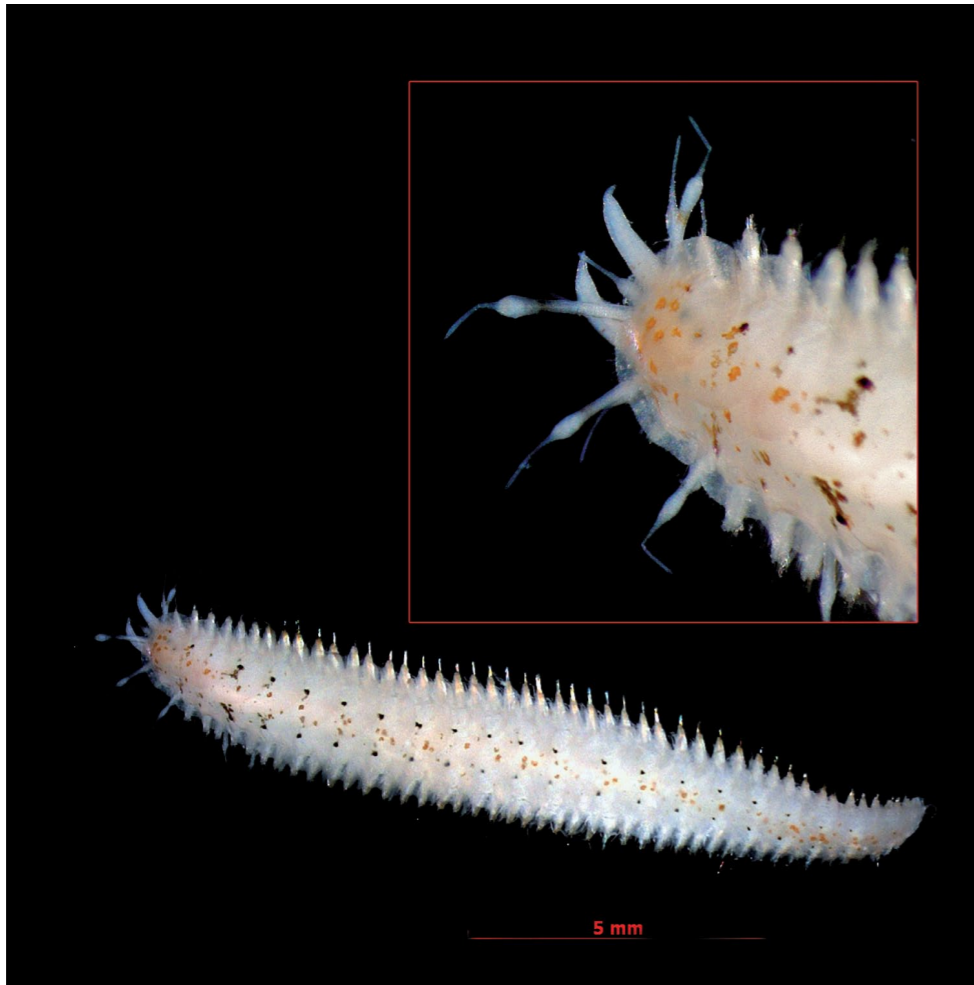


*Harmothoe* sp.2



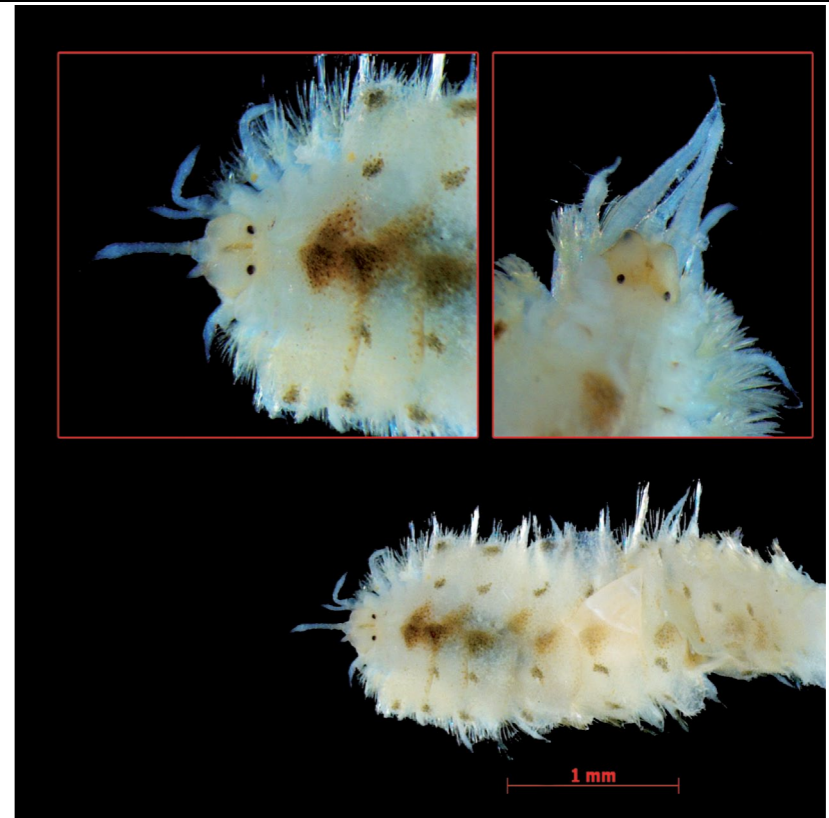
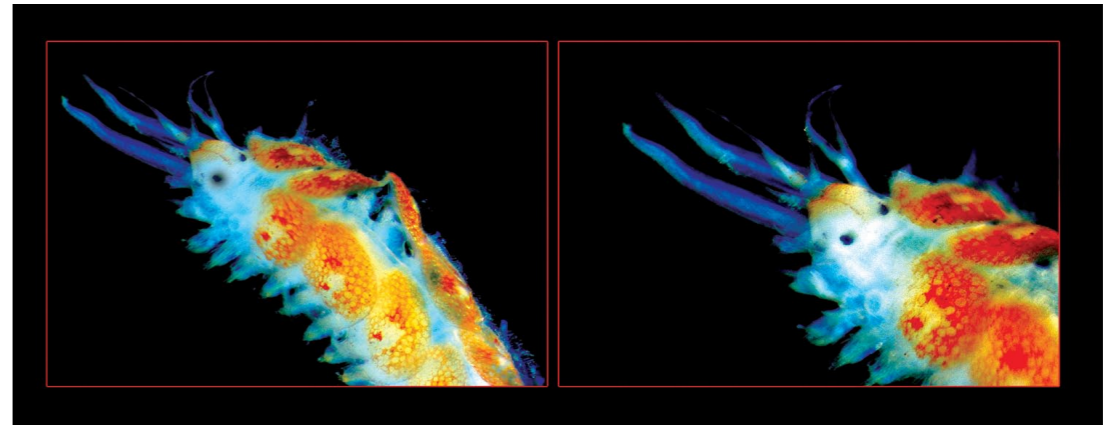
*Harmothoe* sp.3

Plate 1B. *Harmothoe* species retrieved from Qatar marine sediments.

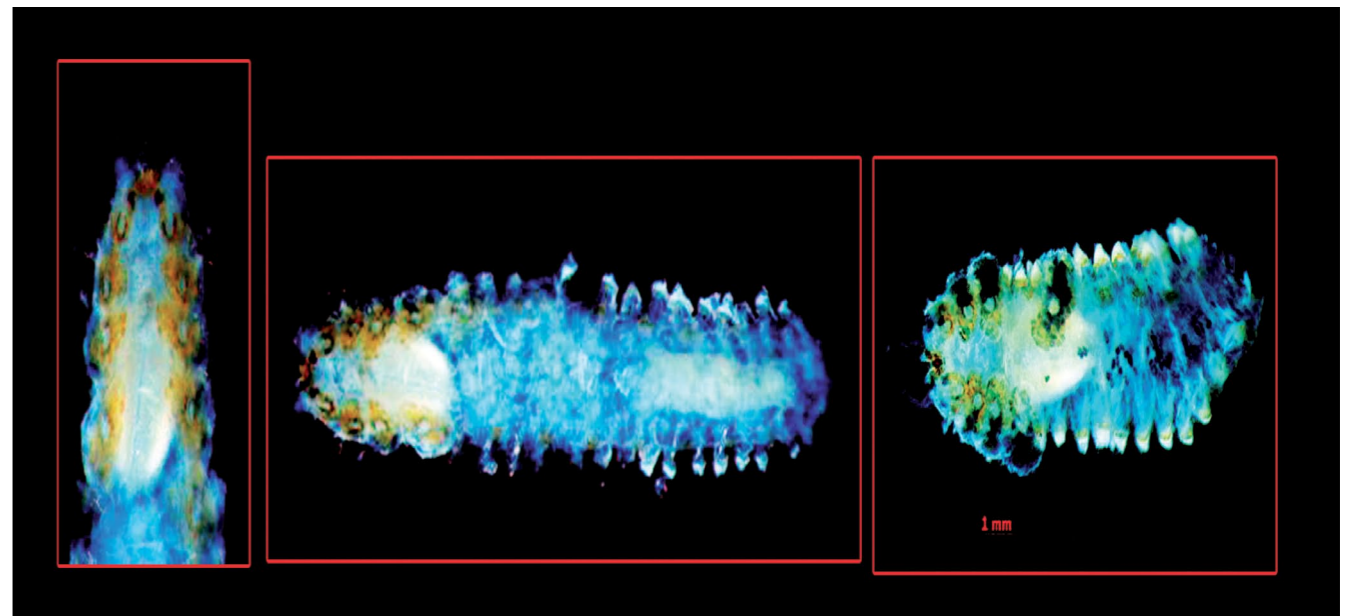


*Lepidonotus tenuisetosus* (Gravier, 1901)

Plate 2A. *Lepidonotus* worms retrieved from Qatar marine sediments.



*Lepidonotus carinulatus* (Grube, 1876)

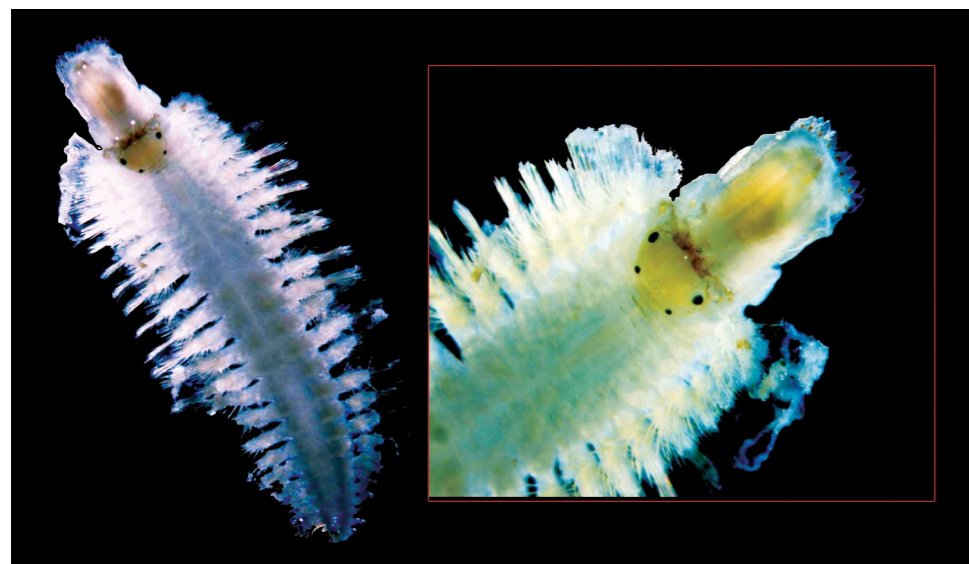


*Lepidonotus* sp.

Plate 2B. *Lepidonotus* worms retrieved from Qatar marine sediments.



*Paralepidonotus ampulliferus* (Grube, 1878)



*Paralepidonotus* sp.1



*Paralepidonotus* sp.2

Plate 3. *Paralepidonotus* worms retrieved from Qatar marine sediments.

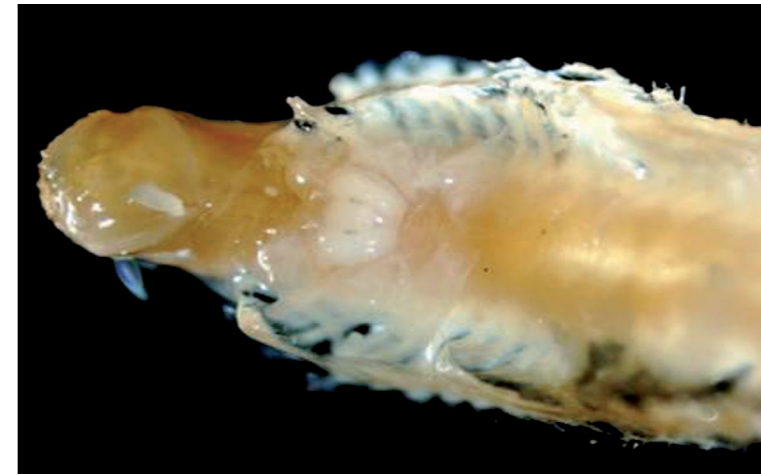
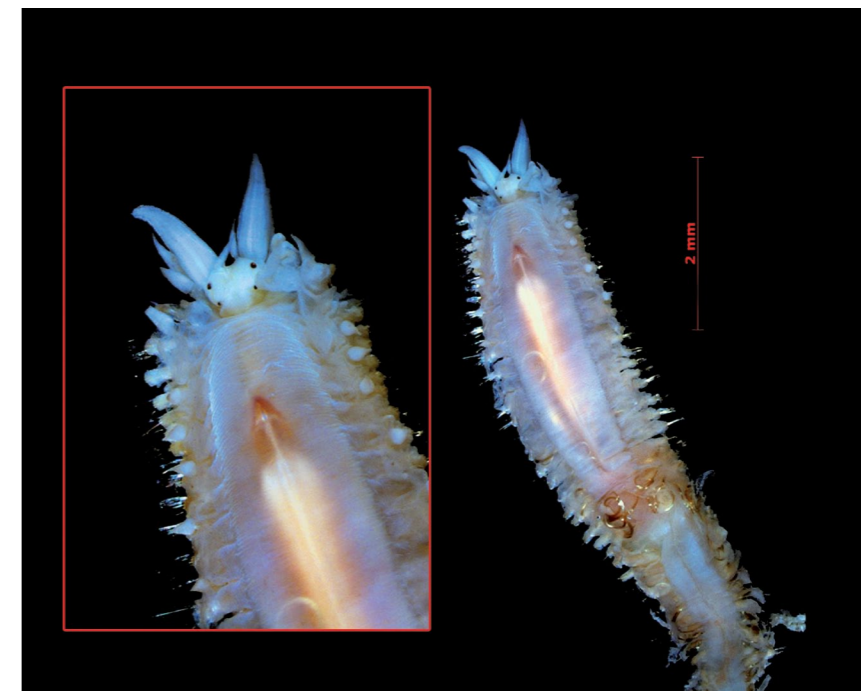


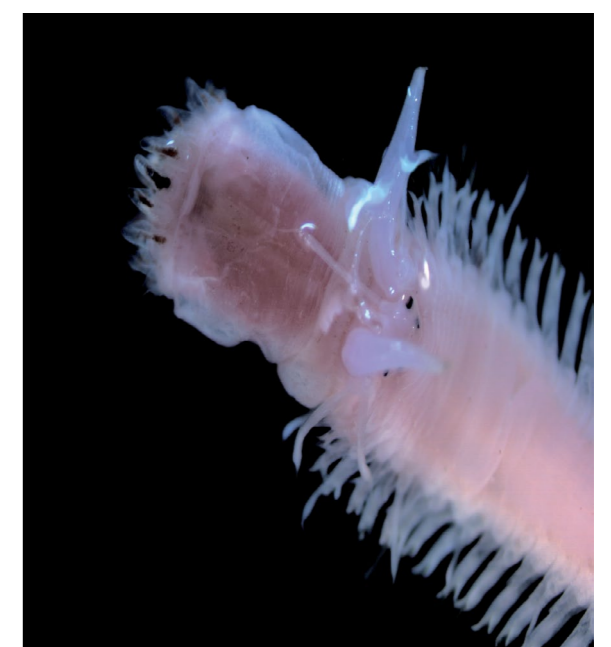
Plate 4. *Gattyana* cf. *cirrhosa* (Pallas, 1766) retrieved from Qatar marine sediments.



*Polynoe* cf. *magnipalpa* McIntosh, 1885



*Polynoe* sp.1

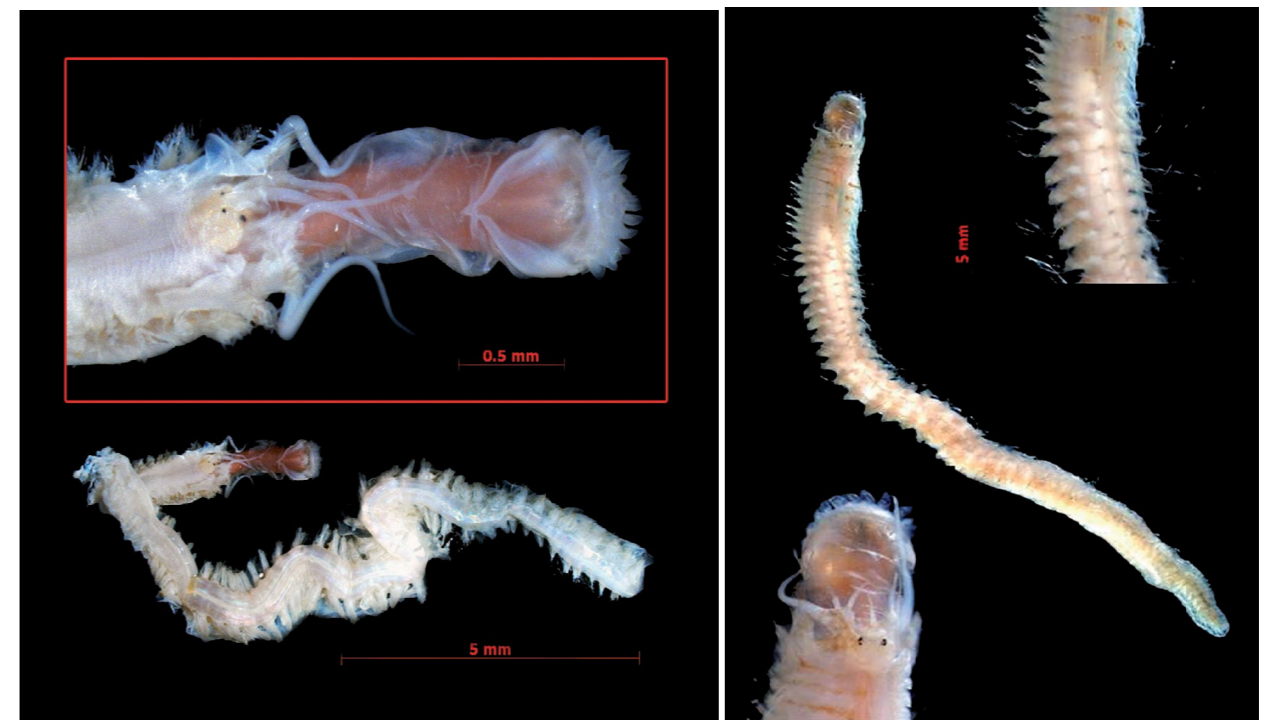


*Polynoe* sp.2

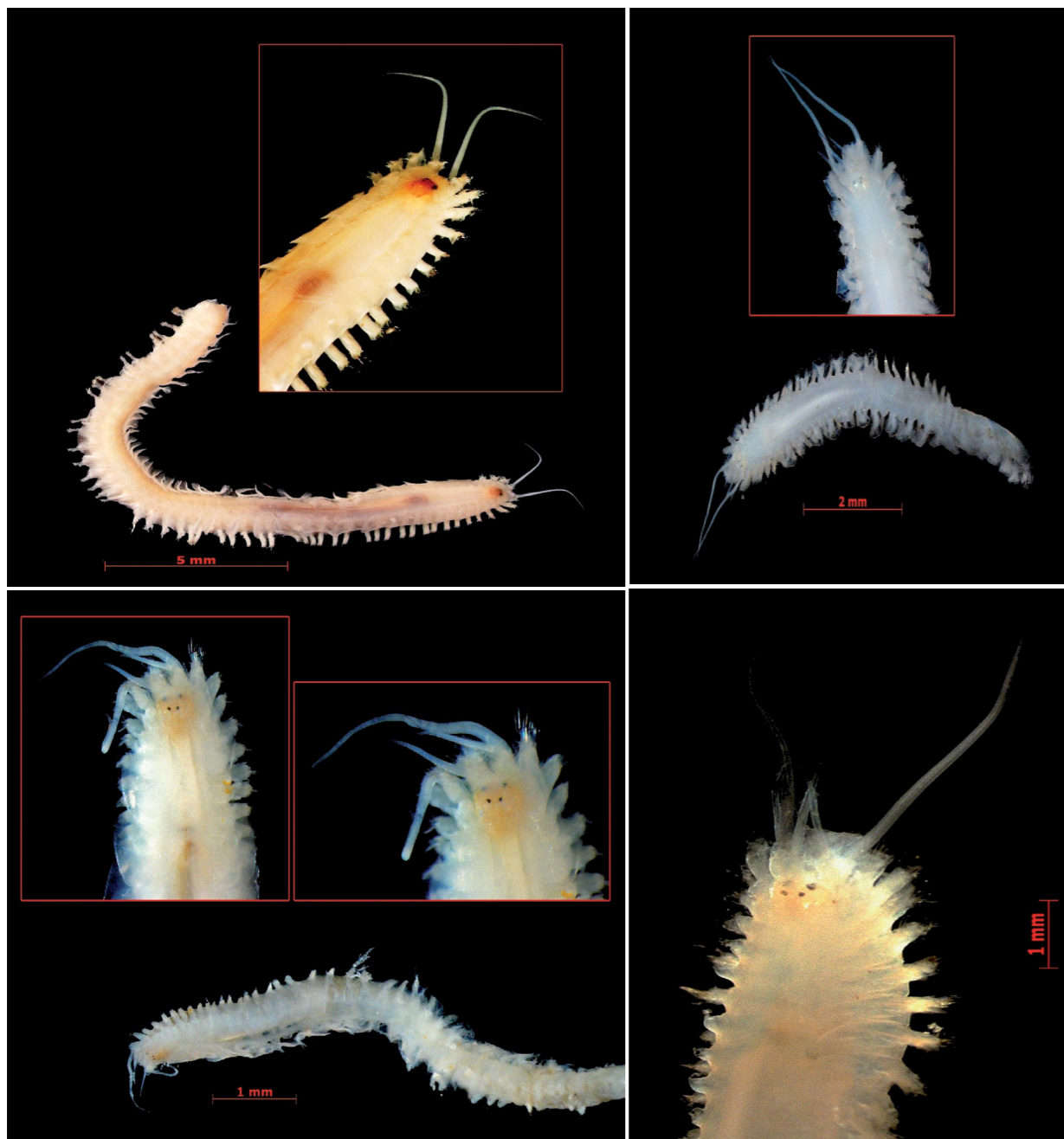
Plate 5. *Polynoe* species retrieved from Qatar marine sediments.



*Polynoe* sp.3



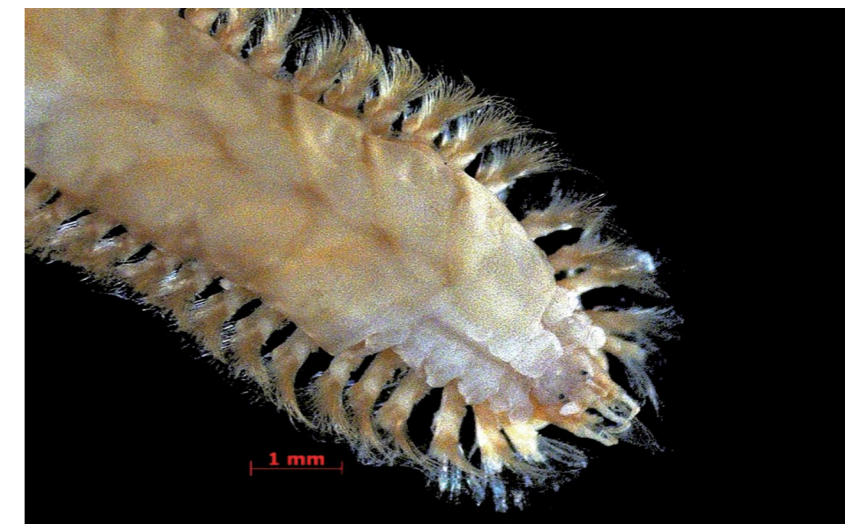
*Polyeunoa* cf. *dubia* Hartmann-Schröder, 1965



*Polynoe* sp.4



*Polyeunoa* sp.



*Euphionella* sp.

Plate 6. *Polynoe* species retrieved from Qatar marine sediments.

Plate 7. *Polyeunoa* and *Euphionella* species retrieved from Qatar marine sediments.

FAMILY:Sigalionidae (Scale worms)

Scaleworms, usually long bodied, with elytra on alternate segments anteriorly and every segment subsequently. The prostomium has 1-3 antennae and a single pair of palps. The eversible pharynx has 2 pairs of jaws. Parapodia are biramous, notopodia have simple setae while those in the neuropodium are compound (Figure 4). Five species were recorded in Qatar marine sediments. *Psammolyce* sp. (Plate 8), *Euthalenessa* [sp1& sp.2] *Thalenessa* [sp.1 & sp.2] (Plate 9).

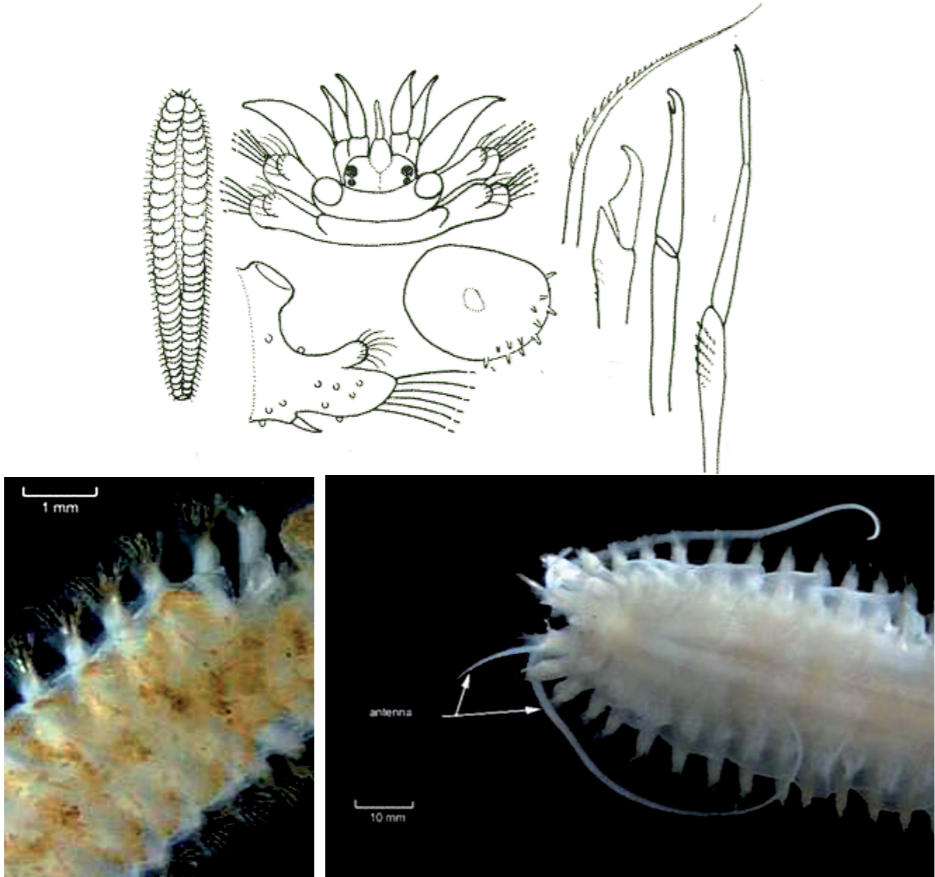


Figure 4. Main features of a scale worm.  
Source:<http://www.nhm.ac.uk/> , <http://personal.cityu.edu.hk/~bhworm/sedentary/photo.htm>



Plate 8. *Psammolyce* sp. retrieved from Qatar marine sediments.



*Euthalenessa* sp1



*Euthalenessa* sp.2



*Thalenessa* sp.1

*Thalenessa* sp.2

Plate 9. *Euthalenessa* retrieved from Qatar marine sediments.

FAMILY: Chrysopetalidae

Members of this family are characterized by their flattened notosetae [Figure 5]. Four species [*Chrysopetalum debile* (Grube, 1855) (Plate 10)] and *Chrysopetalum* sp., *Paleanotus debilis* (Grube, 1855) and *Paleanotus* sp. (Plate 11) were recorded in Qatar marine sediments.

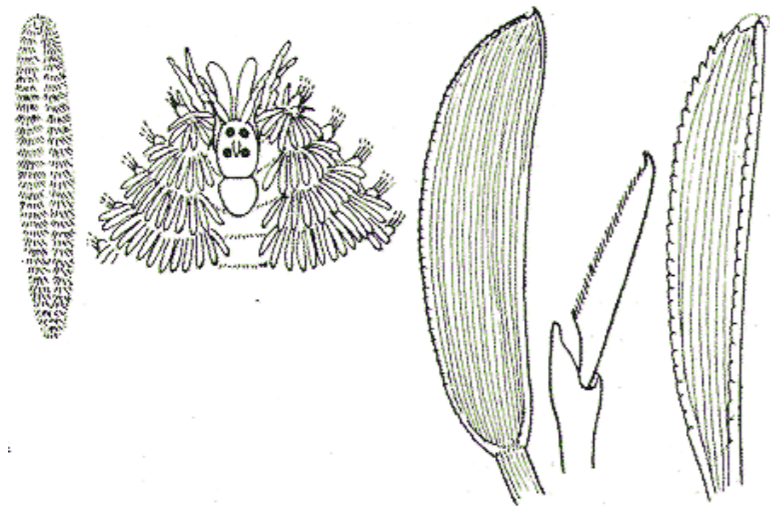
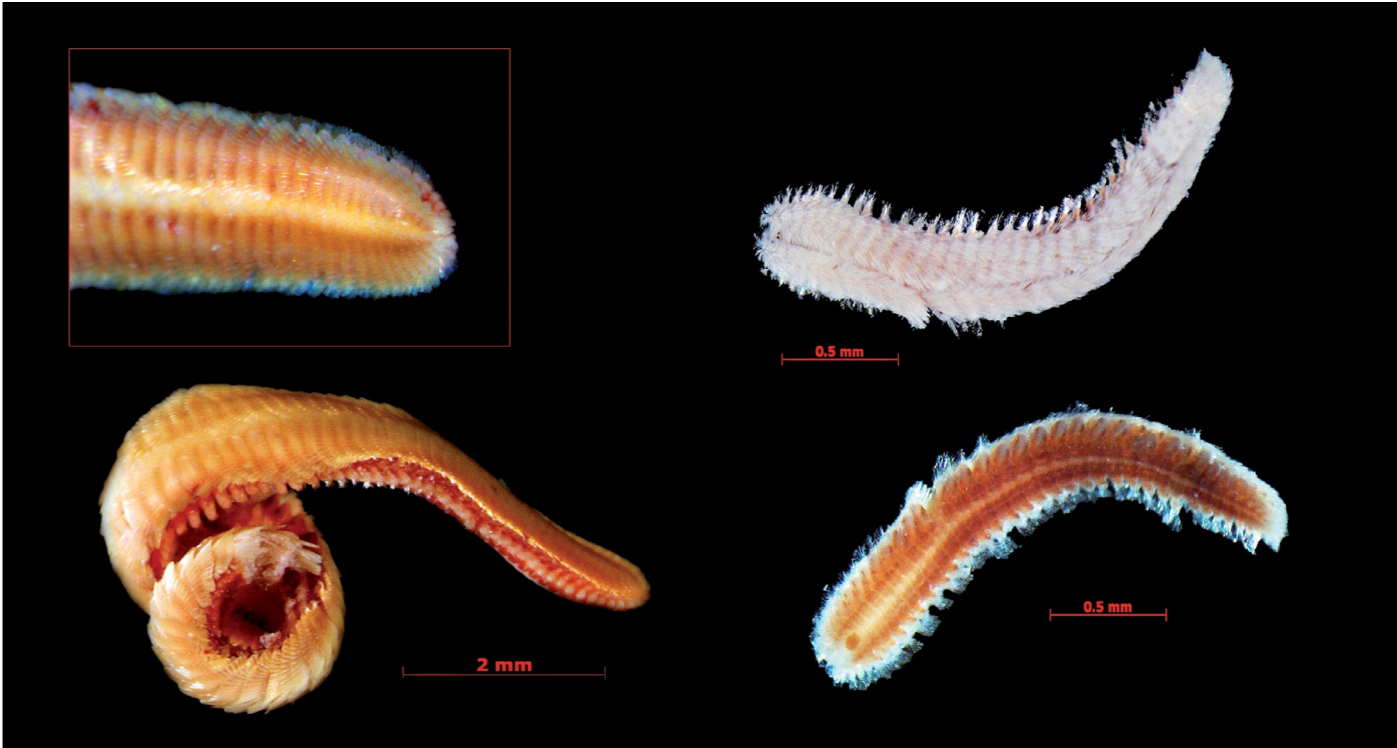


Figure 5. notosetae in transverse dorsal fans.  
Source: <http://www.nhm.ac.uk/>



*Chrysopetalum* sp.

*Paleanotus debilis* (Grube, 1855)

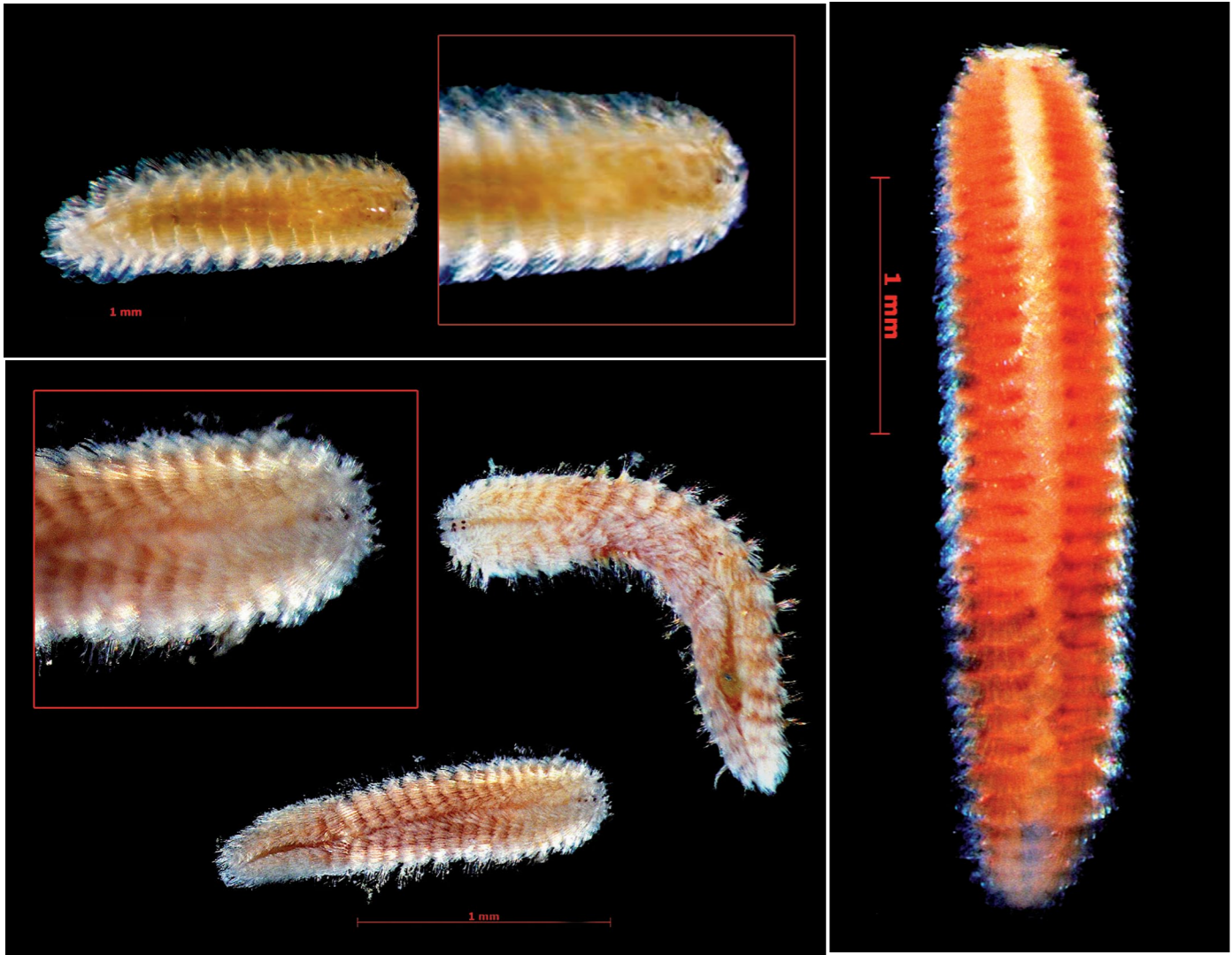


Plate 10. *Chrysopetalum debile* (Grube, 1855) retrieved from Qatar marine sediments.



*Paleanotus* sp.

Plate 11. *Chrysopetalum* and *Paleanotus* species retrieved from Qatar marine sediments.

**FAMILY : Acoetidae (Polyodontidae)**

The Acoetidae are **tube-dwelling scale worms**. The elytra extend over the whole length of the body although the centre of the animal's back usually remains bare. The tube is built from the secretions of notopodial glands (spinning glands) whose presence characterises the family. Setae are all simple [Figure 6]. Two species has been record in Qatar marine sediments; *Polydortes* cf. *melanotus* (Grube, 1876), Plate 12] and *Acoetes melanonota* (Grube, 1876) (Plate 13).

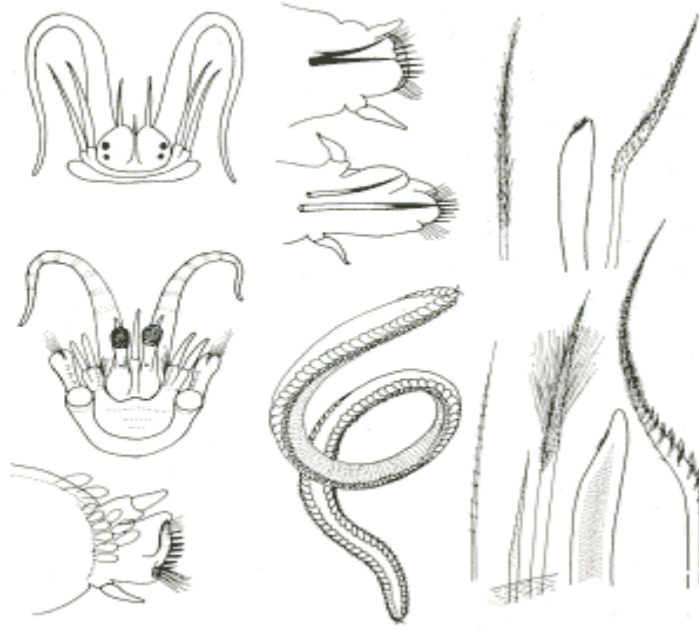


Figure 6. General features of the Acoetidae.  
Source: <http://www.nhm.ac.uk/>

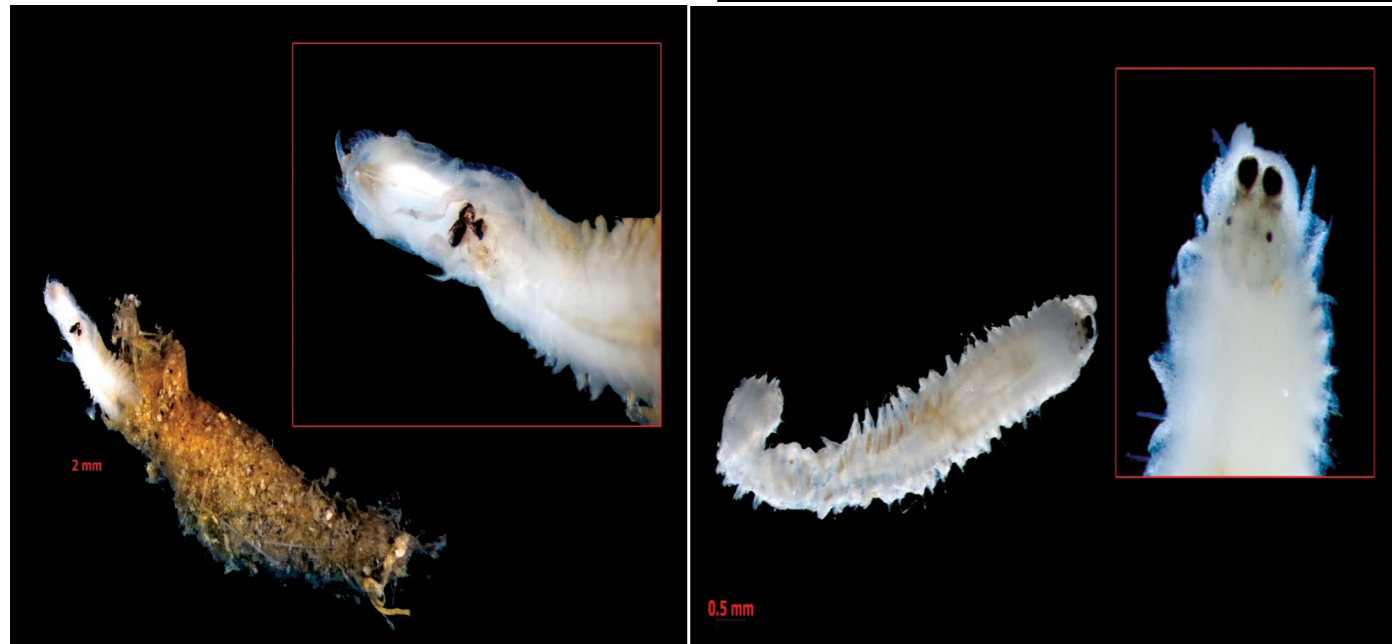


Plate 12. *Polydortes* cf. *melanotus* (Grube, 1876) retrieved from Qatar marine sediments.

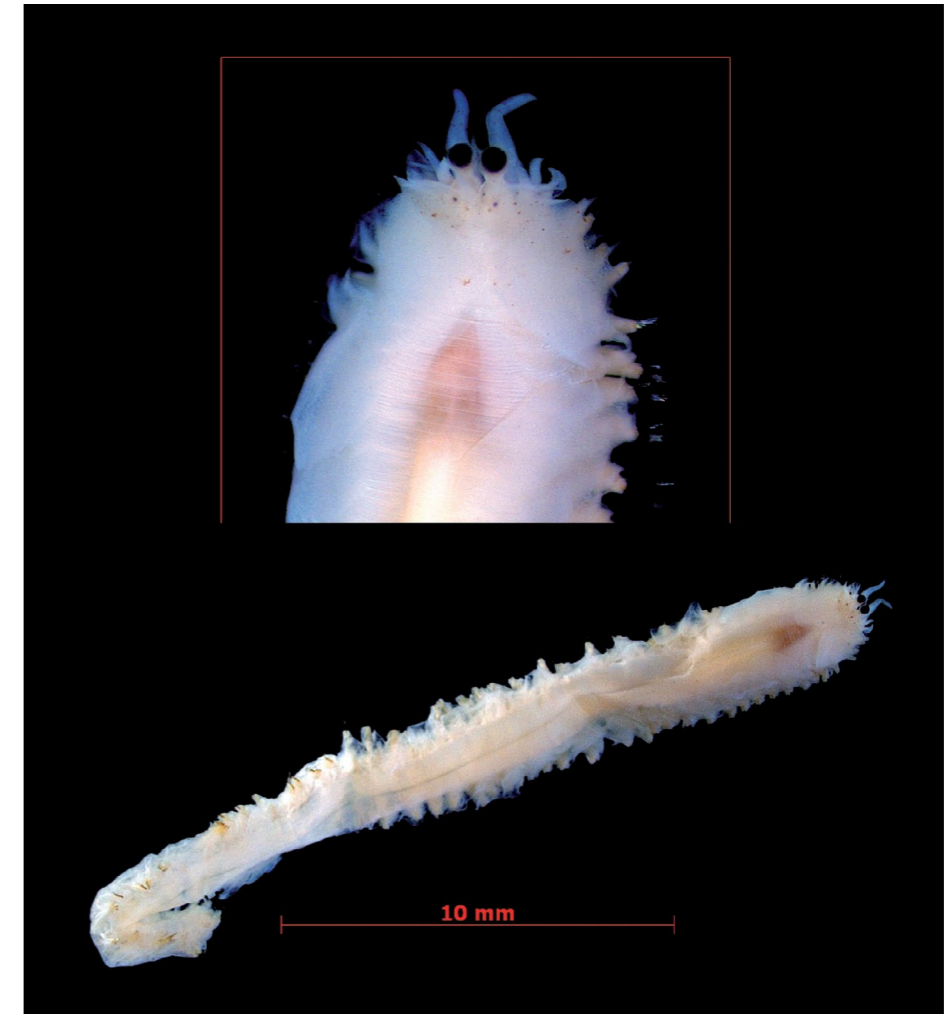
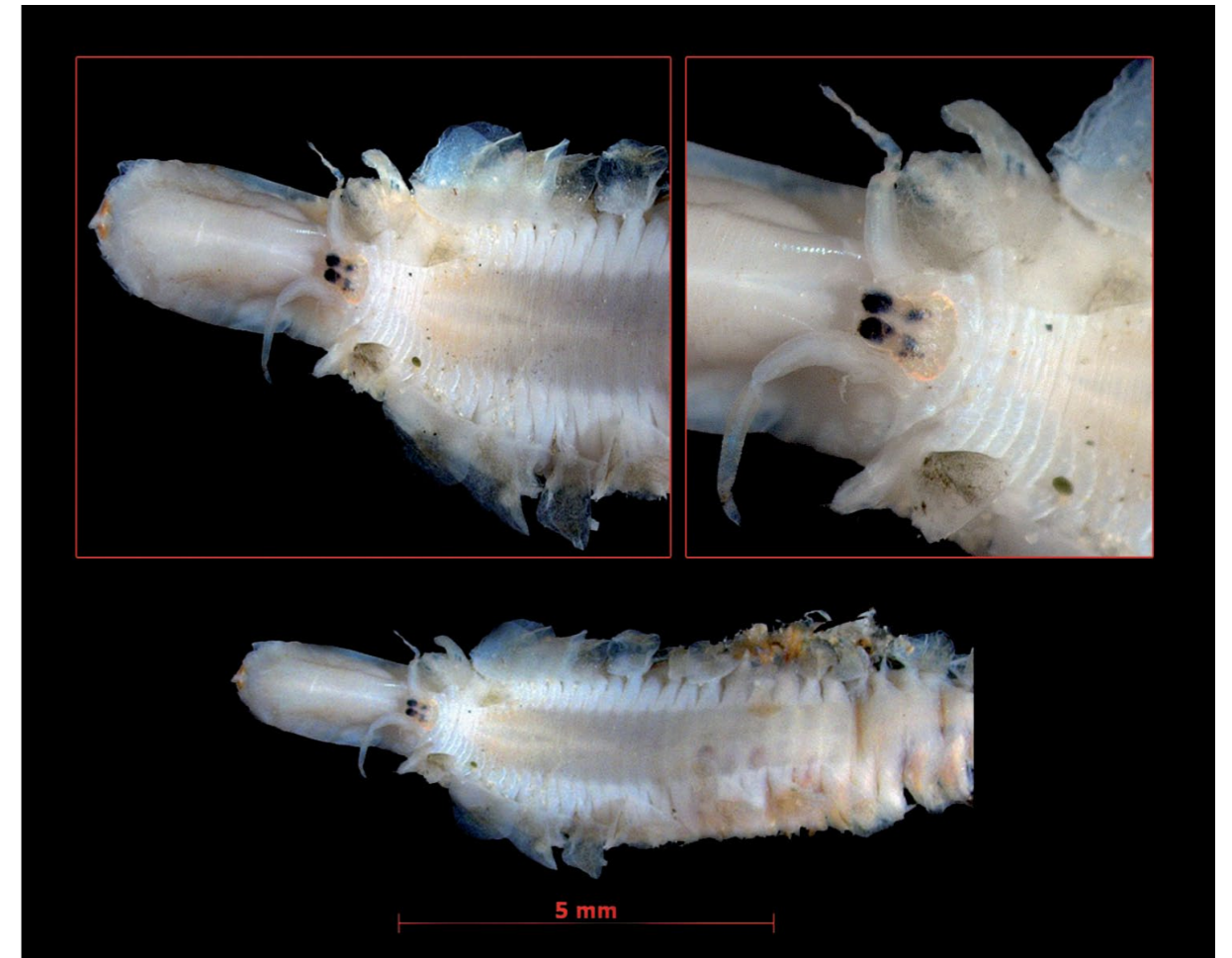


Plate 13. *Acoetes melanonota* (Grube, 1876) retrieved from Qatar marine sediments.

FAMILY: Euphrosinidae

Body short and broad, almost elliptical with less than 40 segments. Prostomium is small, nearly vertically orientated narrow ridge, with three antennae and 2-4 eyes. No external palps. Caruncle consisting of three lobes. Peristomium limited to lips. First segment curved around prostomium, with parapodia similar to those on other segments, without tentacular cirri. Parapodia biramous. Notopodia transverse ridges nearly meeting medially, with branched gills. Chaetae capillary or forked, calcified and therefore very brittle. Aciculae present. Dorsal and ventral cirri present. Pygidium with two inflated cirri. Pharynx eversible, without jaws [Figure 7]. World-wide distribution on various mixtures of sand, stones and rocks and on corals and sponges. One species was obtained in Qatar marine sediments: [*Euphrosine* sp. (Plate 14)].

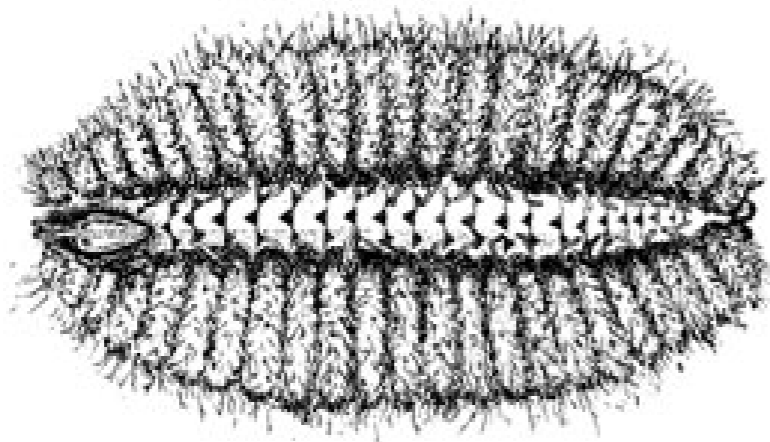


Figure 7. Main diagnostic features of the Euphrosinidae.  
Source:<http://www.answers.com>



Plate14. *Euphrosine* sp. retrieved from Qatar marine sediments.

FAMILY: Amphinomidae (Fire worms)

Members of this family are known as the **Fire Worms**. Body either elongate or ovate is flattened. Prostomium is sunk into anterior segments and its anterior lobe bears a pair of cirriform palps laterally and 2 antennae dorsally. Calcareous notosetae are used in defence. Gills are in tufts [Figure 8]. Four fire worms were obtained in Qatar marine sediment [*Chloeia* sp.1, *Chloeia* sp.2 (Plate 15), *Pseudeurythoe hirsuta* Wesenberg-Lund, 1949 and *Pseudeurythoe* sp. (Plate 16A & B)].

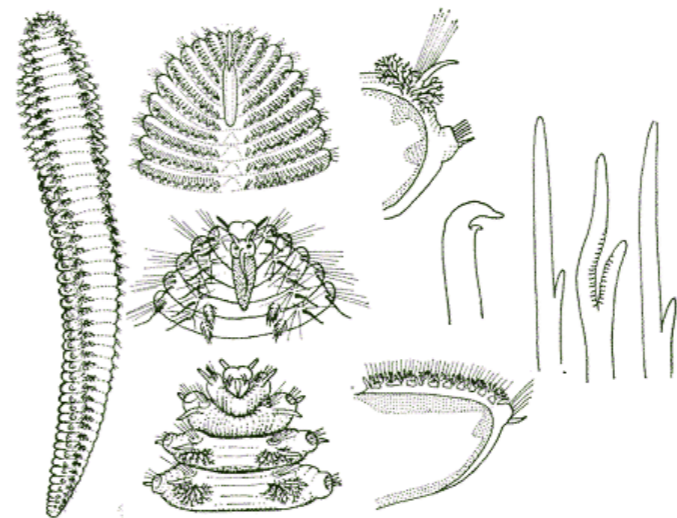
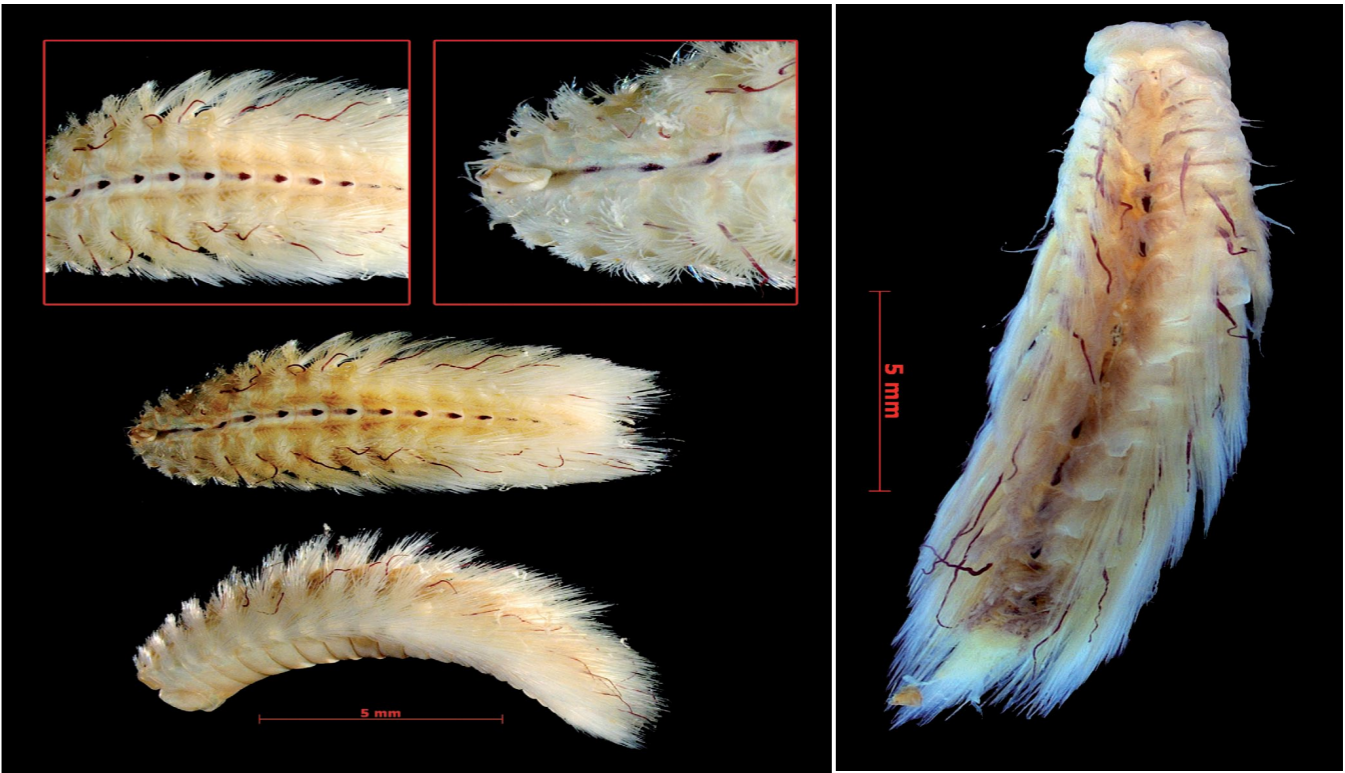


Figure 8. Main diagnostic features of the fire worms.  
Source:<http://www.nhm.ac.uk/>

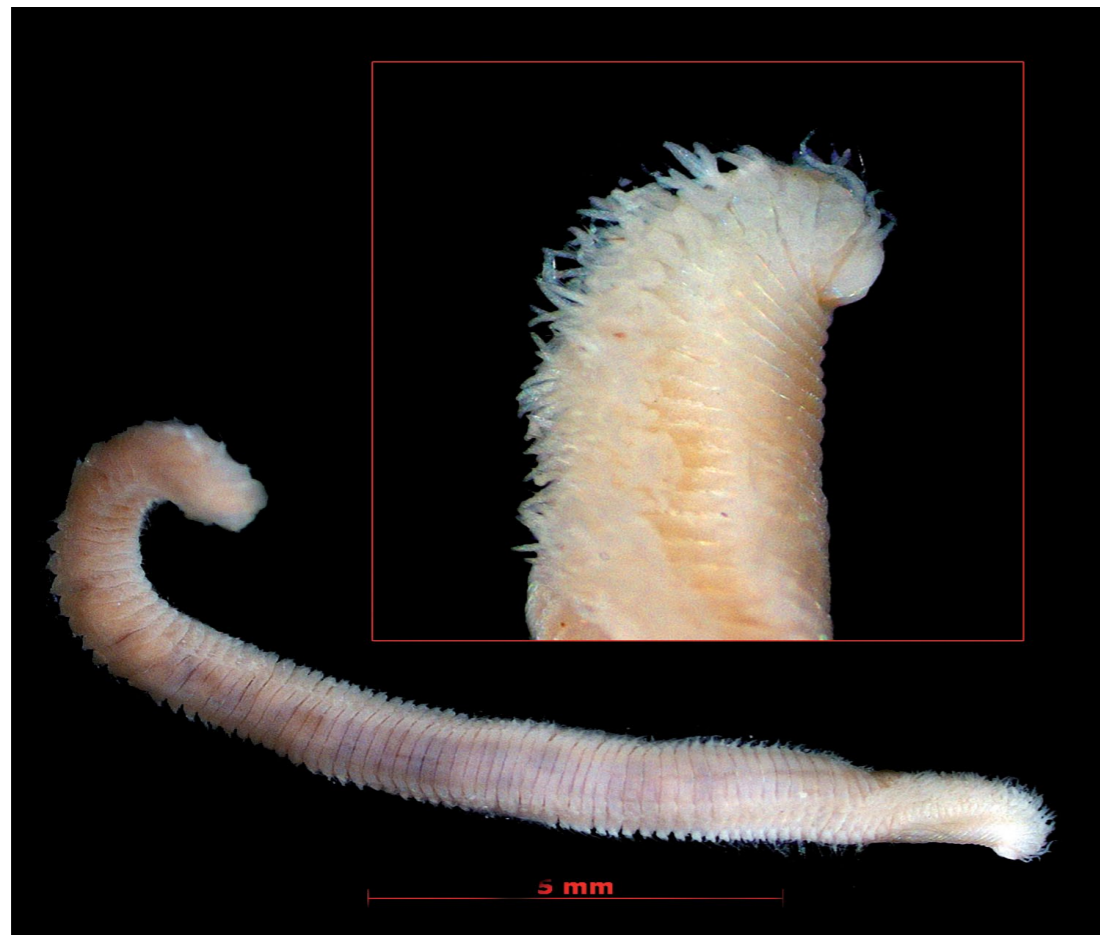
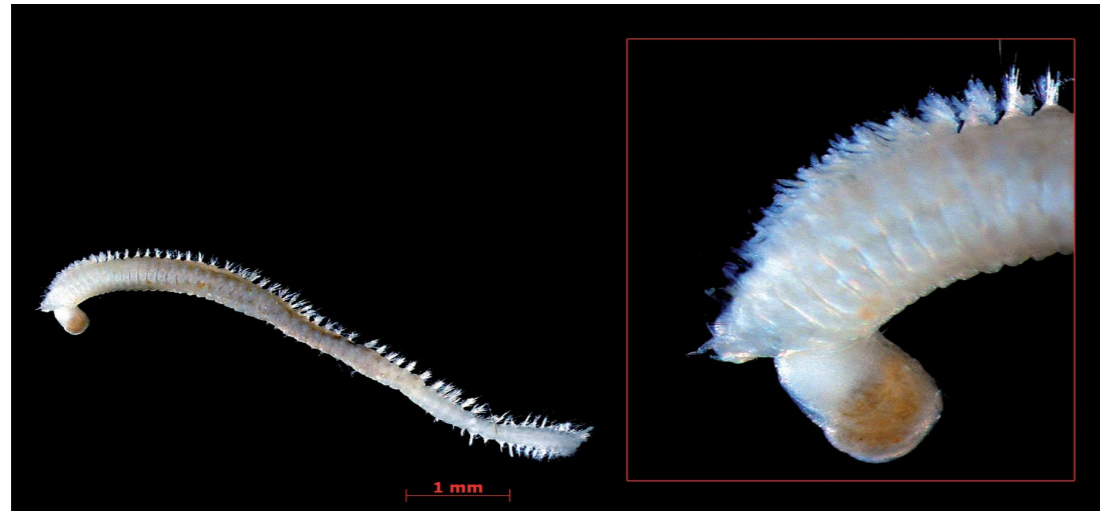


*Chloeia* sp.1



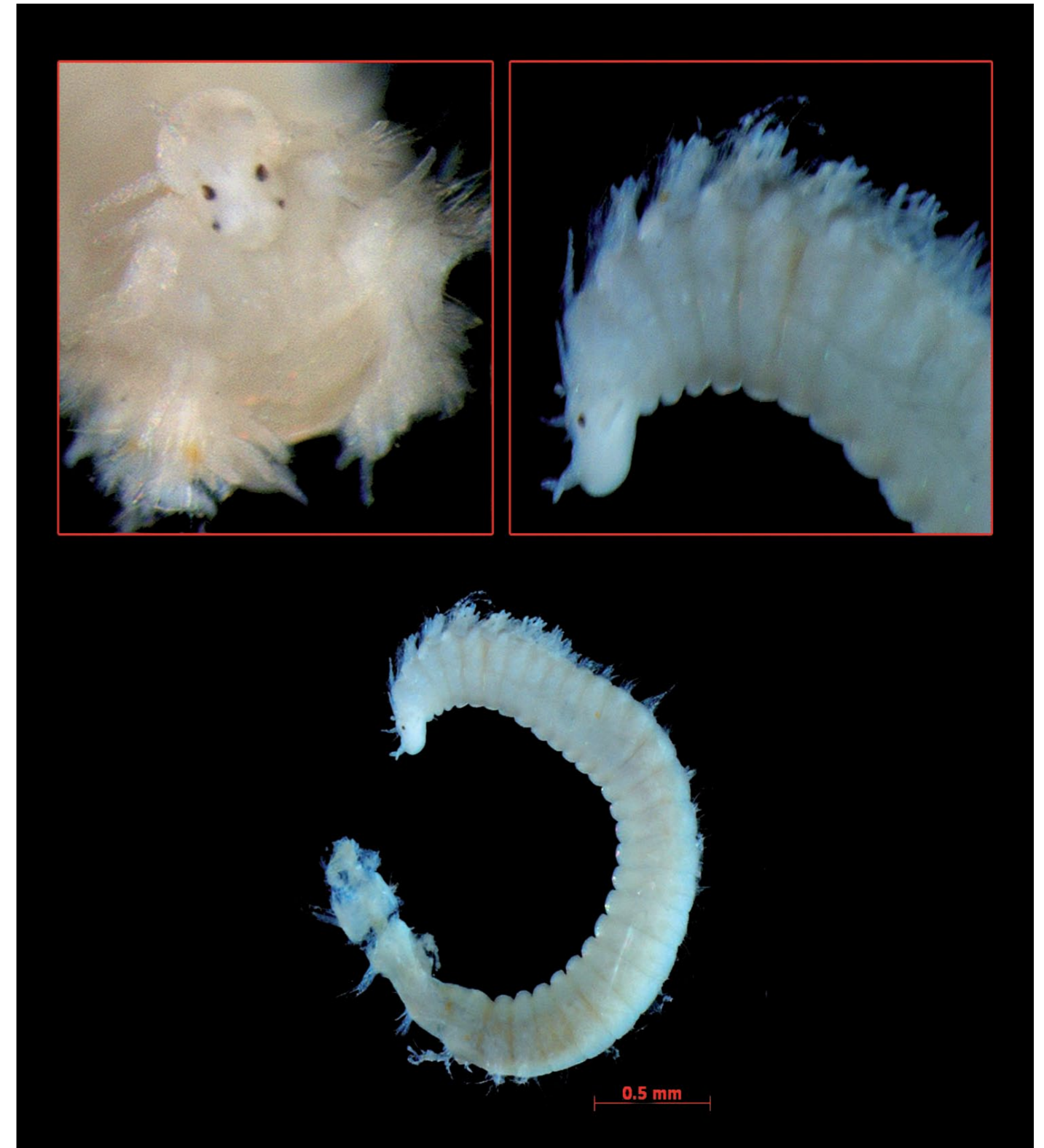
*Chloeia* sp.2

Plate15. *Chloeia* sp.1 and *Chloeia* sp2 retrieved from Qatar marine sediments.



*Pseudeurythoe hirsuta* Wesenberg-Lund, 1949

Plate16A. *Pseudeurythoe* species retrieved from Qatar marine sediments.



*Pseudeurythoe* sp.

Plate16B. *Pseudeurythoe* species retrieved from Qatar marine sediments.

**FAMILY: Aphroditidae** (sea mice worms)

Members of this family are known as the sea mice worms. The body may be short or long. Scale worms having only simple setae, some of which are elongated and flattened to produce a felt across the dorsal surface of the animal. A single antenna. The ever-visible pharynx sometimes has a pair of jaws. Eyes, if present, are sessile or on large eye-stalks. Facial tubercle present between palps and above mouth. There are 15 or 2 pairs of scales [Figure 9]. Two sea mice worms were obtained in Qatar marine sediment [*Afrogenia* sp.1 and *Afrogenia* sp.2 (Plate 17)].

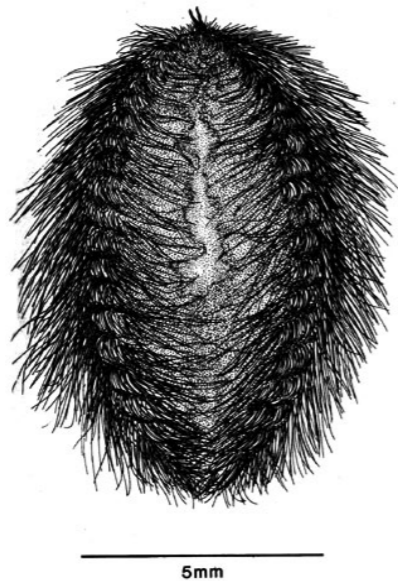


Figure 9. Main features of the Aphroditidae.  
Source: <http://www.researchdata.museum.vic.gov>.



*Afrogenia* sp.1

*Afrogenia* sp.2

Plate17. Species of the genera *Afrogenia* retrieved from Qatar marine sediments.

**FAMILY:Phyllodoceidae** (Green oyster worms)

Members of this family are highly mobile animals with long slender bodies and many segments. Prostomium with 4 or 5 pairs of antennae; Peristomium with 2-4 pairs of tentacular cirri; Parapodia are usually uniramous with the notopodium represented by the expanded foliose dorsal cirri which characterise the family. Neurosetae are compound and notosetae (if present) are simple.[Figure 10]. Fourteen species were obtained in Qatar marine sediments: *Eumida sanguinea* (Marenzeller,1879) (Plate18) , *Eumida* sp. , *Eulalia mustela* Pleijel, 1987, *Eulalia* sp. and *Nereiphylla castanea* (Marenzeller,1879) (Plate 19), *Phyllodoce* sp.1, *Phyllodoce* sp.2, *Phyllodoce* sp.3, *Phyllodoce* sp.4 and *Eteone foliosa* Quatrefages, 1866 (Plate 20), *Eteone* cf. *spetsbergensis* Malmgren, 1865, *Eteone* cf. *picta* Quatrefages, 1865, *Eteone* sp.1 and *Eteone* sp.2 (Plate 21).

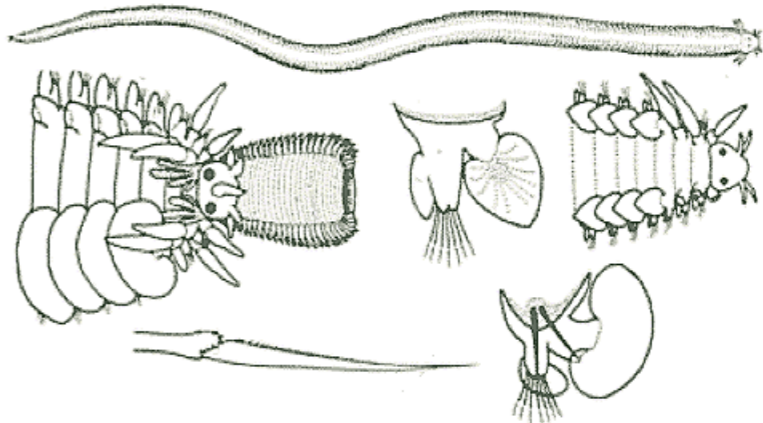


Figure 10. Main features of the Phyllodoceidae.  
Source:<http://www.nhm.ac.uk/>



Plate18 *Eumida sanguinea* (Marenzeller,1879) retrieved from Qatar marine sediments.



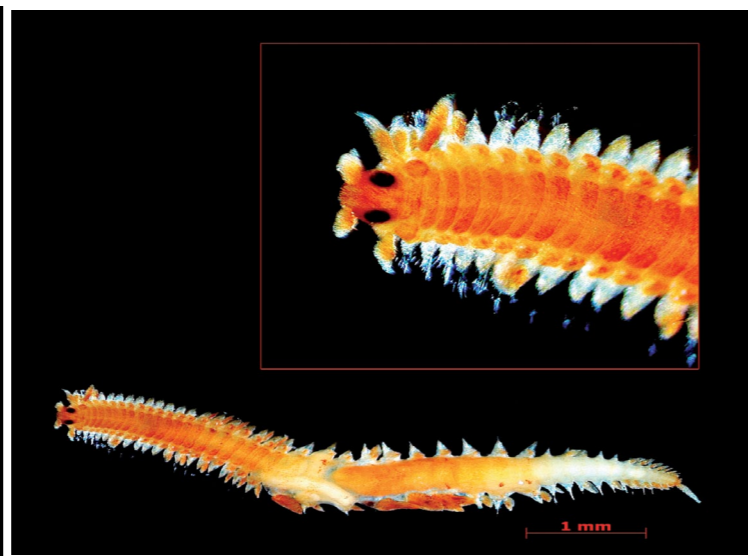
*Eumida* sp.



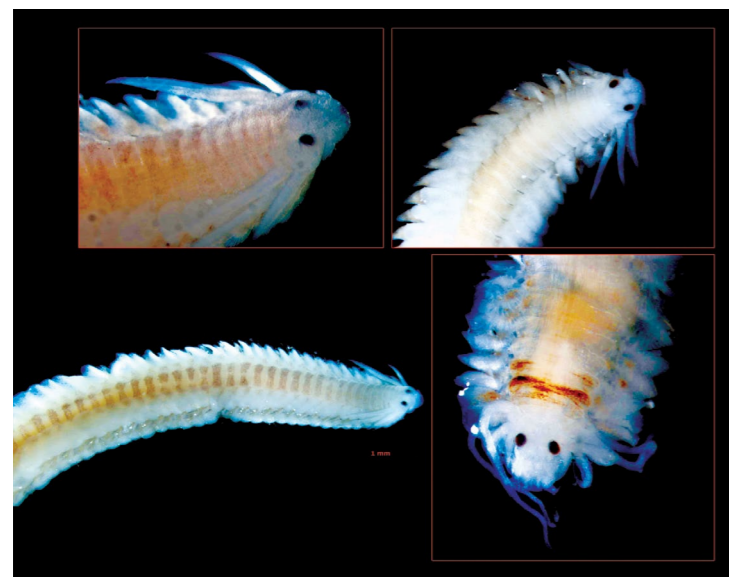
*Eulalia mustela* Pleijel, 1987



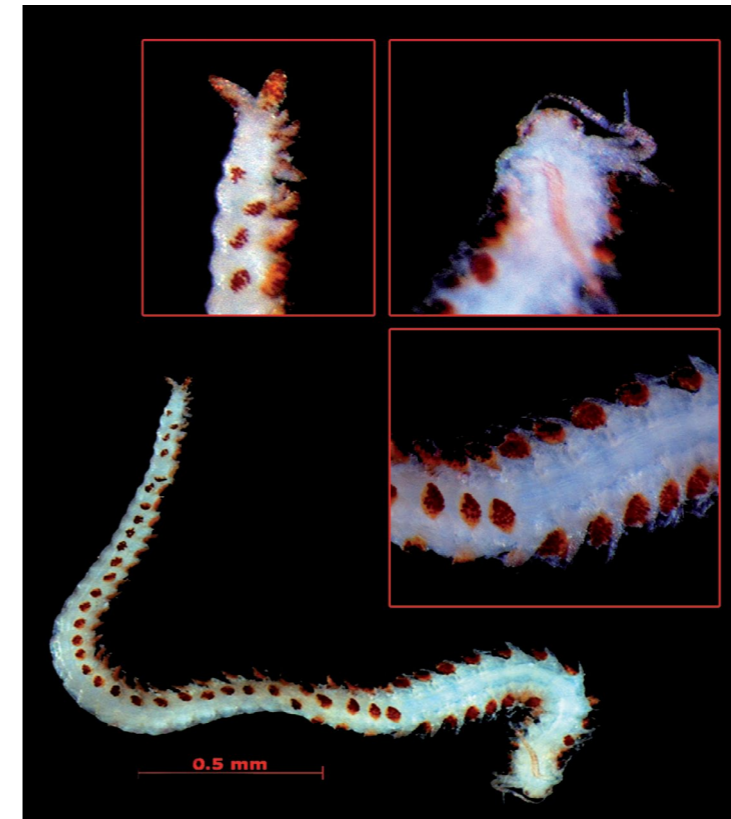
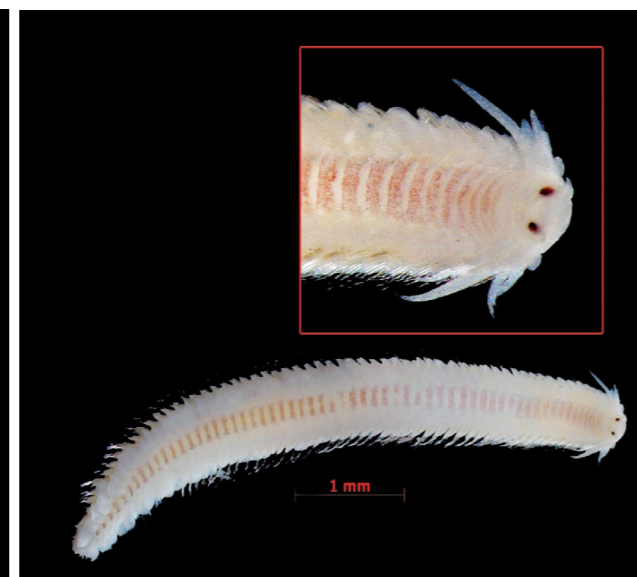
*Eulalia* sp.



*Nereiphylla castanea* (Marenzeller, 1879)



*Nereiphylla castanea* (Marenzeller 1879)



*Phyllodoce* sp. 1



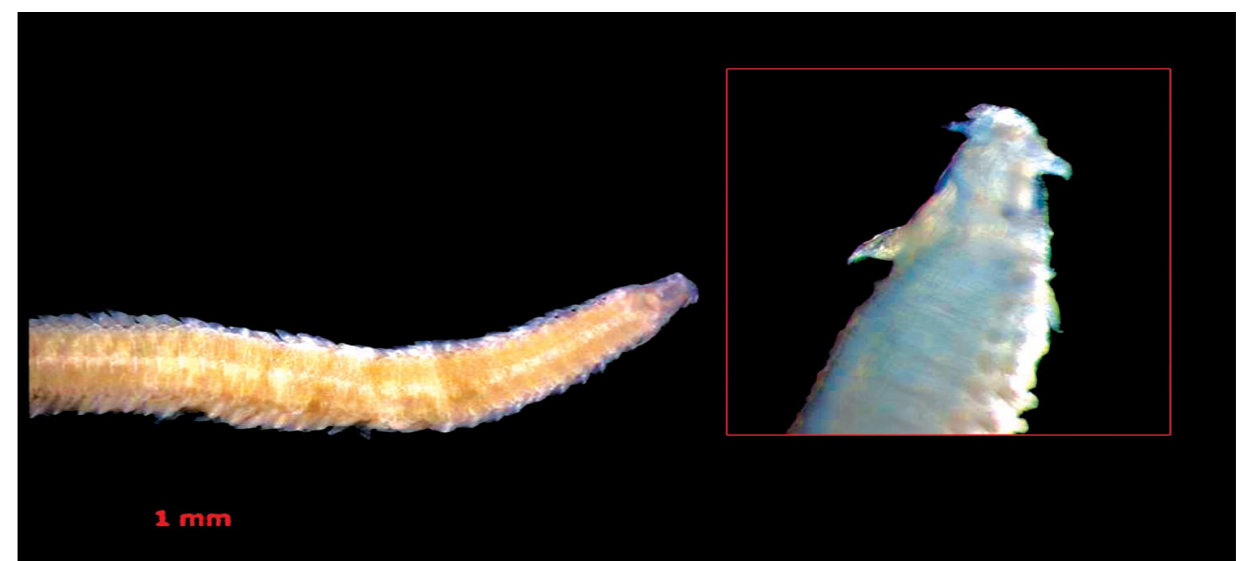
*Phyllodoce* sp. 2



*Phyllodoce* sp. 3



*Phyllodoce* sp. 4



*Eteone foliosa* Quatrefages, 1865

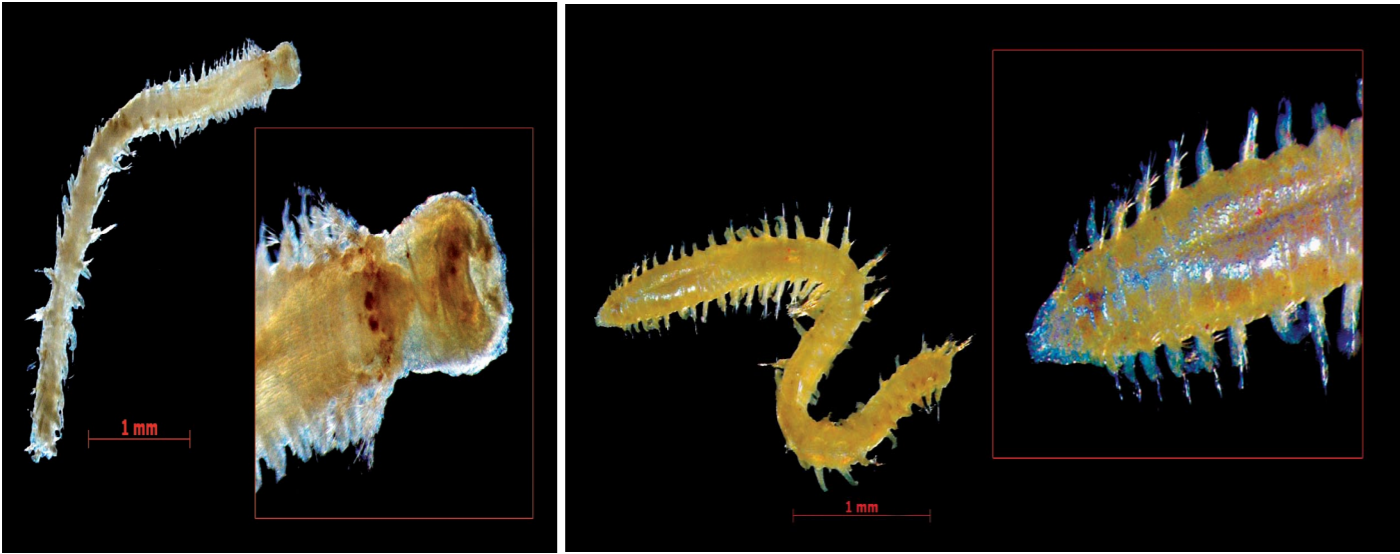
Plate 19. Species of the genera *Eumida*, *Eulalia* and *Nereiphylla* retrieved from Qatar marine sediments.

Plate 20. Two genera *Phyllodoce* and *Eteone* retrieved from Qatar marine sediments.



*Eteone* cf. *Picta*

*Eteone* cf. *spetsbergensis* Malmgren, 1865



*Eteone* sp.1

*Eteone* sp.2

Plate21. The genera *Eteone* retrieved from Qatar marine sediments.

**FAMILY: Tomopteridae**

The species of this family are flattened pelagic forms with long segment-two cirri. One species *Tomopteris* sp. was obtained in Qatar marine sediment (Plate 22) .



Plate 22. *Tomopteris* sp. retrieved from Qatar marine sediments.

**FAMILY: Alciopidae**

The alciopids are delicate planktonic polychaetes with large eyes and are rapid swimmers. Their eversible muscular proboscis and lateral projections enable them to grasp prey but the nature of prey is unknown.. Only one species belonging to the genera *Vanadis* : *Vanadis* cf. *longissima* (Levinsen, 1885) (Plate 23) was obtained in qatar marine sediment.



Plate 23. *Vanadis* cf. *longissima* (Levinsen, 1885) retrieved from Qatar marine sediments.

## FAMILY: Pilargidiidae

Similar to the Nereidae but with all setae simple the Pilargidiidae have unarmed proboscis; prostomium with 2-3 antennae; palps simple or bi-articulate and 2 pairs of tentacular cirri. In some species the notopodium may be reduced or lacking. Setae are always simple. Notopodia may be represented by a strongly reflexed hook or an acicular spine; neurosetae always are simple or serrated [Figure 11]. Three species *Sigambra parva* (Day, 1963), *Sigambra cf. bassi* (Hartman, 1947) and *Sigambra* sp. were encountered in Qatar marine sediment (Plate 24).

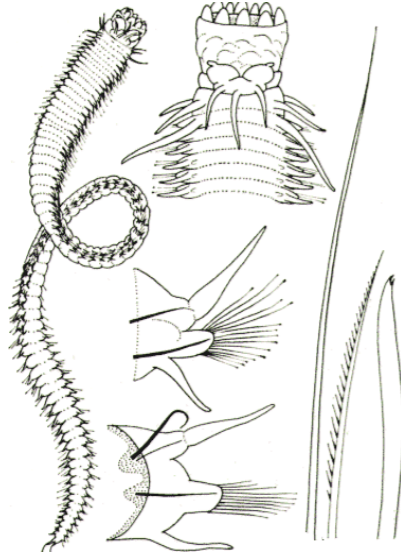
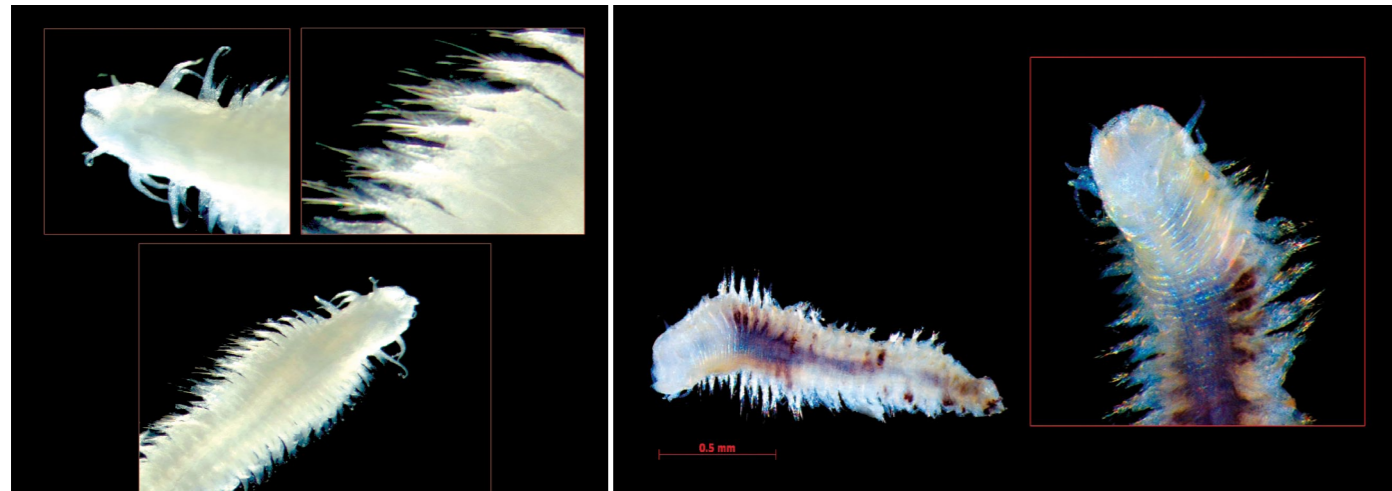
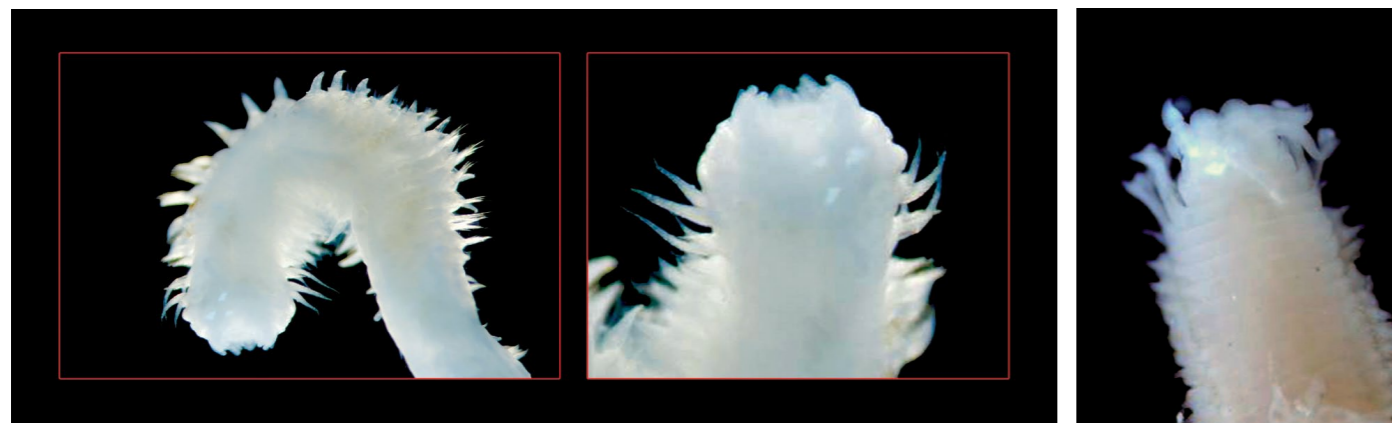


Figure 11. Main features of the Pilargidiidae.

Source: <http://www.nhm.ac.uk/>



*Sigambra parva* (Day, 1963)



*Sigambra cf. bassi* (Hartman, 1947)

*Sigambra* sp.

Plate 24. *Sigambra* species retrieved from Qatar marine sediments.

## FAMILY: Syllidae

The body shape in the Syllidae is vermiform, or grub-shaped and may or may not be dorsoventrally flattened. Body segments numerous (more than about 15) and regionation is absent. Epidermis more-or-less smooth, or papillate, irregularly arranged papillae (rare). Pygidium simple ring or cone. Pygidial appendages present; [one pair of cirri, or one pair of cirri and single medial papilla] [Figure 12]. Sixteen species belonging to the genera *Syllis* (5) (Plate 25A,B&C), *Syllides* (2) (Plate 26), *Typosyllis* (5), *Sphaerosyllis* (1) (Plate 27A,B &C), *Exogone* (2) and cf. *Cirrotylosyllis* (1) (Plate 28) were obtained in Qatar marine sediment.

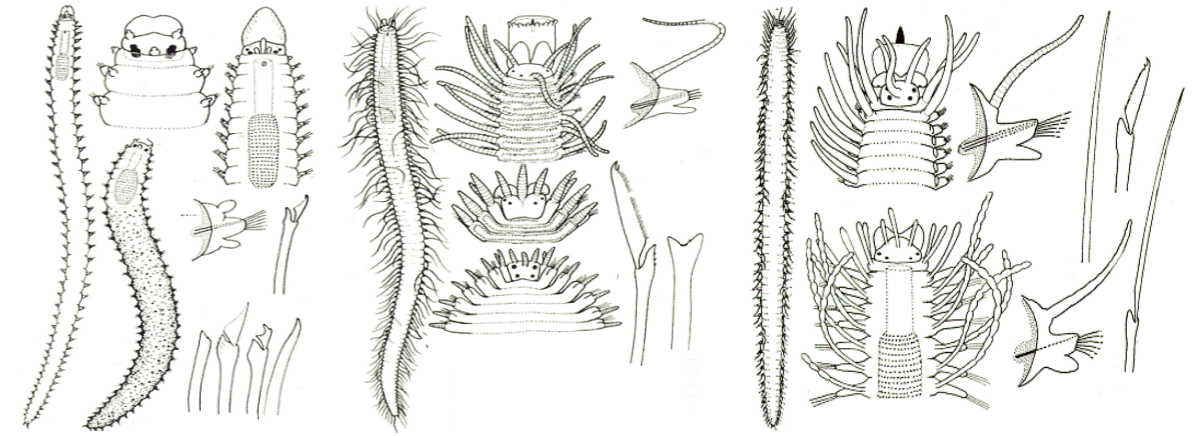


Figure 12. Main features of the Syllidae.

Source: <http://www.nhm.ac.uk/>

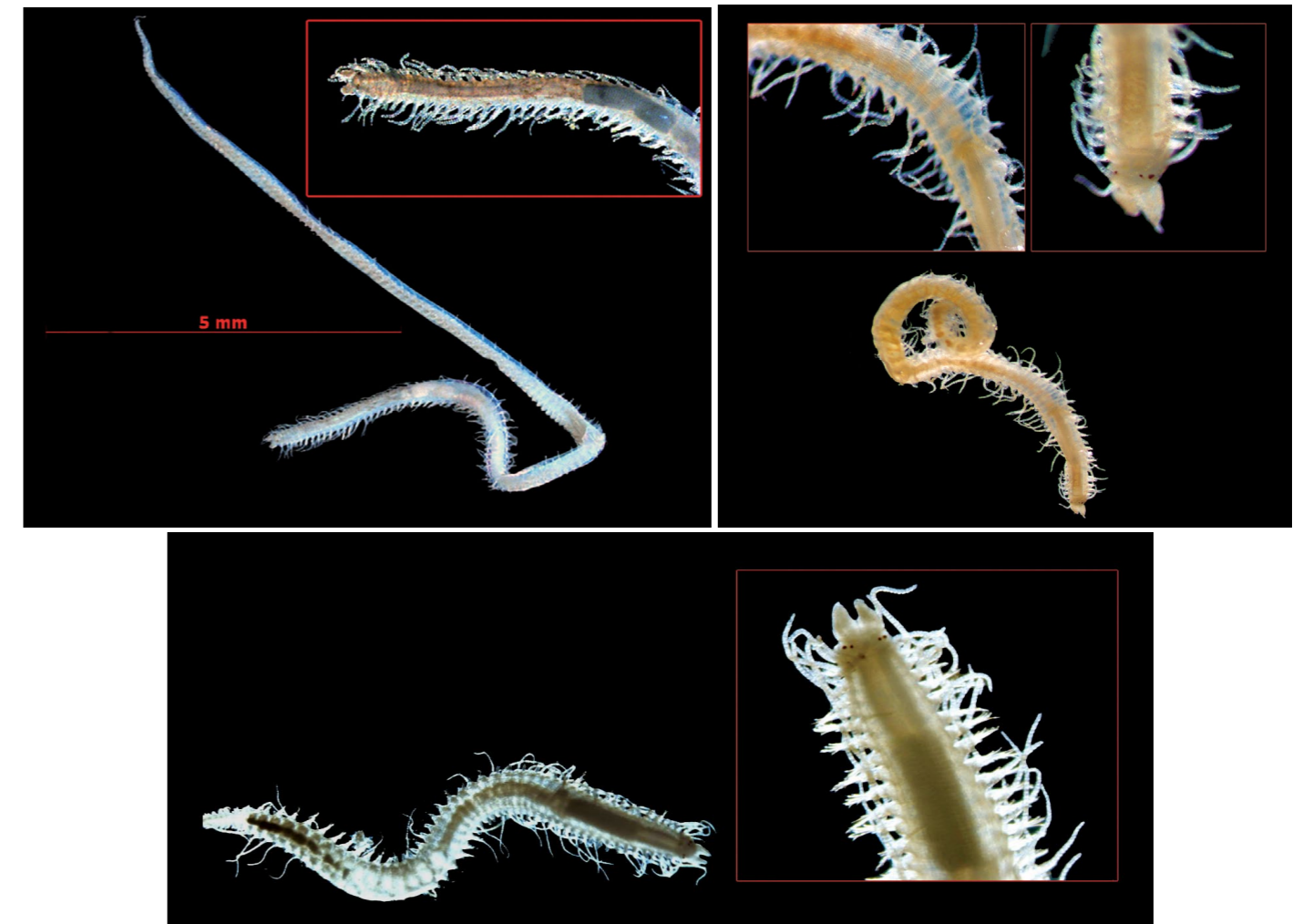


Plate 25A. Various views of *Syllis cornuta* (Rathke, 1843) retrieved from Qatar marine sediments.

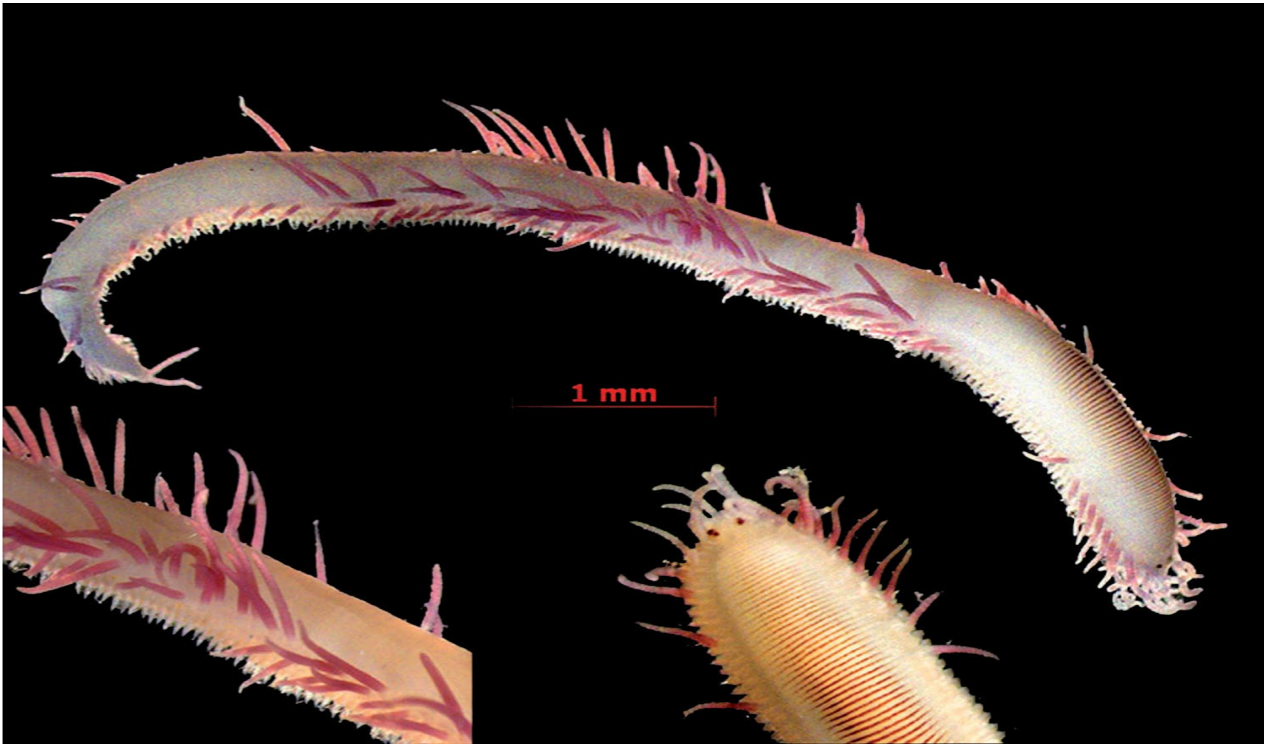


*Syllis gracilis* (Grube, 1840)



*Syllis gigantea* McIntosh, 1885

Plate 25B. *Syllis* species in Qatar marine sediments.

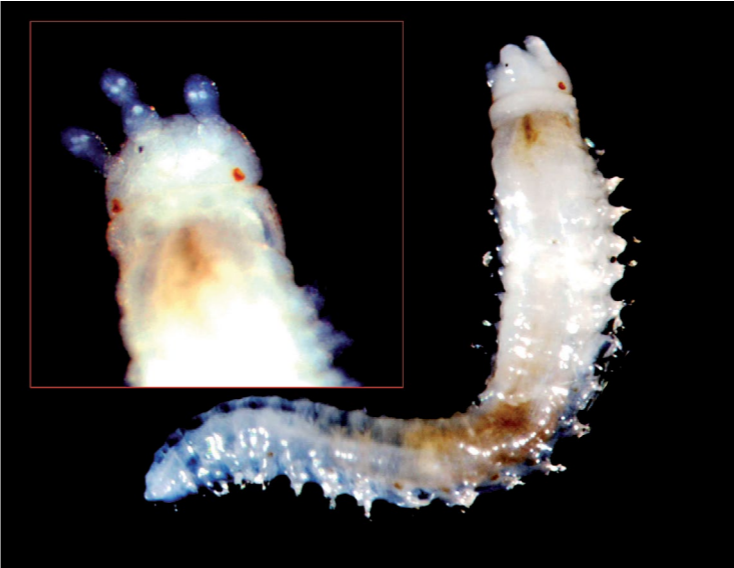


*Syllis variegata* Grube, 1860



*Syllis* sp.

Plate 25 C. *Syllis* species in Qatar marine sediments.

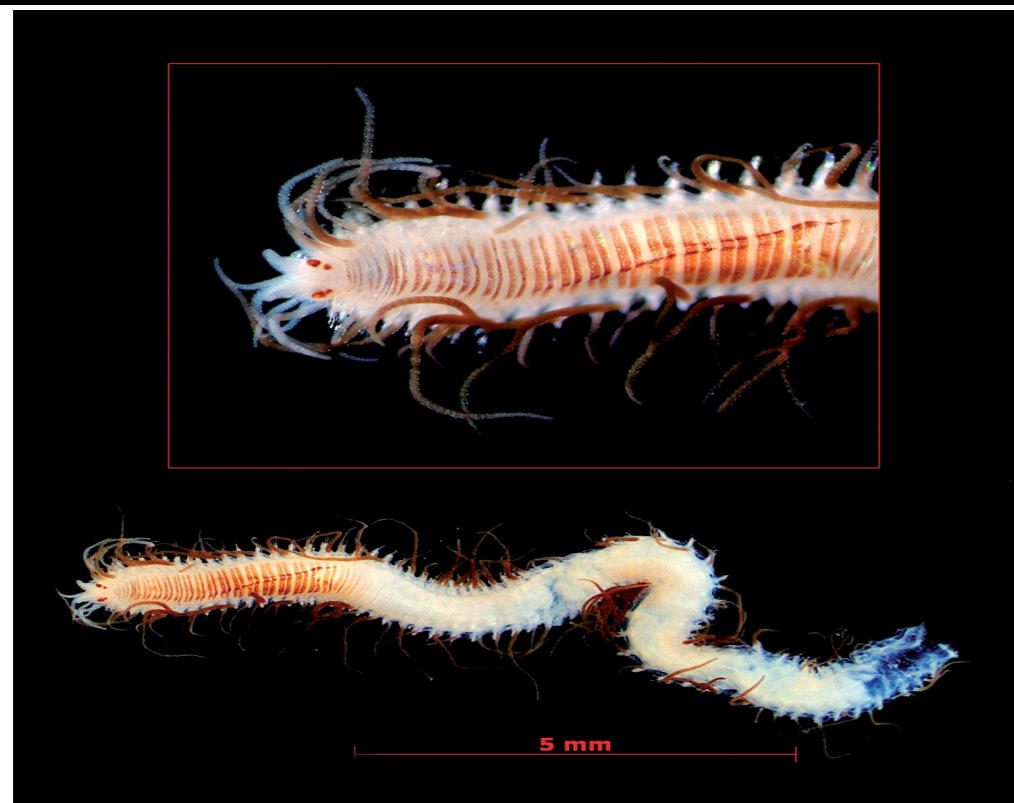


*Syllides* sp.1



*Syllides* sp.2

Plate 26. *Syllides* retrieved from Qatar marine sediments.



*Typosyllis zebra* (Grube, 1860)

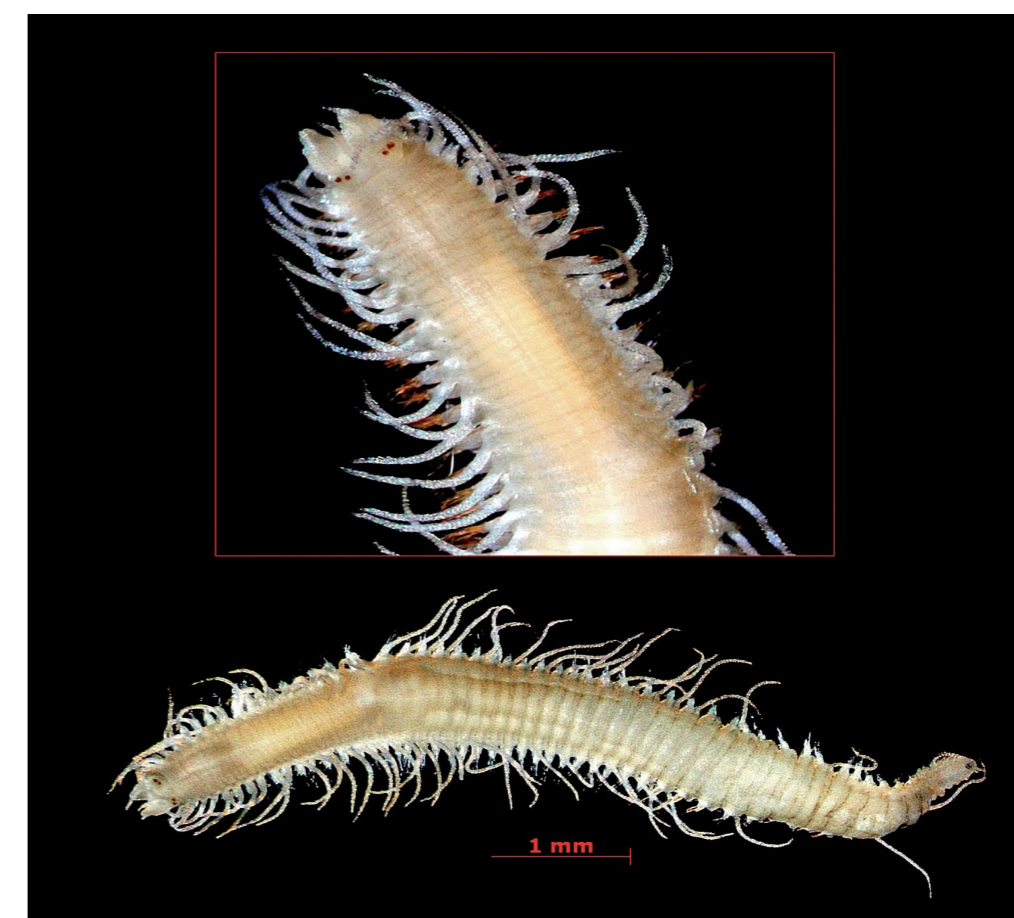
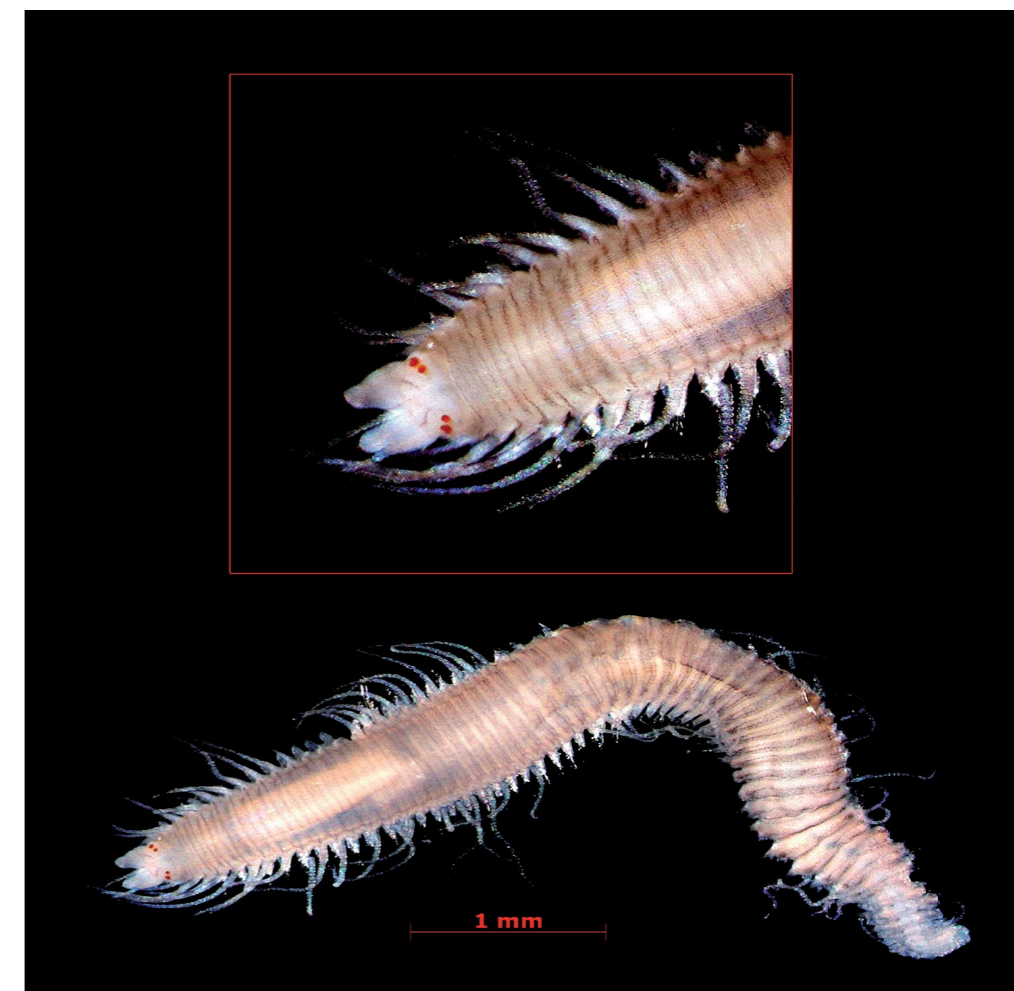


*Typosyllis* sp.1



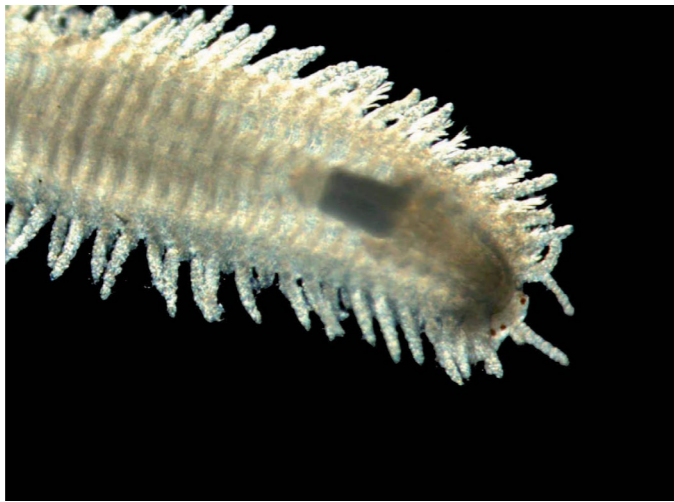
*Typosyllis* sp.2

Plate 27A. *Typosyllis* retrieved from Qatar marine sediments.



*Typosyllis* sp.2

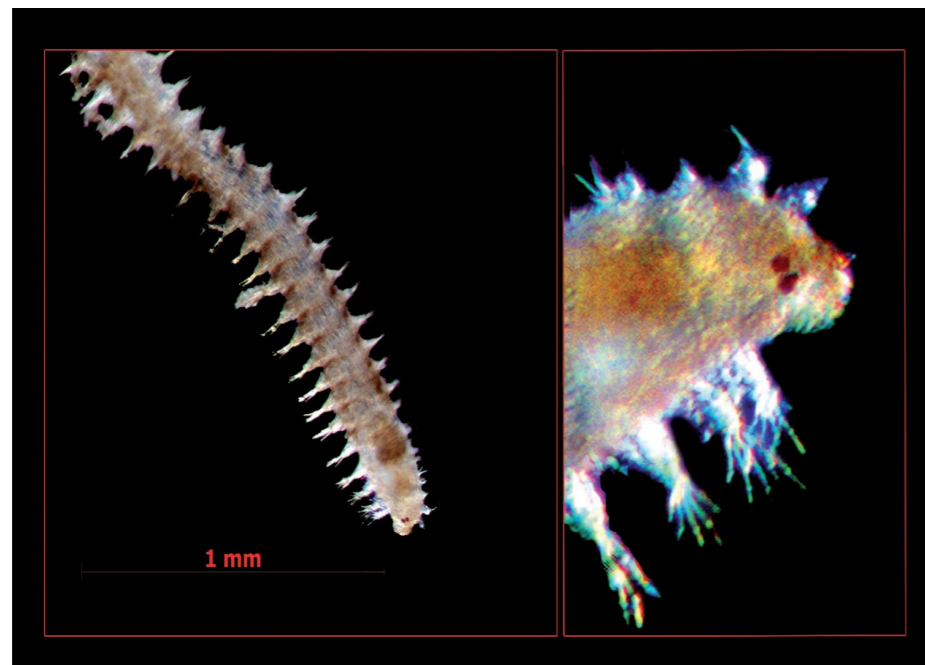
Plate 27B. *Typosyllis* retrieved from Qatar marine sediments.



*Typosyllis* sp.3

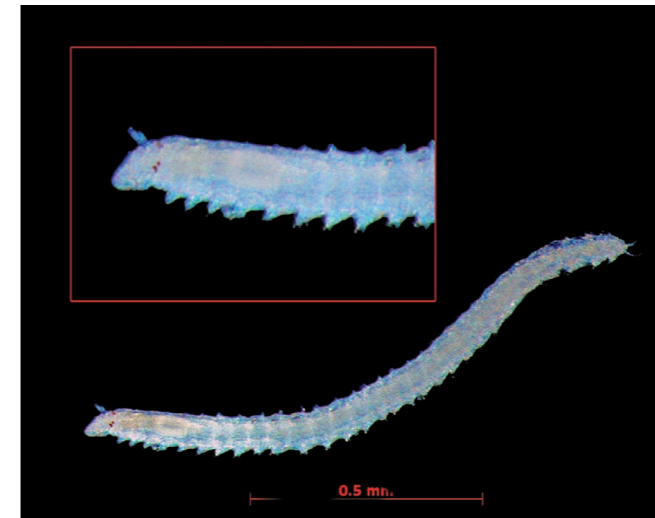


*Typosyllis* sp.4



*Sphaerosyllis* sp.

Plate 27C. *Typosyllis* and *Sphaerosyllis* retrieved from Qatar marine sediments.



*Exogone verugera* (Claparede, 1868)



*Exogone* sp.



cf. *Cirrosyllis* sp.

Plate28. *Exogone* and *Cirrosyllis* retrieved from Qatar marine sediments.

FAMILY: Nephtyidae

Members are characterized by the presence of 2 pairs of short antennae on the anterior corners of small pentagonal prostomium. No palps. Proboscis large and muscular with a pair of jaws. Body rectangular in cross-section. Complex biramous parapodia with interramal cirri (branchiae). All setae are simple, usually barred. Occasional, forked seta may be seen (Figure 13). Five species of the genus *Nephtys*: *Nephtys cornuta* Clark & Jones, 1955, *Nephtys californiensis* Hartman, 1938, *Nephtys* cf. *cirrosa*, *Nephtys verrilli* McIntosh, 1885, *Nephtys tulearensis* Fauvel, 1919 (Plate 29 A,B&C ) and one species of the genus *Aglaophamus*: *Aglaophamus* sp. (Plate 30) were obtained in Qatar marine sediments.

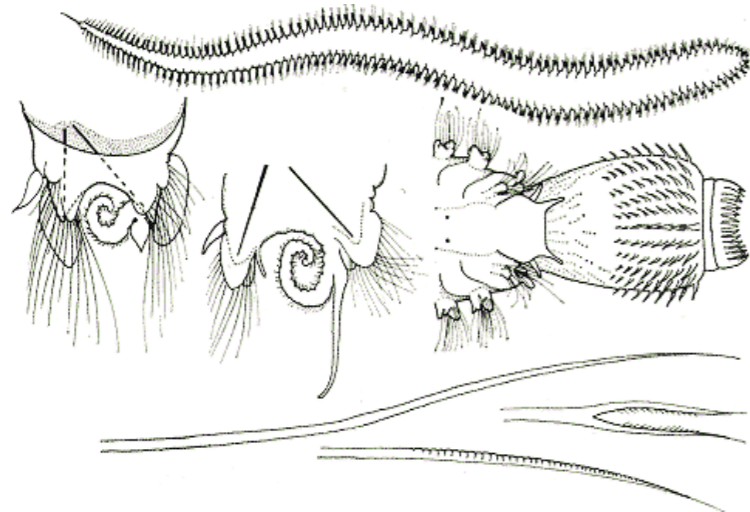
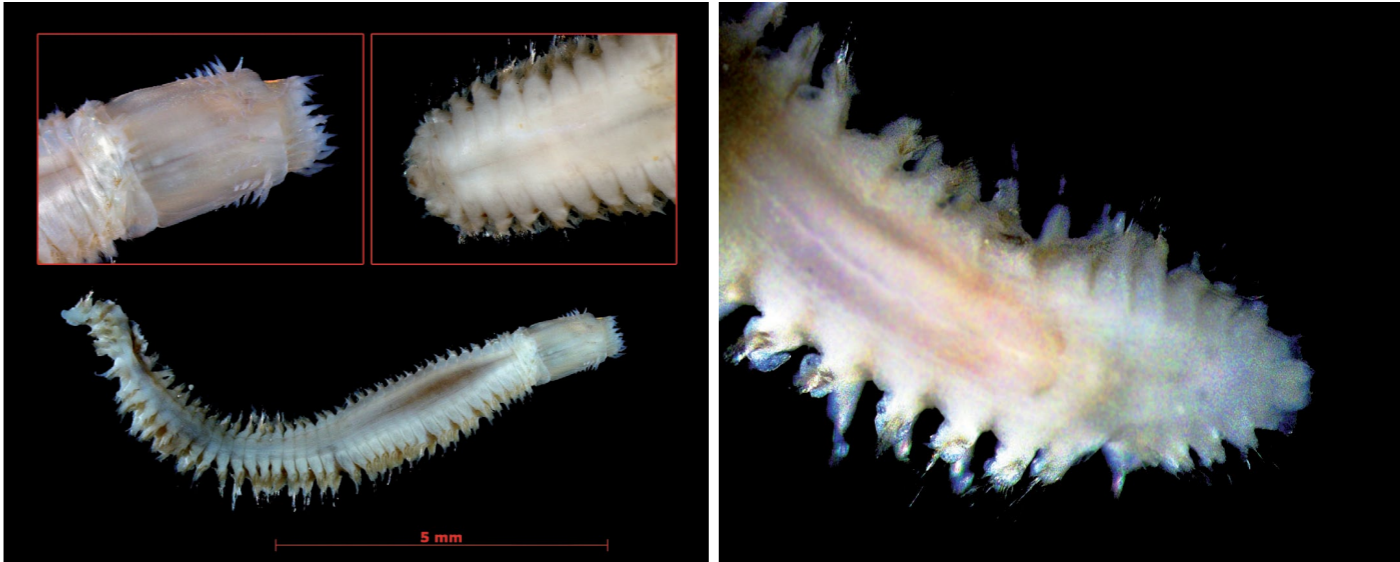


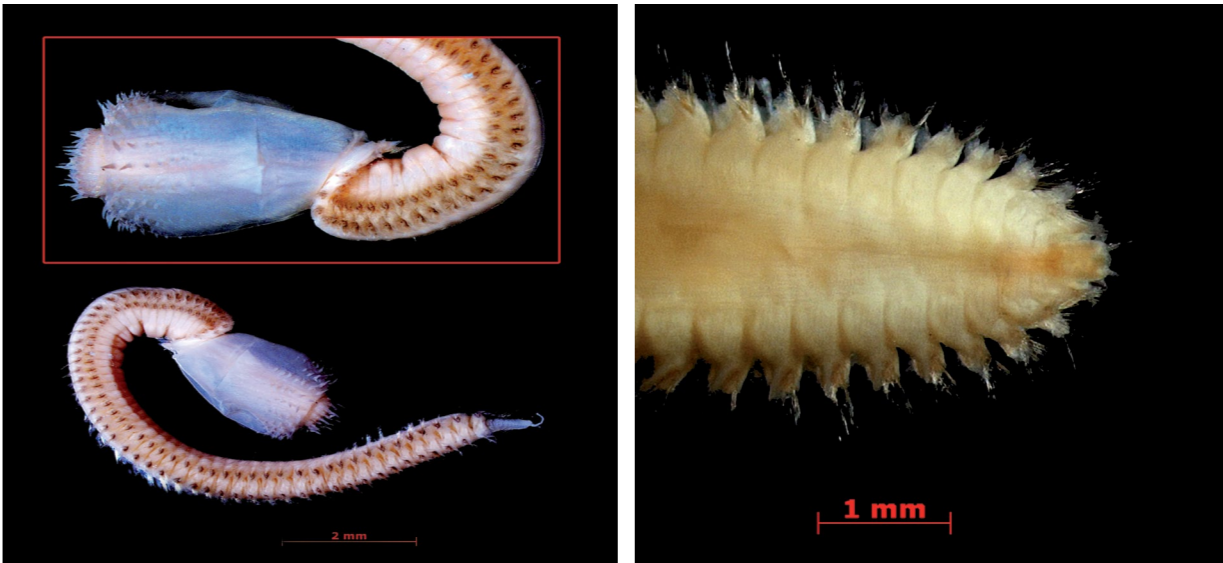
Figure 13. Key characters in the Nephtyidae.  
Source:<http://www.nhm.ac.uk/>



*Nephtys* cf. *cirrosa* Clark & Jones, 1955

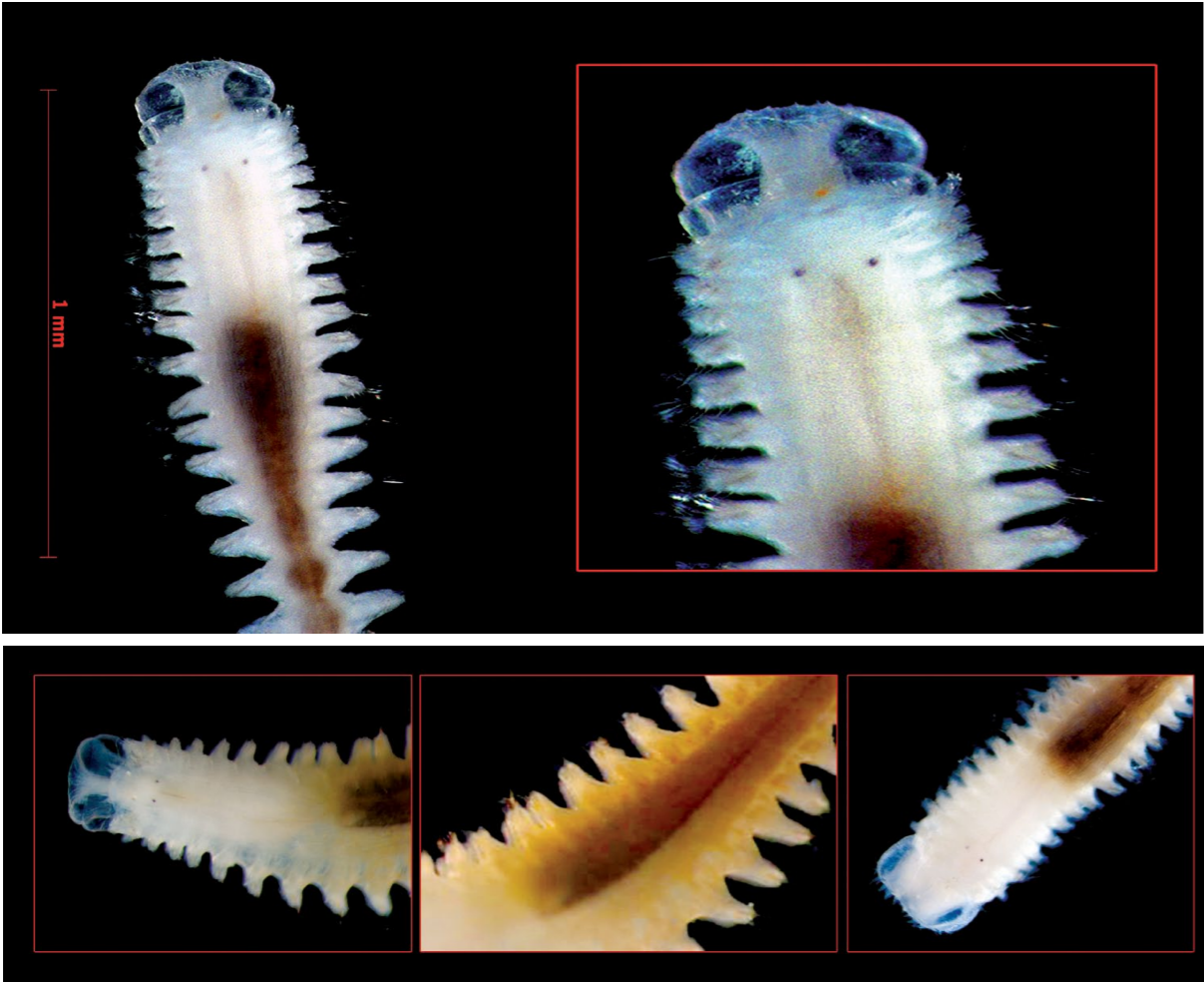


*Nephtys californiensis* Hartman, 1938



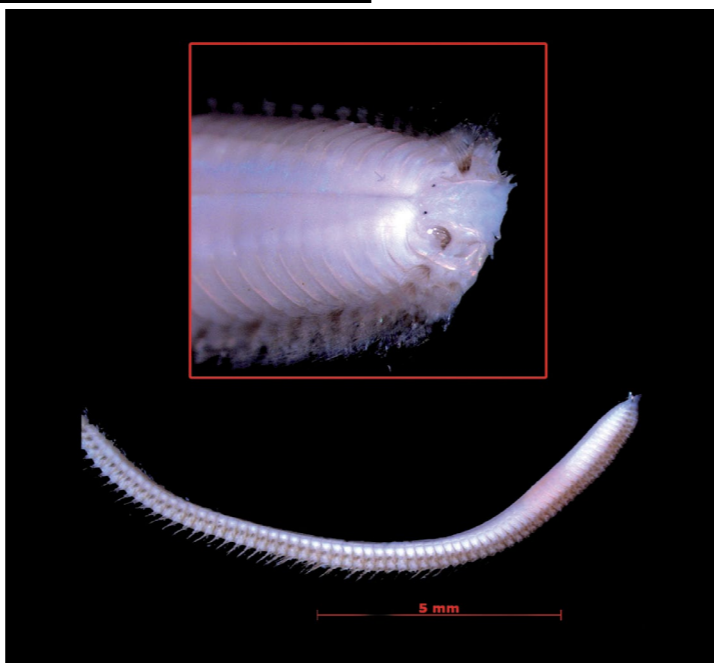
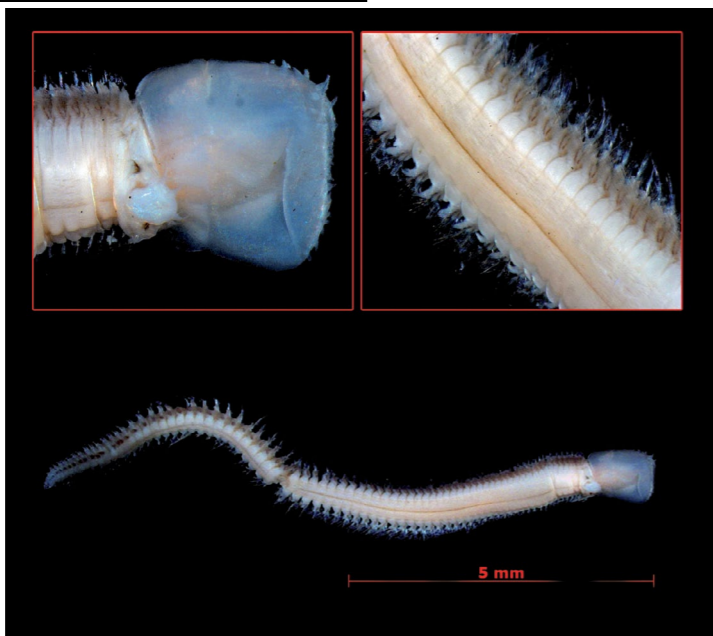
*Nephtys verrilli* McIntosh, 1885

Plate 29B. *Nephtys* species in Qatar marine sediments.



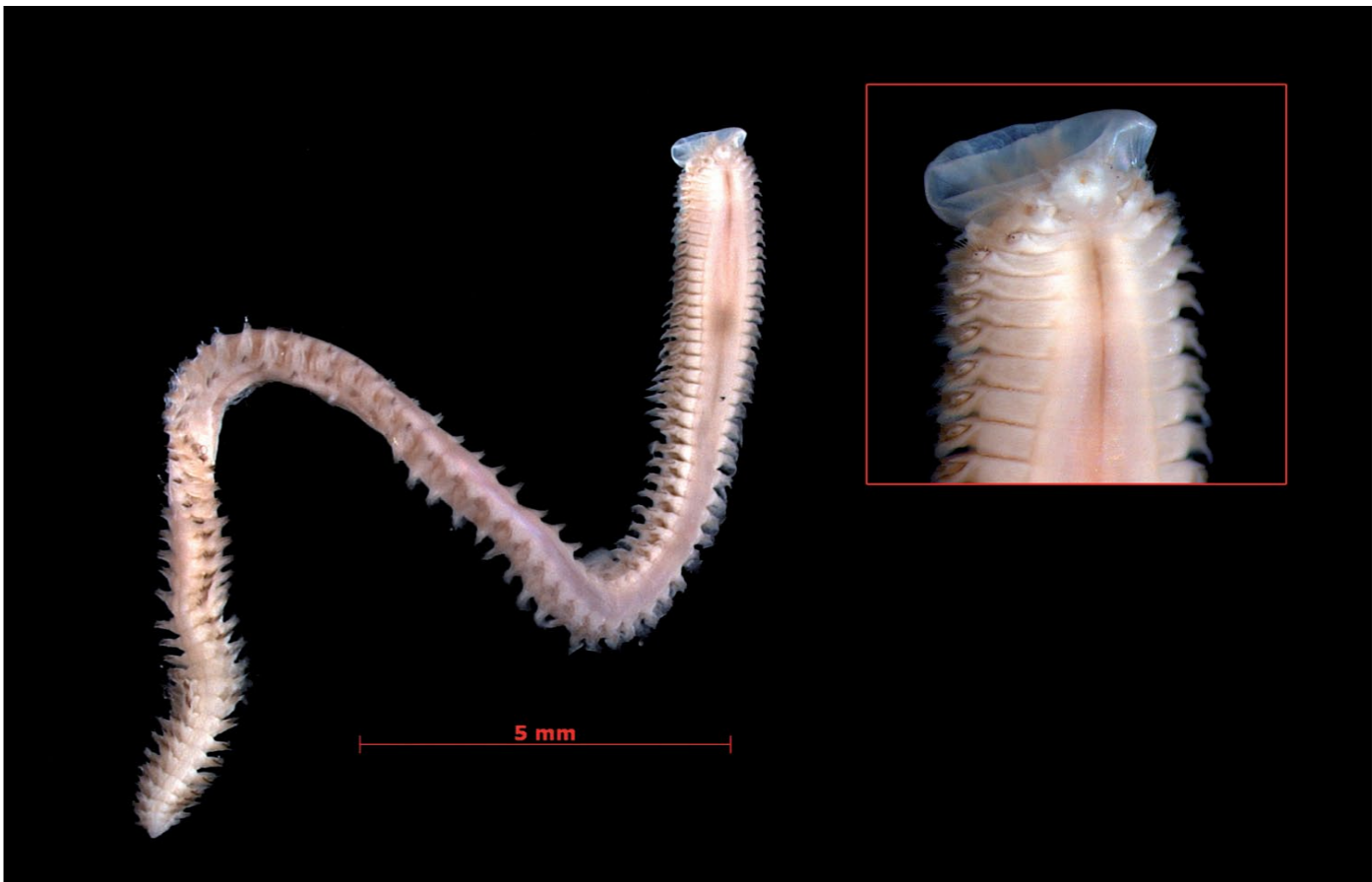
*Nephtys cornuta* Clark & Jones, 1955

Plate 29A. *Nephtys* species in Qatar marine sediments.



*Nephtys tulearensis* Fauvel ,1919

Plate 29C. *Nephtys* species in Qatar marine sediments.



*Aglaophamus* sp.

Plate 30. *Aglaophamus* species in Qatar marine sediments.

FAMILY: Nereididae (Rag worm or Ball worm)

Large elongate worms. Prostomium usually with 2 pairs of antennae and always with a pair of bi-articulate palps. Peristome with usually 4 but sometimes 3 pairs of tentacular cirri. Eversible pharynx with a pair of jaws some genera are armed with many chitinous paragnaths or papillae, while in several genera the pharynx is unarmed. Parapodia uniramous for first two setigers then usually biramous but some genera are uniramous throughout. Most genera usually without branchiae/gills; where branchiae occur, they are usually branched and arise on the mid anterior segments of the body. Setae mainly compound, with both falcigers and spinigers [Figures 14,15,16,17,18,19 and 20].

Four species of the genus *Ceratonereis* [*Ceratonereis burmensis* Monro 1934, *Ceratonereis erythraensis* Fauvel 1918, *Ceratonereis* cf. *hircinicola* (Eisig, 1870) and *Ceratonereis* sp. (Plate 31A & B)]. Four species belonging to the genera *Perinereis* [*Perinereis nigropunctata* (Horst,1889) (Plate32), *Perinereis nuntia* (Savigny,1818), *Perinereis* cf. *aibuhitensis* (Grube, 1878) and *Perinereis* sp. (Plate 33)]. Three species of the genus *Nereis* [*Nereis* cf. *zonata* Malmgren, 1867, *Nereis denhamensis* (Augener, 1913) , *Nereis* sp. (Plate 34)]. One species of the genus *Nicon* sp. (Plate 35). One species of the genus *Pseudonereis* sp. (Plate 36) and four species of the genus *Platynereis* [*Platynereis pulchella* Gravier, 1902, *Platynereis* cf. *dumerilii* (Audouin & Milne Edwards ,1834, *Platynereis* sp.1 and *Platynereis* sp.2 (Plate 37 A&B)], were obtained in Qatar marine sediments .

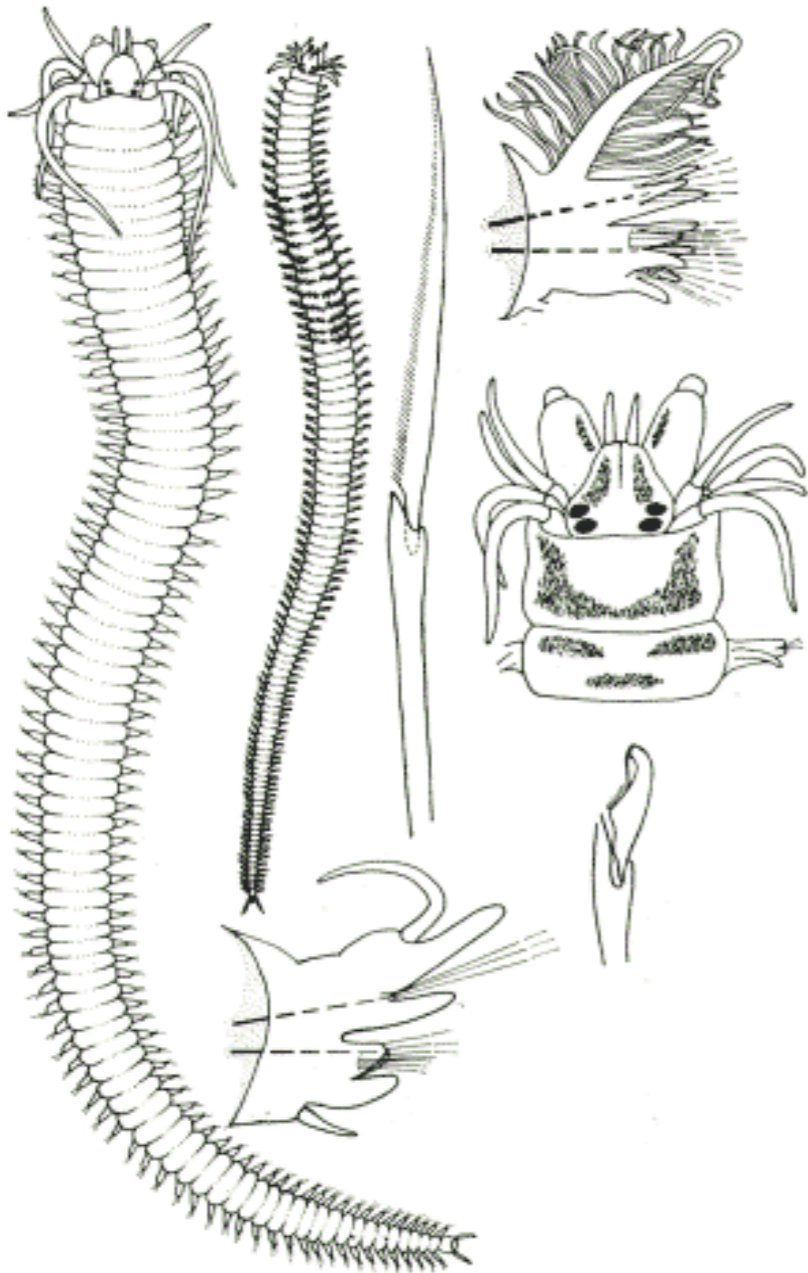


Figure 14. Key characters in the Nereididae  
Source:<http://www.nhm.ac.uk/>

Table 4. Main diagnostic charactes in the Ragworm:

ORGANS	<i>CERATONEREIS</i>	<i>NEREIS</i>	<i>PERINEREIS</i>	<i>PLATYNEREIS</i>
Prostomium	2 tentacles, 4 pairs of tentacular cirri.	Two antennae. Four pairs of tentacular cirri.	2 antennae, 4 pairs of tentacular cirri.	2 antennae, 4 pairs of tentacular cirri.
Parapodia	Biramous (except for first two uniramous setigers).	Biramous except for first two uniramous setigers.	Biramous (except for first two uniramous setigers).	Biramous.
Paragnaths	Maxillary ring) conical. Oral ring smooth without armament.	Conical paragnaths on both oral and maxillary rings.	Conical and transverse bars on maxillary and oral rings.	Pectinate bars and conical paragnaths on both oral and maxillary rings
Notosetae	Homogomph spinigers and falcigers.	Homogomph spinigers and falcigers in the mid to posterior setigers.	Homogomph spinigers.	Homogomph spinigers and falcigers; some falcigers forming simple hooks.
Neurosetae	Homogomph and heterogomph spinigers and heterogomph falcigers.	Homogomph and heterogomph spinigers and heterogomph falcigers..	Homogomph and heterogomph spinigers and heterogomph falcigers.	Homogomph and heterogomph spinigers and heterogomph falcigers.
Others	Dorsal cirri attached to the base of the superior notopodial lobe.			
Figurs	14	17	15	16

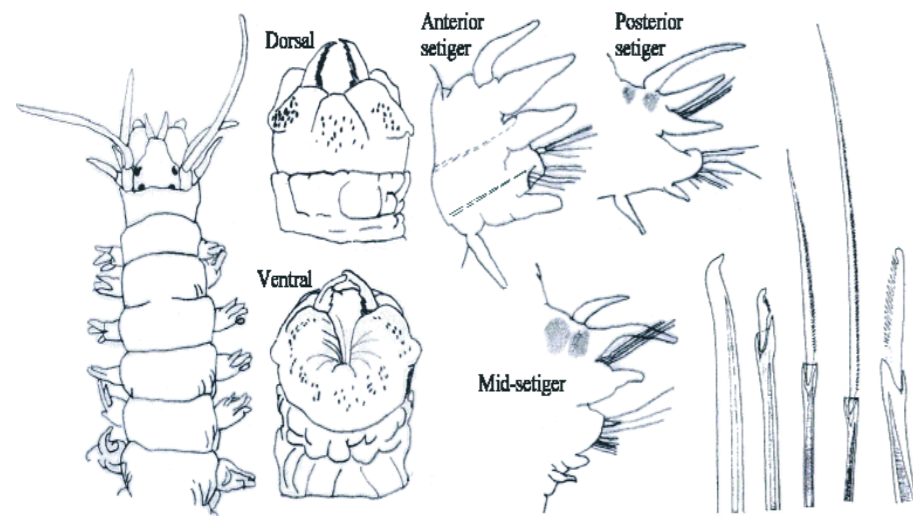


Figure 15. Diagnostic features in the genus *Ceratonereis*.  
Source: <http://www.nhm.ac.uk/>



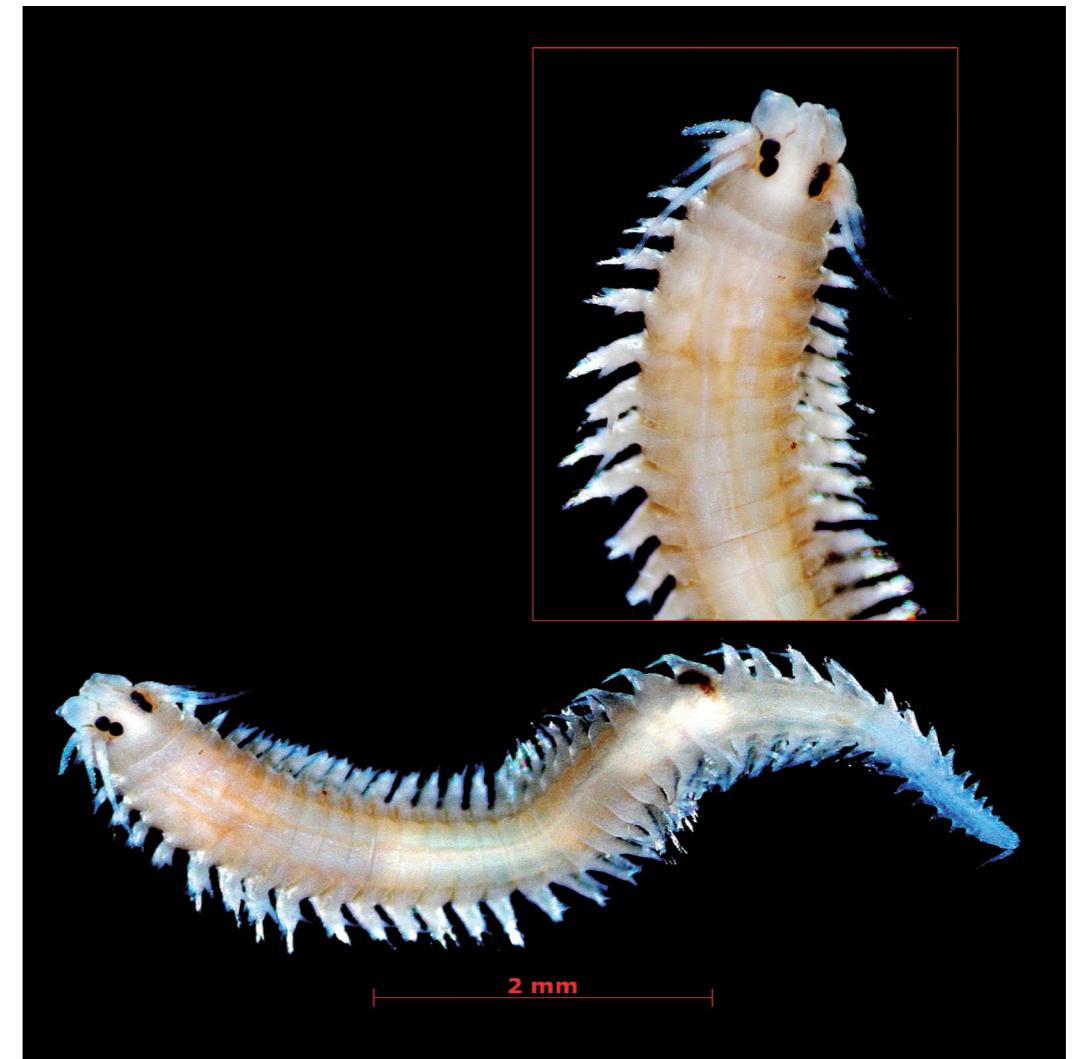
*Ceratonereis burmensis* Monro 1934



*Ceratonereis erythraensis* Fauvel 1918



Plate 31A. *Ceratonereis* in Qatar marine sediments.



*Ceratonereis* cf. *hircincola* (Eisig, 1870)



*Ceratonereis* sp.

Plate 31B. *Ceratonereis* in Qatar marine sediments.

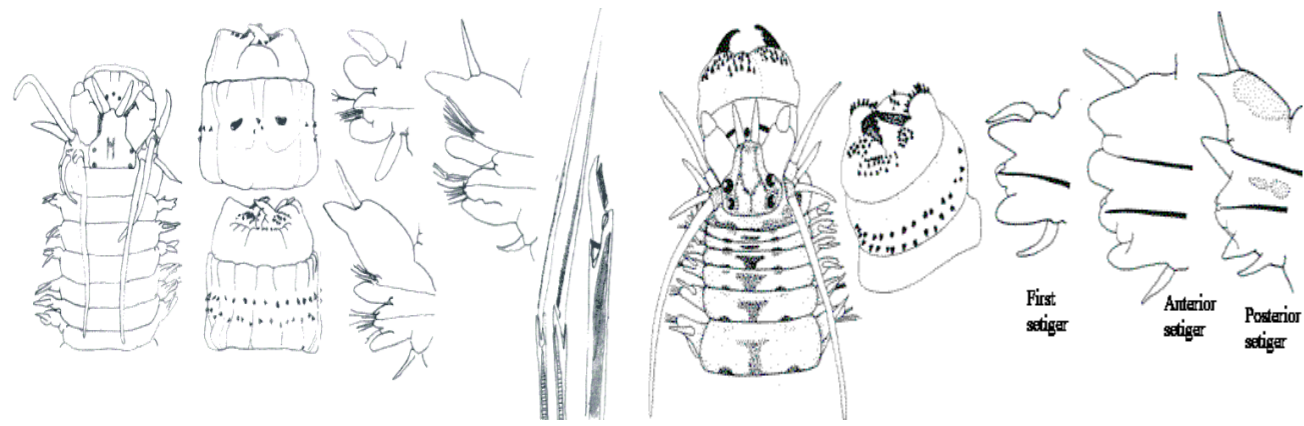
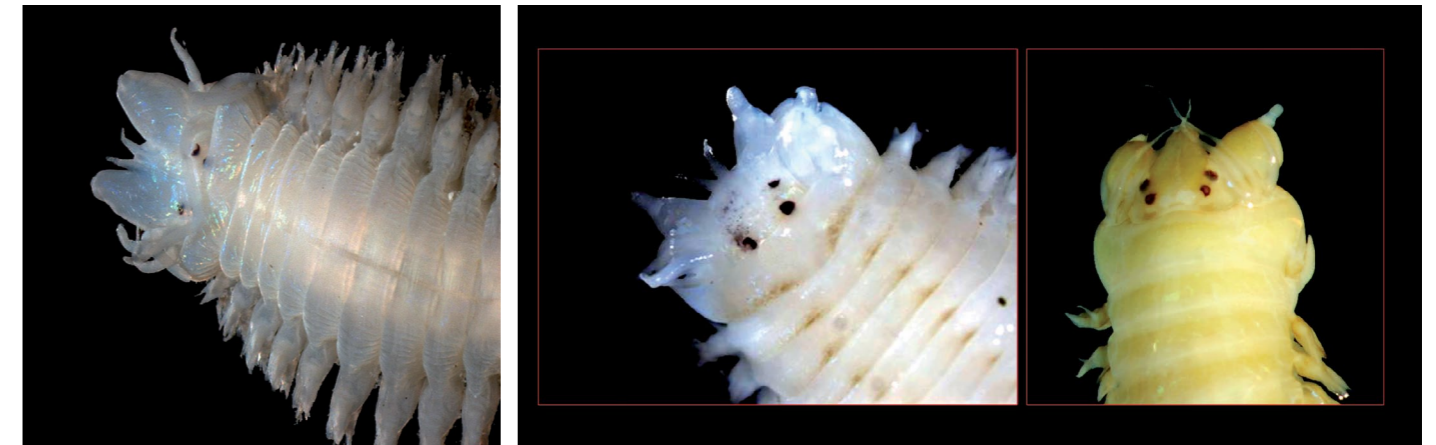


Figure 16. Diagnostic features in the genus *Perinereis*.  
Source: <http://www.nhm.ac.uk/>



*Perinereis nuntia* Savigny, 1878

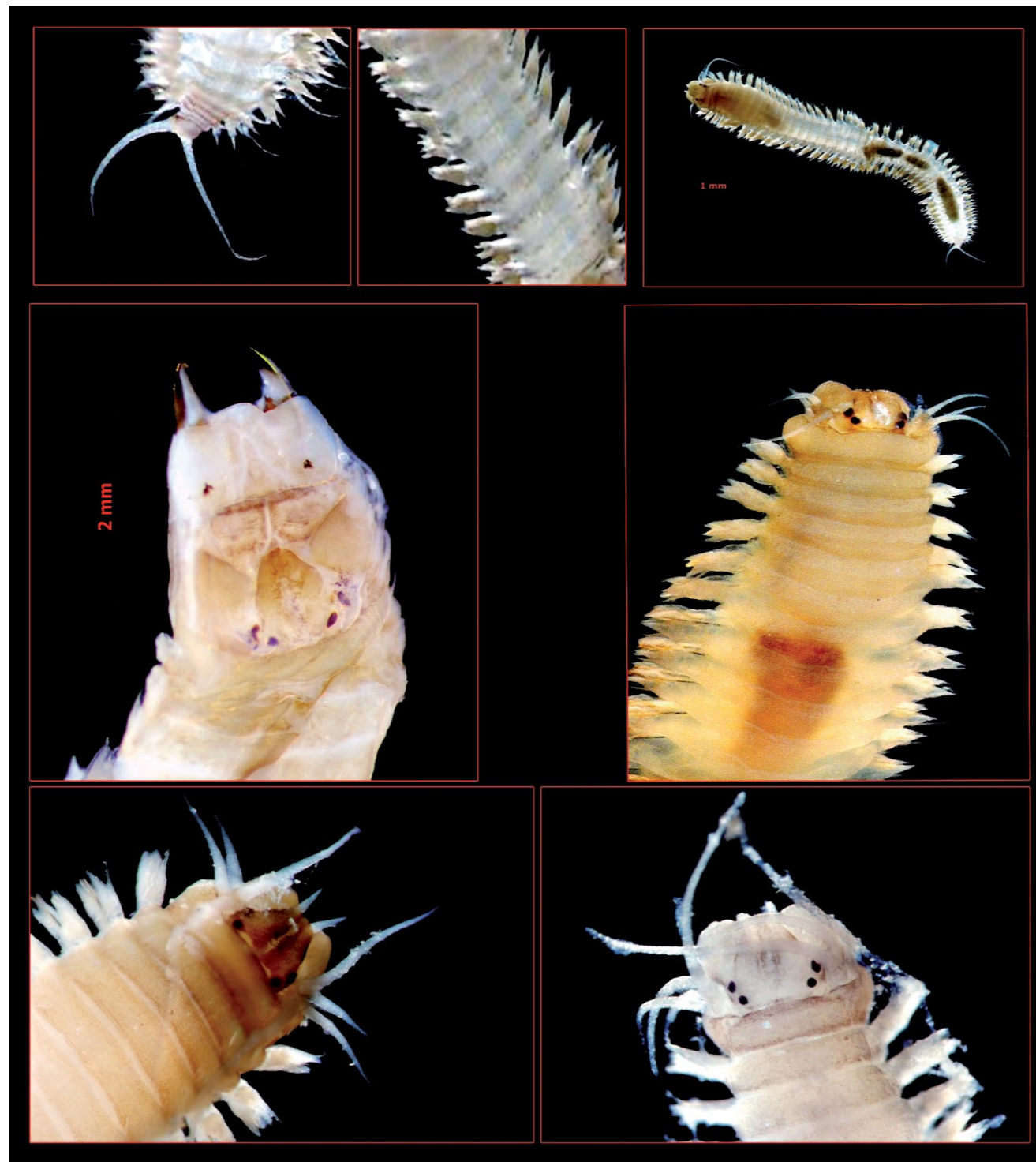
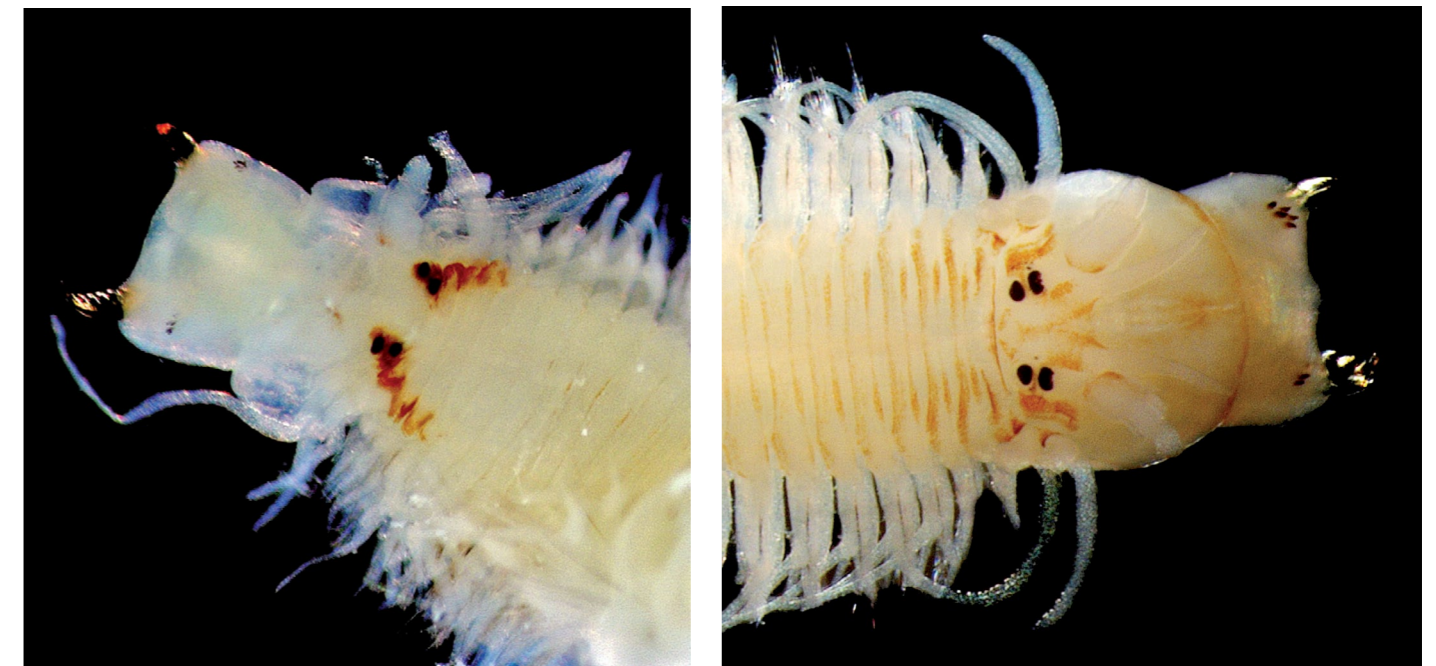


Plate 32. *Perinereis nigropunctata* (Horst, 1889) in Qatar marine sediments.



*Perinereis* cf. *aibuhitensis* Grube, 1878

*Perinereis* sp.

Plate 33. *Perinereis* in Qatar marine sediments.

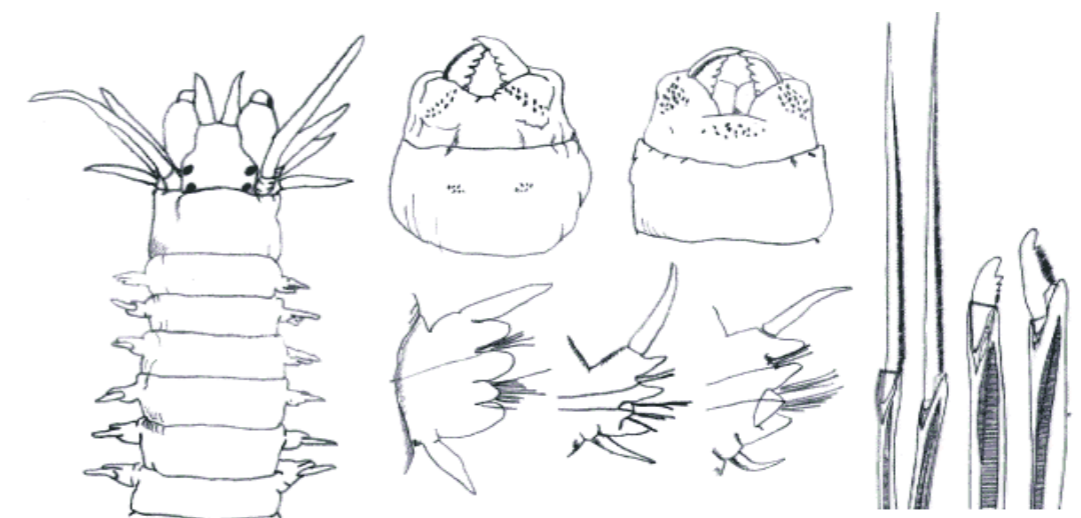
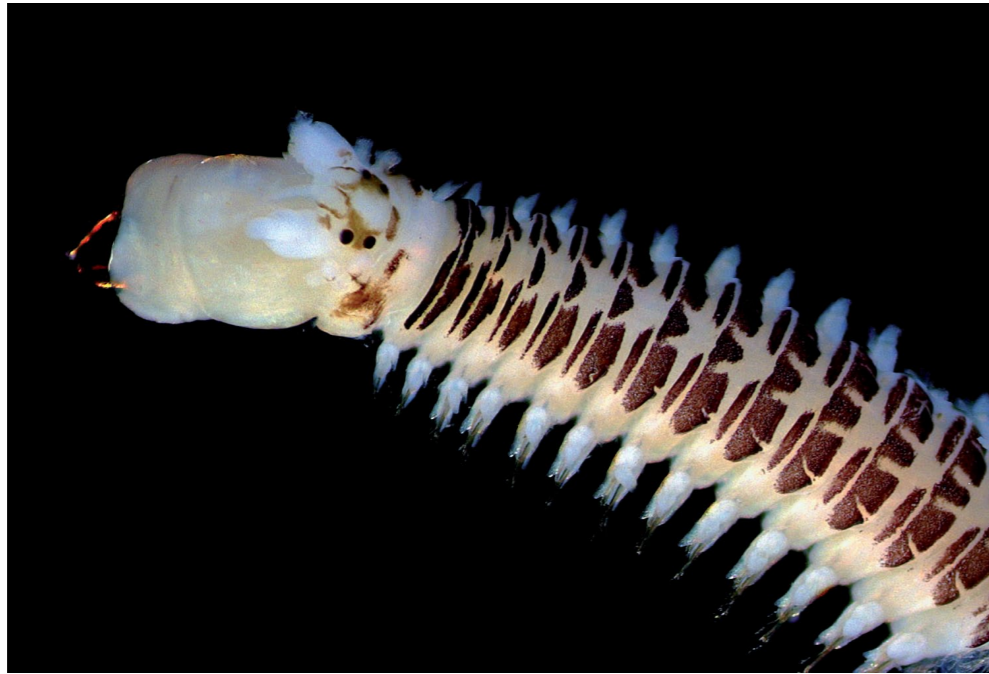
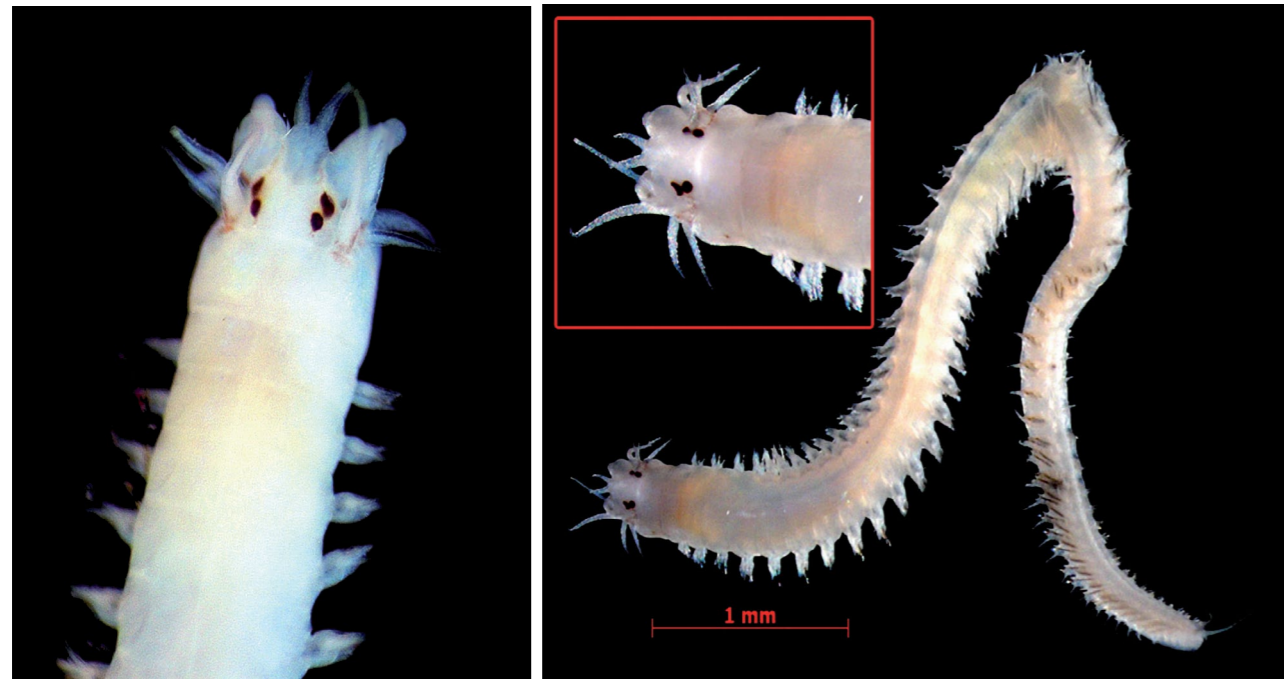


Figure 17 Diagnostic features in the genus *Nereis*.  
Source: <http://www.nhm.ac.uk/>



*Nereis cf. zonata* Malmgren, 1867



*Nereis denhamensis* (Augener, 1913)



*Nereis* sp.

Plate 34. *Nereis* in Qatar marine sediments.

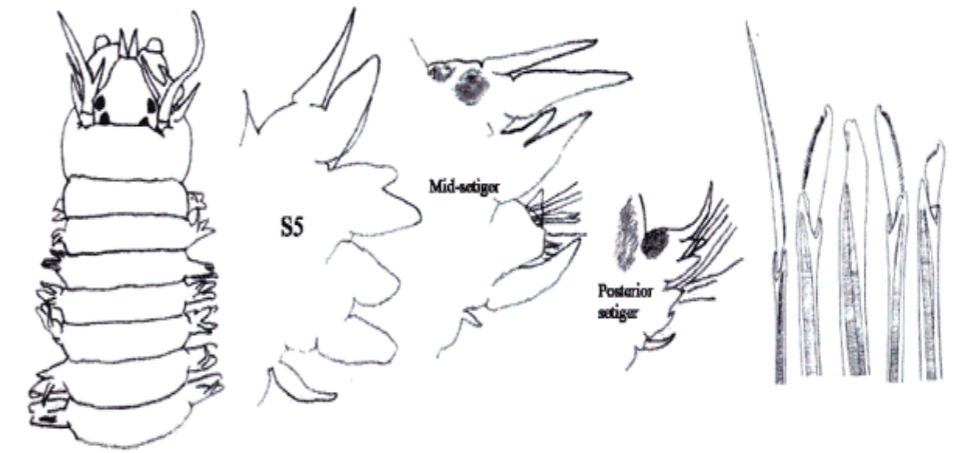


Figure 18. Diagnostic features in the genus *Nicon*.

Source: <http://www.nhm.ac.uk/>

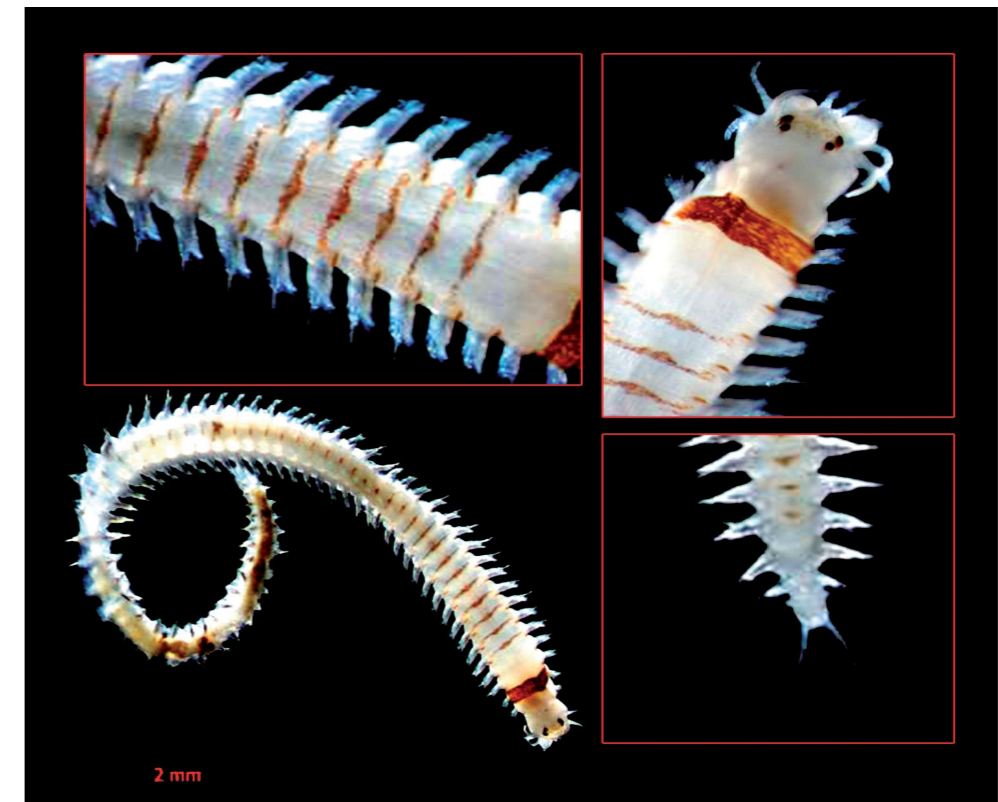


Plate 35. *Nicon* sp. in Qatar marine sediments.

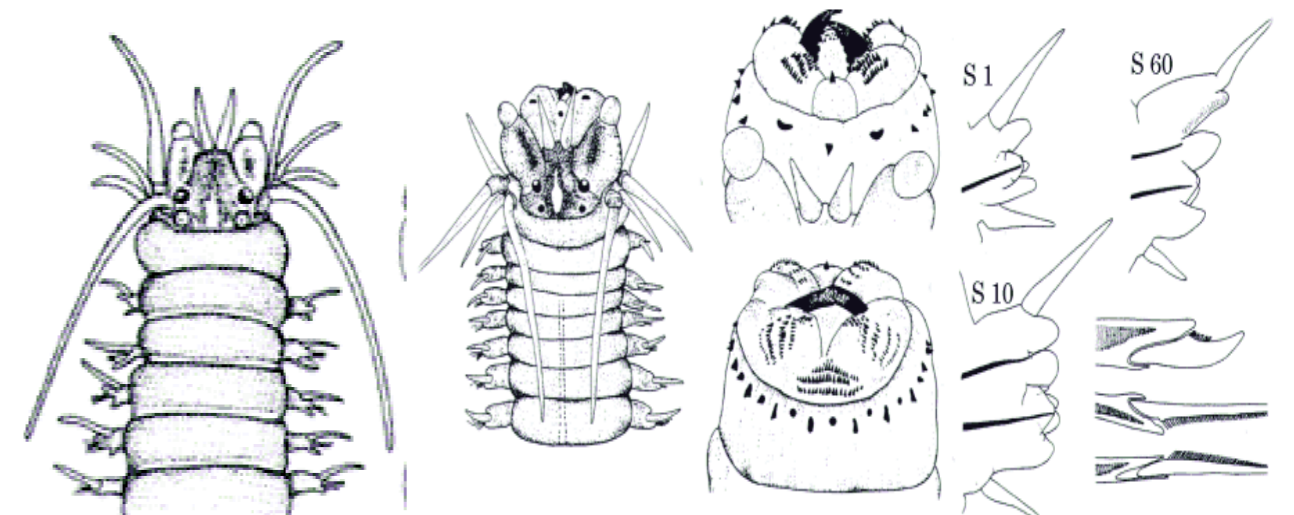


Figure 19. Diagnostic features in the genus *Pseudonereis*.

Source: <http://www.nhm.ac.uk/>

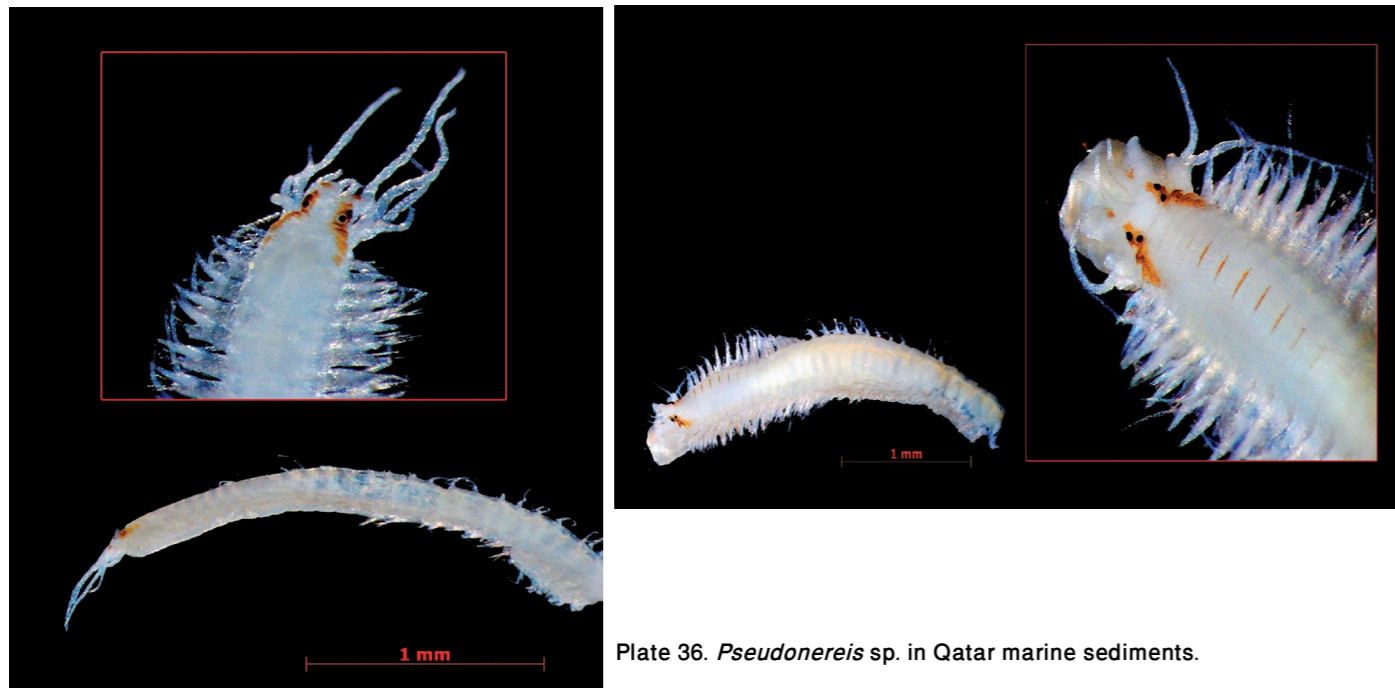


Plate 36. *Pseudonereis* sp. in Qatar marine sediments.

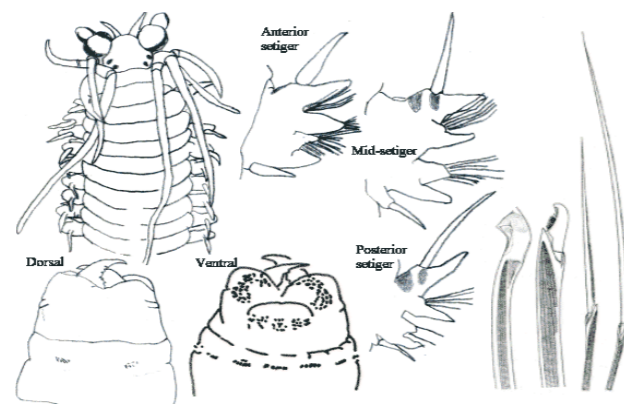
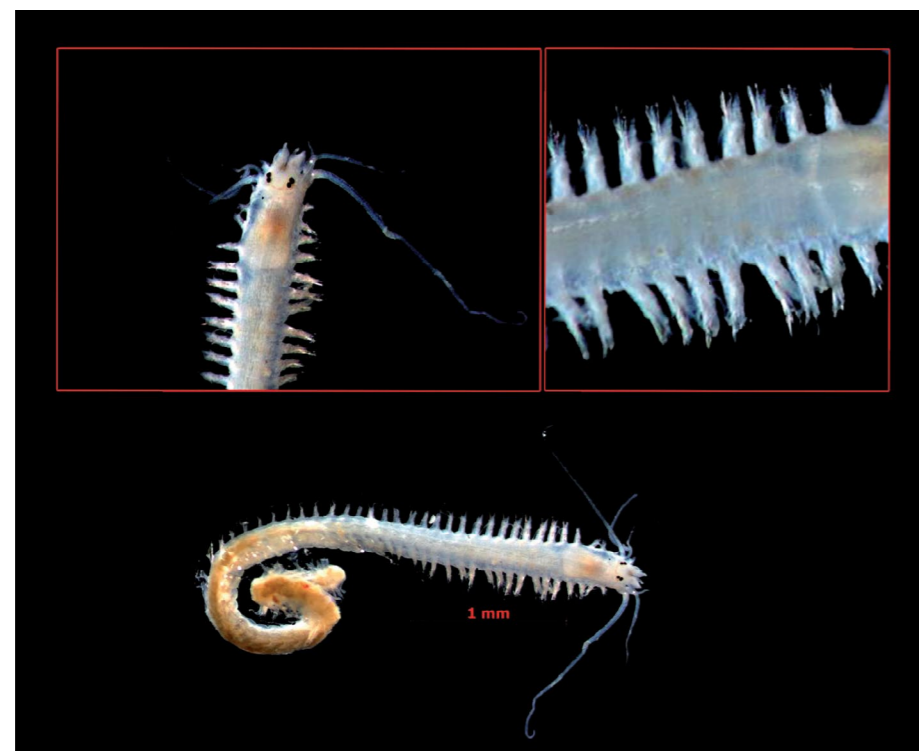
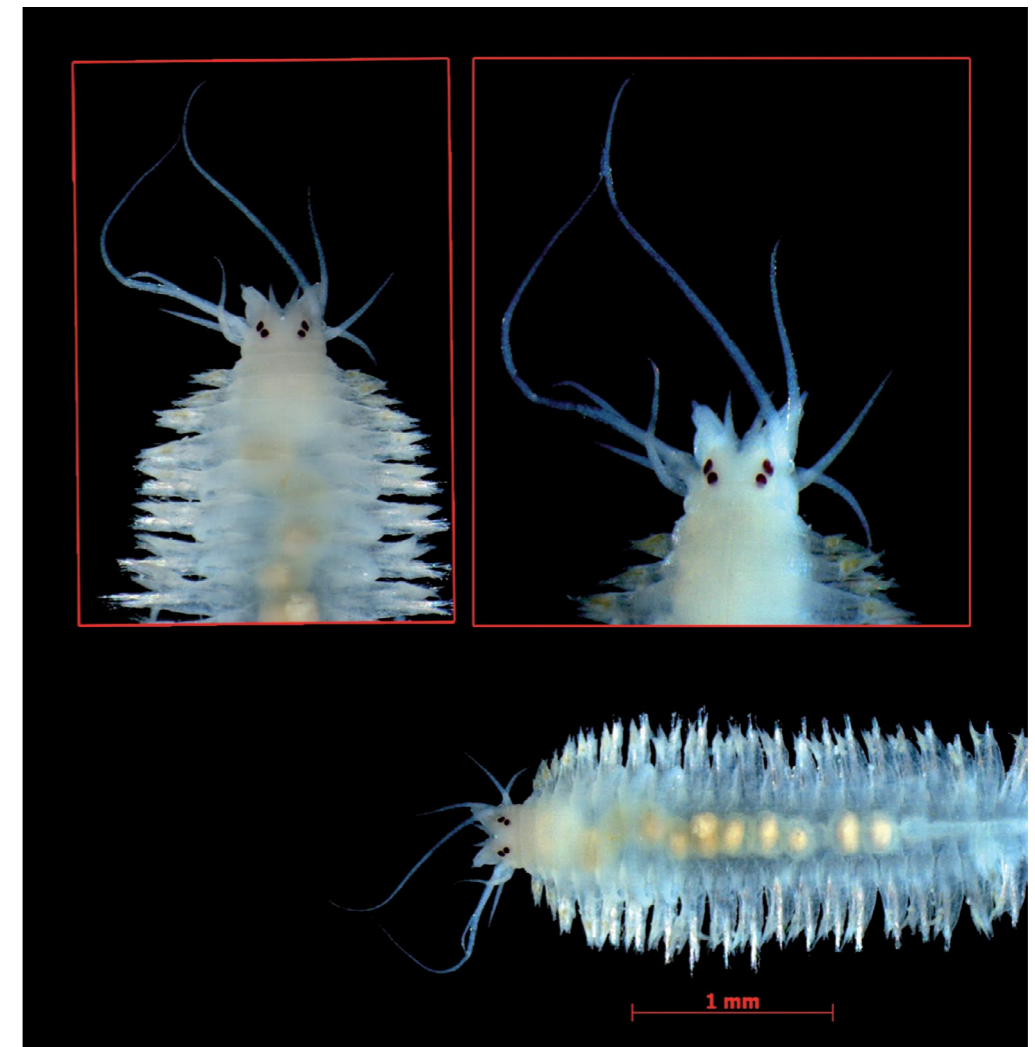


Figure 20. Diagnostic features in the genus *Platynereis*.  
Source: <http://www.nhm.ac.uk/>



*Platynereis* cf. *dumerilii* (Audouin & Milne Edwards, 1833)

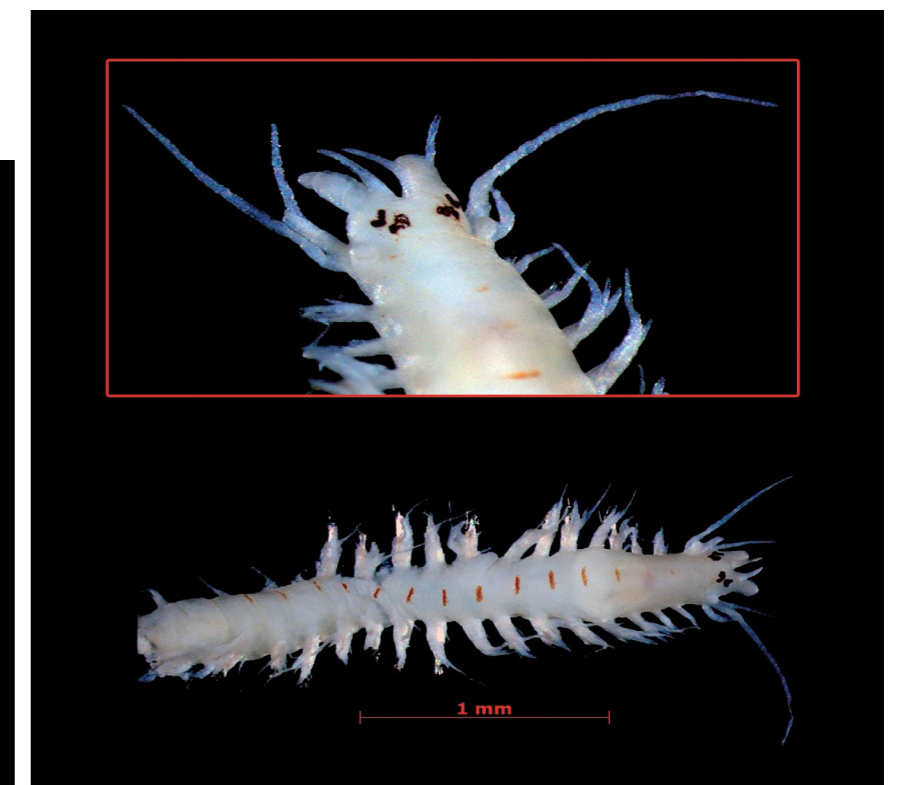
Plate 37A. *Platynereis* cf. *dumerilii* (Audouin & Milne Edwards, 1833) in Qatar marine sediments.



*Platynereis pulchella* Gravier, 1902



*Platynereis* sp.1



*Platynereis* sp.2

Plate 37B. *Platynereis* in Qatar marine sediments.

FAMILY: Glyceridae (Blood worms)

An errant polychaete with an elongate conical prostomium tipped by 2 pairs of short antennae. Eversible pharynx with 4 jaws in a cross. Parapodia either all uniramous or all biramous. Where present notosetae are all simple and neurosetae compound spinigers [Figure 21]. Seven species of the genus *Glycera* [ *G. alba* Fauvel, 1923 , *G. tessellata* Grube, 1863, *G. cf. macintosh* McIntosh, 1885, *G. cf. amboinensis* McIntosh, 1885, *G. sp.1*, *G. sp.2* and *G. sp.3* ], Two species of *Glycinde* [ *G. cf. gurjanovae* Uschakov & Wu, 1962 and *G. wireni* Arwidsson, 1899]. One species of *Goniadopsis* [ *G. incerta* Fauvel, 1932] and one species of *Hemipodus* { *Hemipodus* sp. } were found in Qatar marine sediments [Plate 38 (A,B,C,&D), 39, 40 and 41].

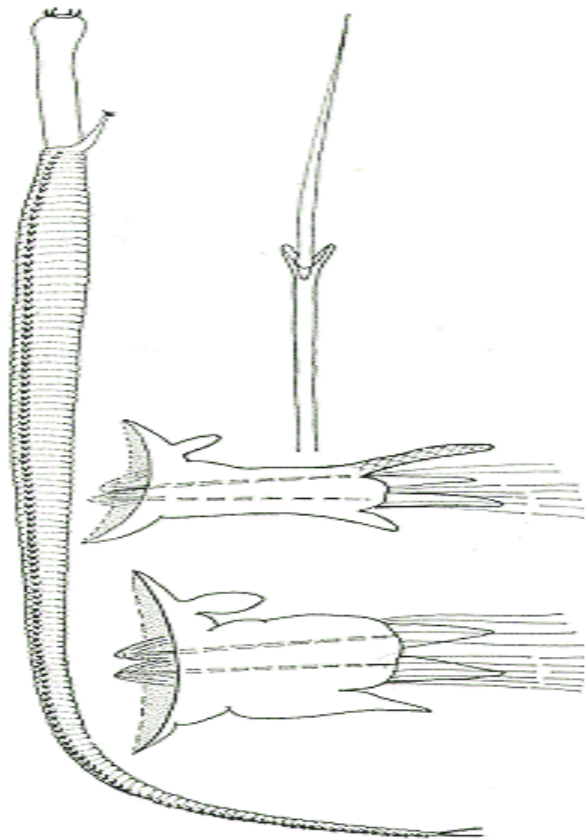


Figure 21. Diagnostic features in the Glyceridae  
Source: <http://www.nhm.ac.uk/>

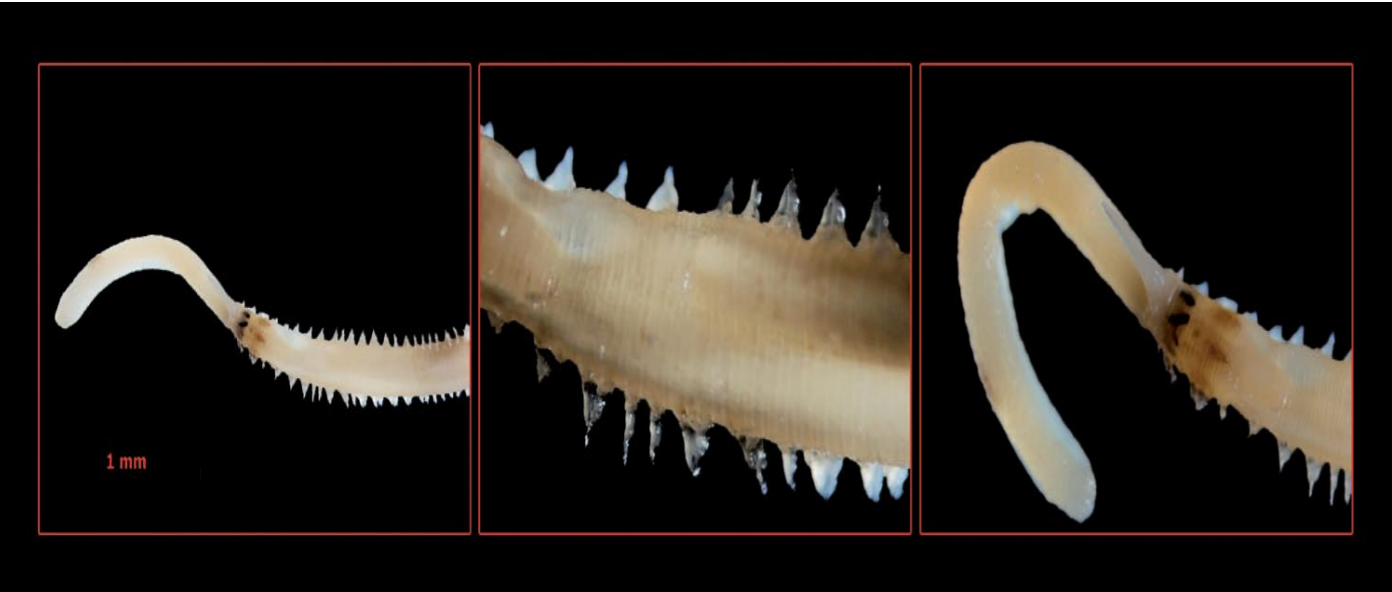
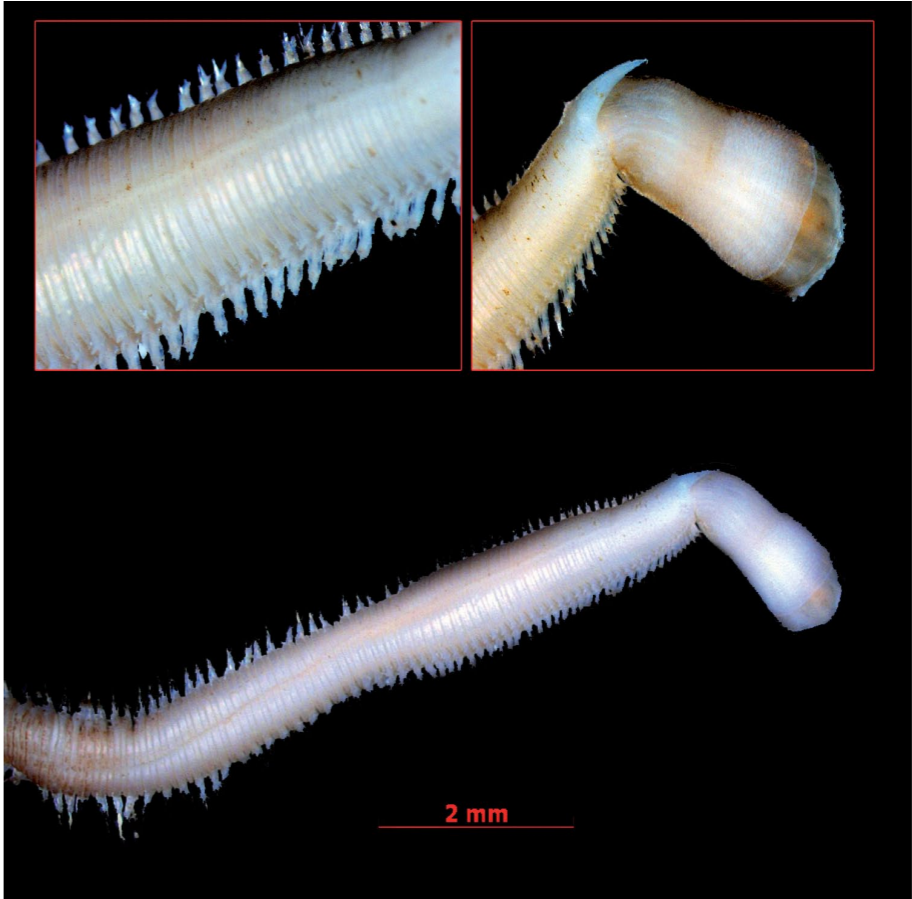
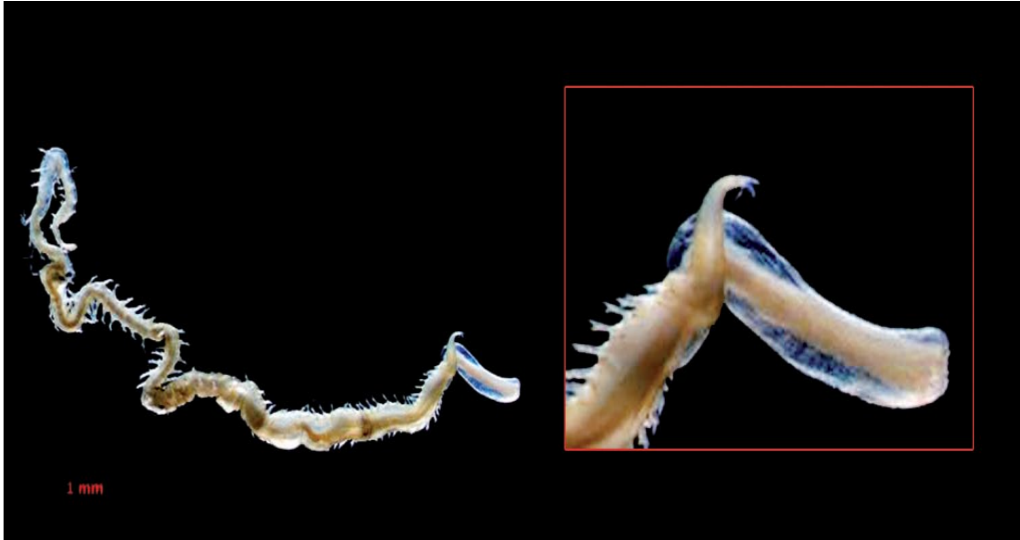
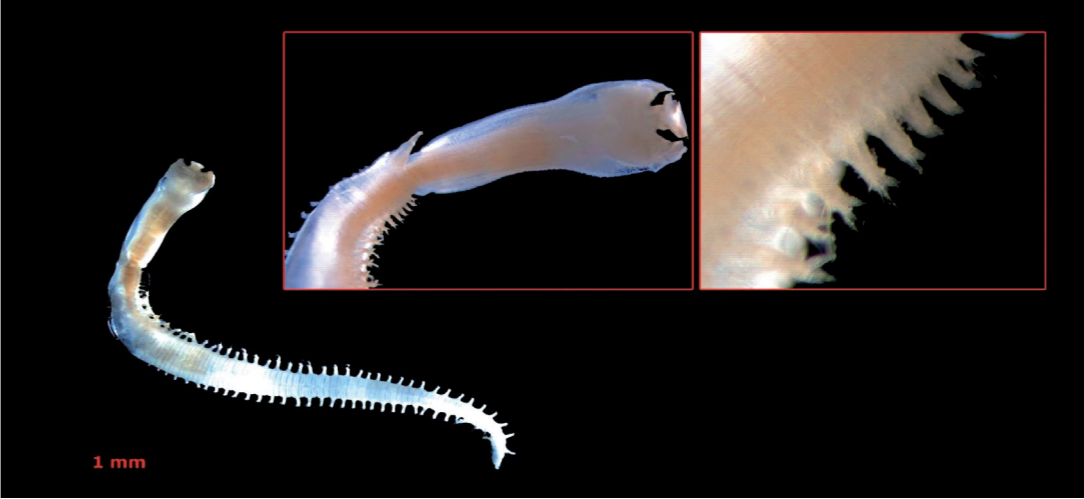
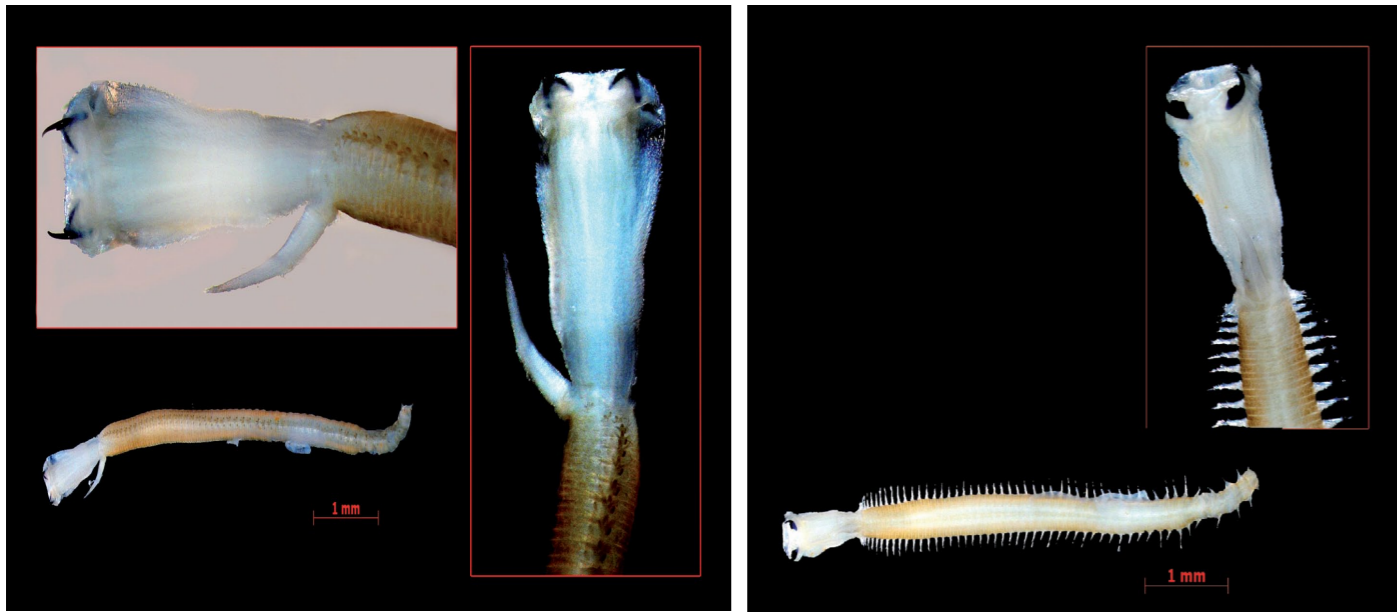


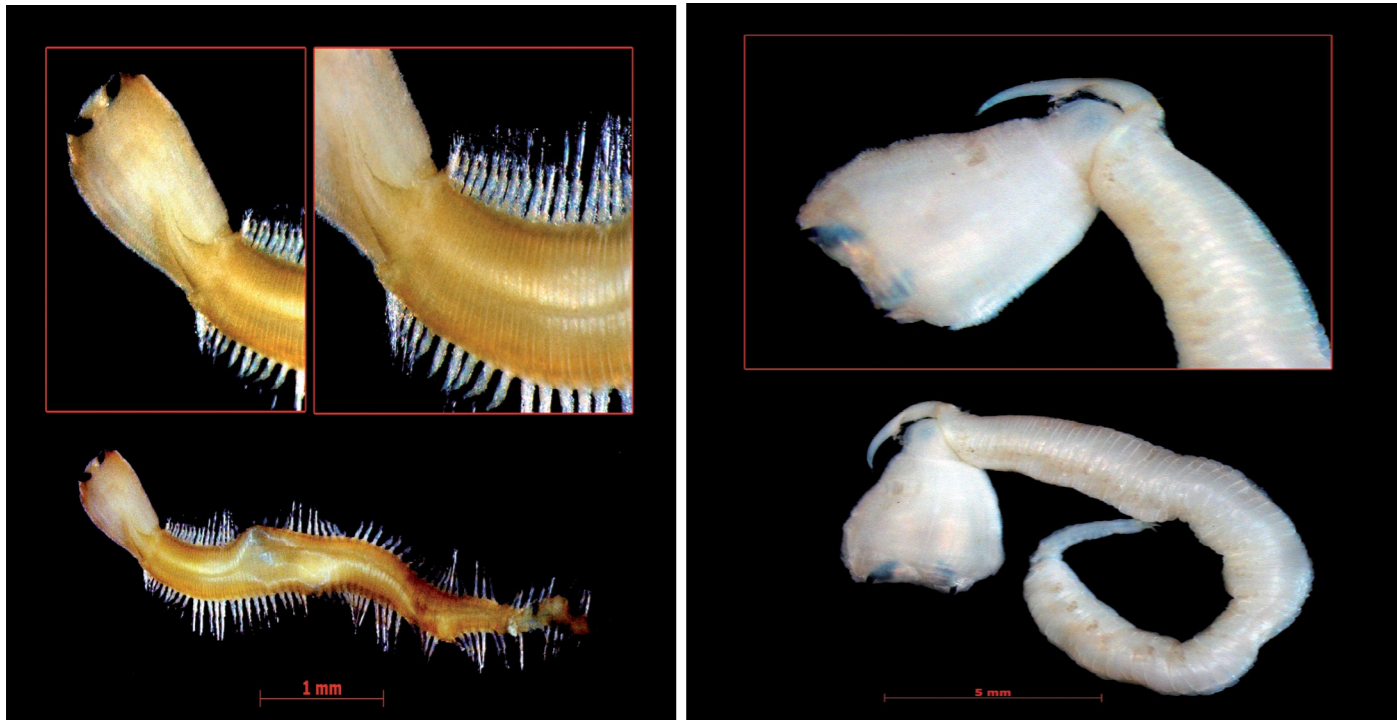
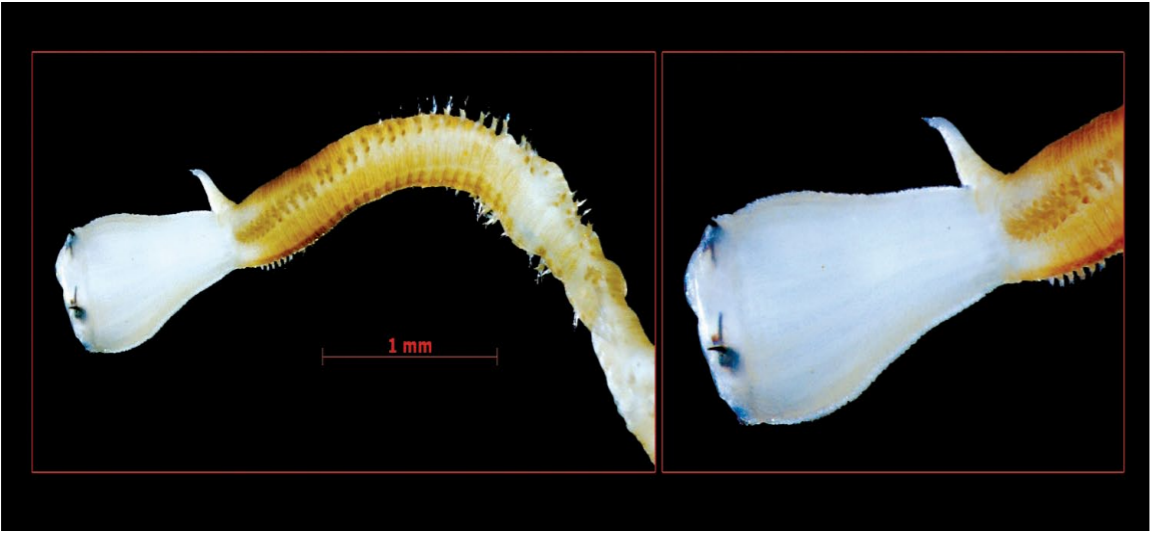
Plate 38A. *Glycera alba* Fauvel, 1923 in Qatar marine sediments.



*Glycera tessellata* Grube, 1863  
Plate 38B. *Glycera tessellata* Grube in Qatar marine sediments.

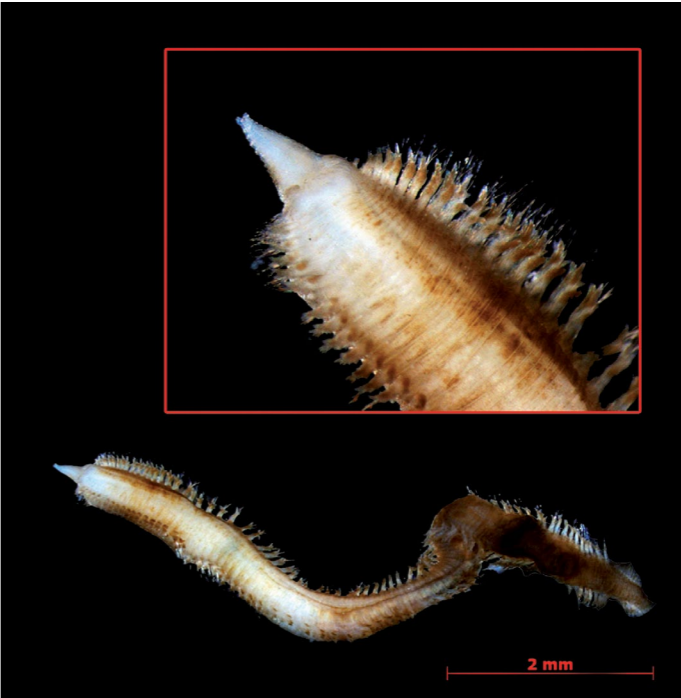
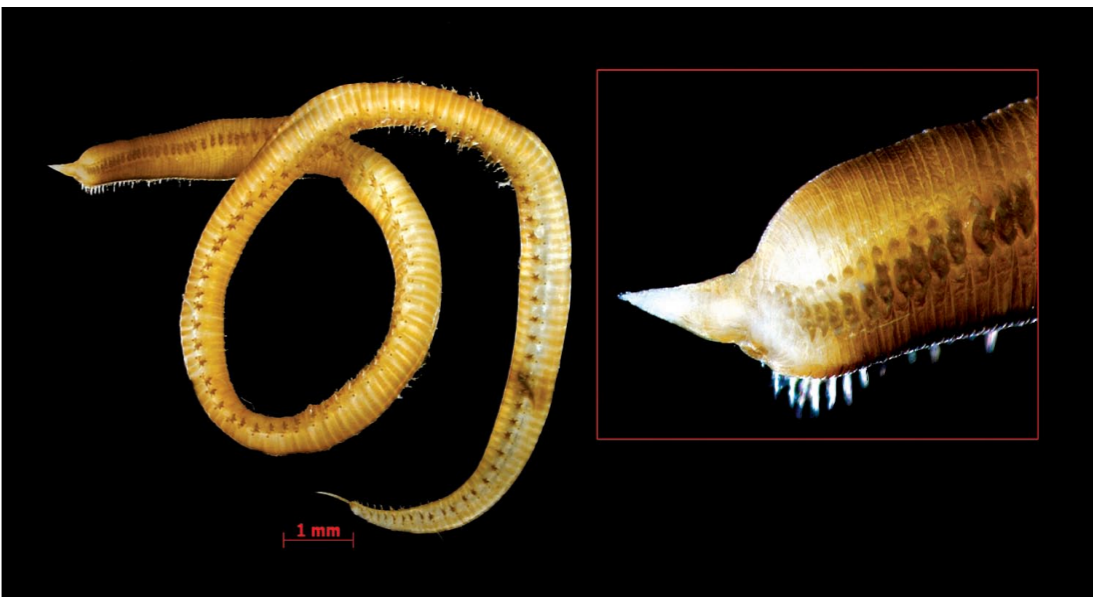


*Glycera cf. macintosh* McIntosh, 1885

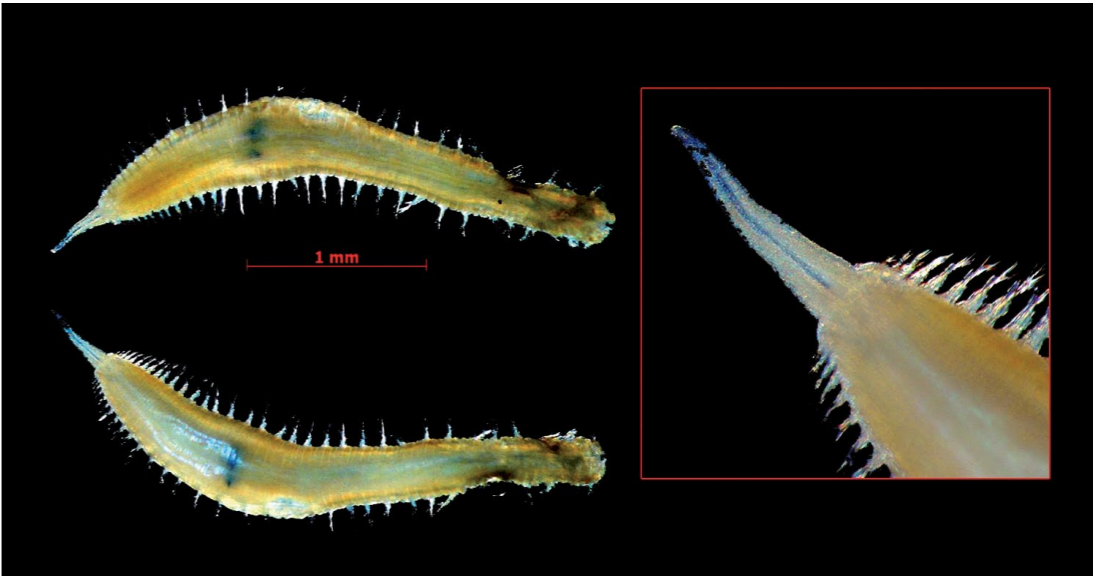


*Glycera cf. amboinensis* McIntosh, 1885

Plate 38C. *Glycera* species in Qatar marine sediments.

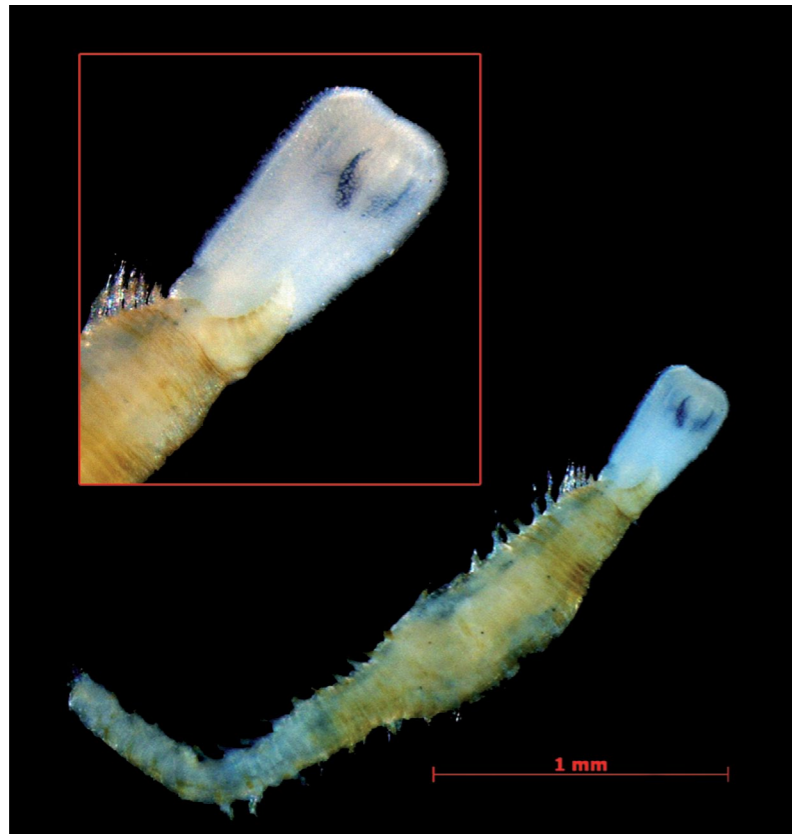


*Glycera* sp.1

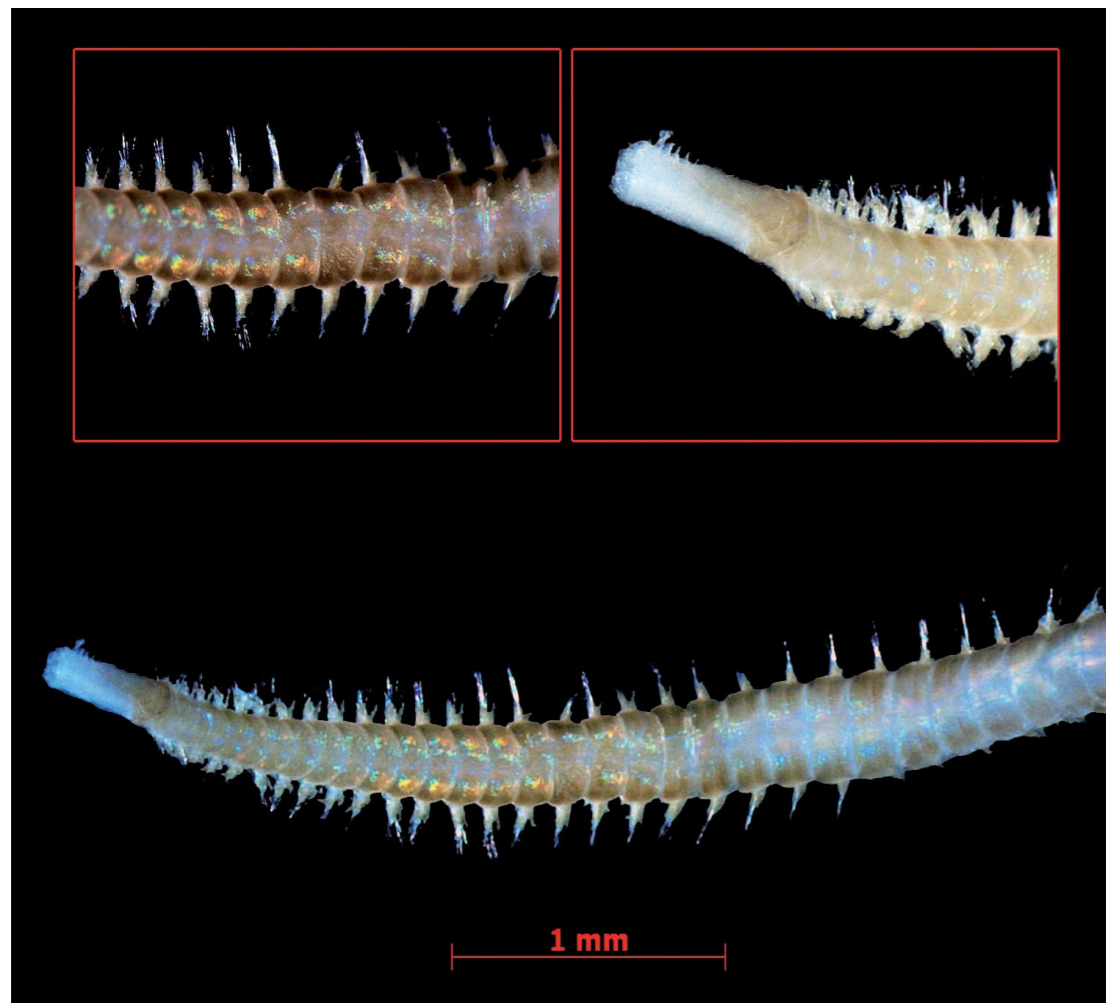


*Glycera* sp.2

Plate 38D. *Glycera* species in Qatar marine sediments.



*Glycera* sp.3



*Glycinde wireni* Arwidsson, 1899

Plate 39. *Glycera* and *Glycinde* species in Qatar marine sediments.

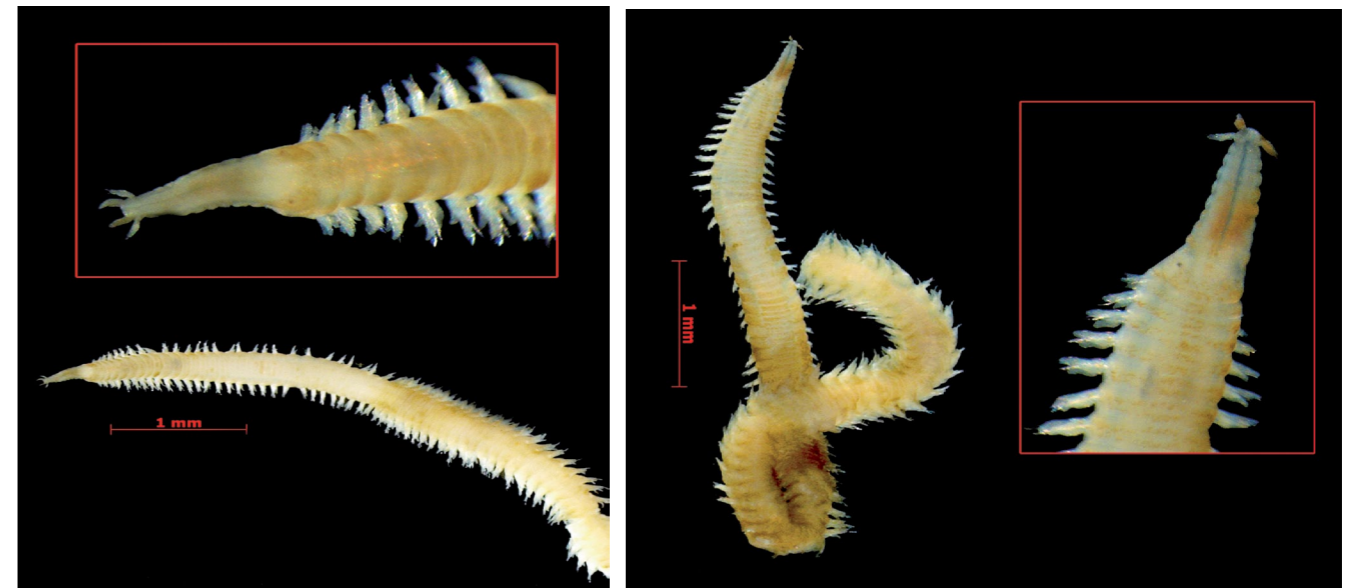
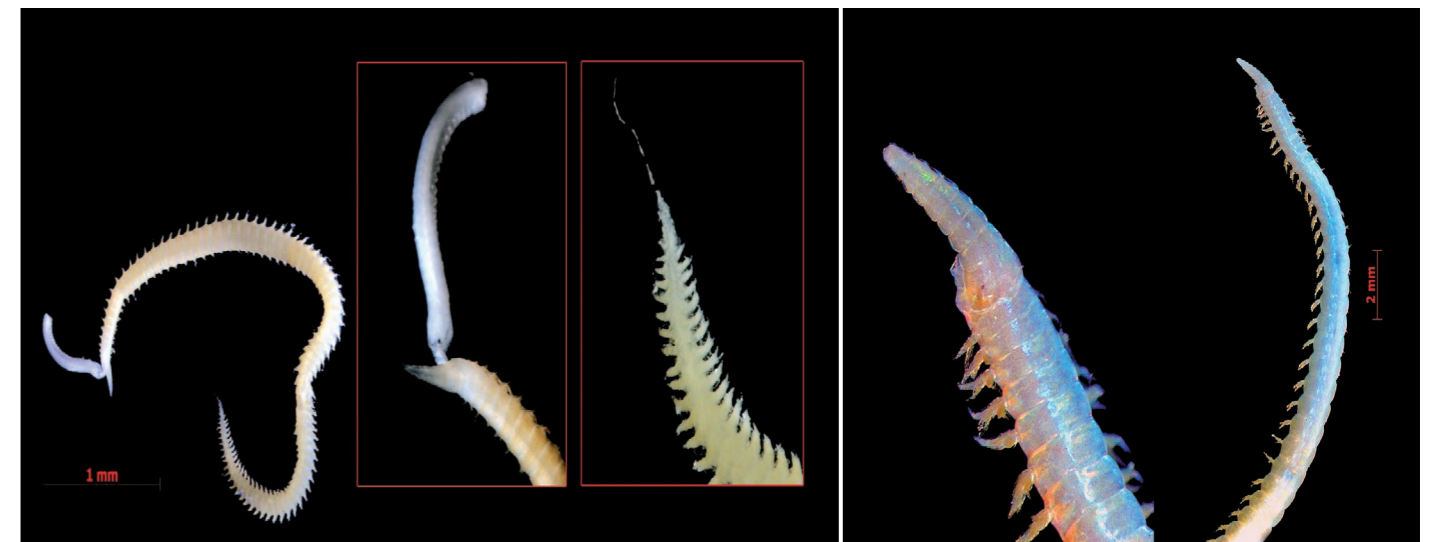


Plate 40. *Glycinde gurjanovae* Uschakov & Wu, 1962 in Qatar marine sediments.



*Goniadopsis incerta* Fauvel, 1932



*Hemipodus* sp.

Plate 41. *Goniadopsis* and *Hemipodus* in Qatar marine sediments.

**FAMILY: Goniadidae**

Glycerid-like with anterior parapodia uniramous and posterior parapodia biramous, multiple jaw- pieces at crown of proboscis. Chevron structures may be present on proboscis. Pharyngeal papillae usually prominent [Figure 22]. Four species [*Goniada emerita* Audouin & Milne Edwards, 1833, *Goniada maculata* Oersted, 1843, *Goniada* sp.1 and *Goniada* sp.2] were encountered in Qatar marine sediments (Plate 42 A,B & C).

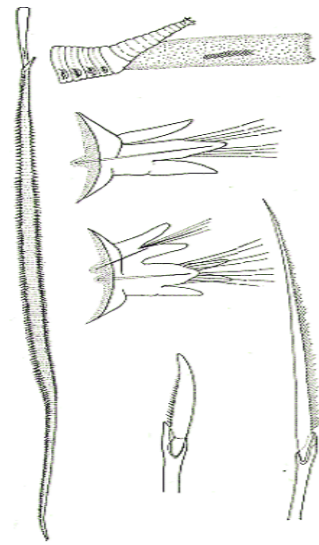


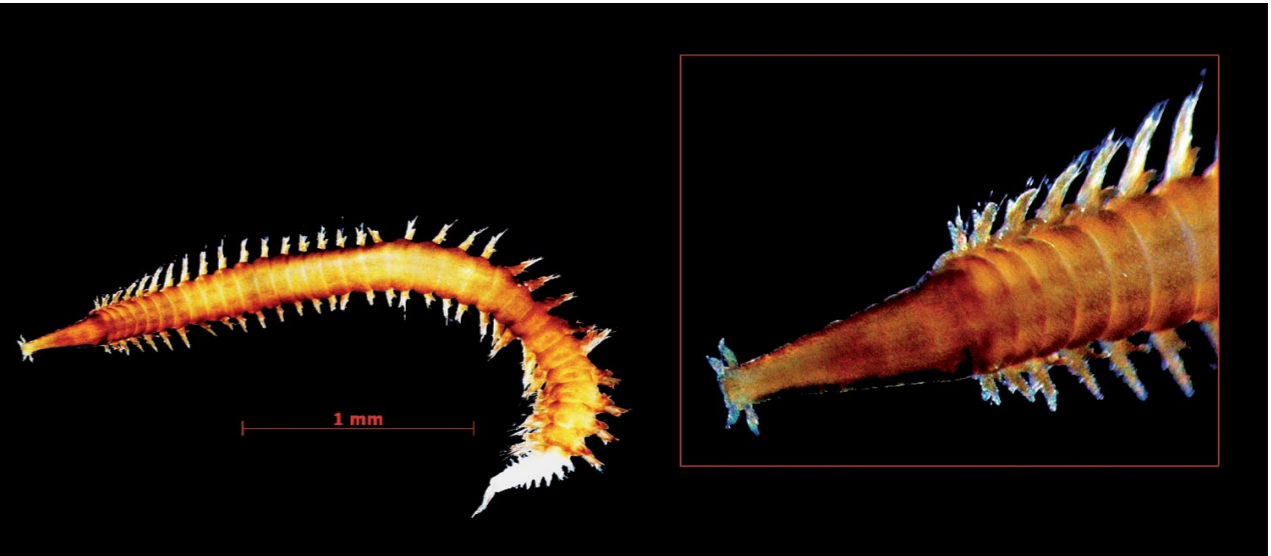
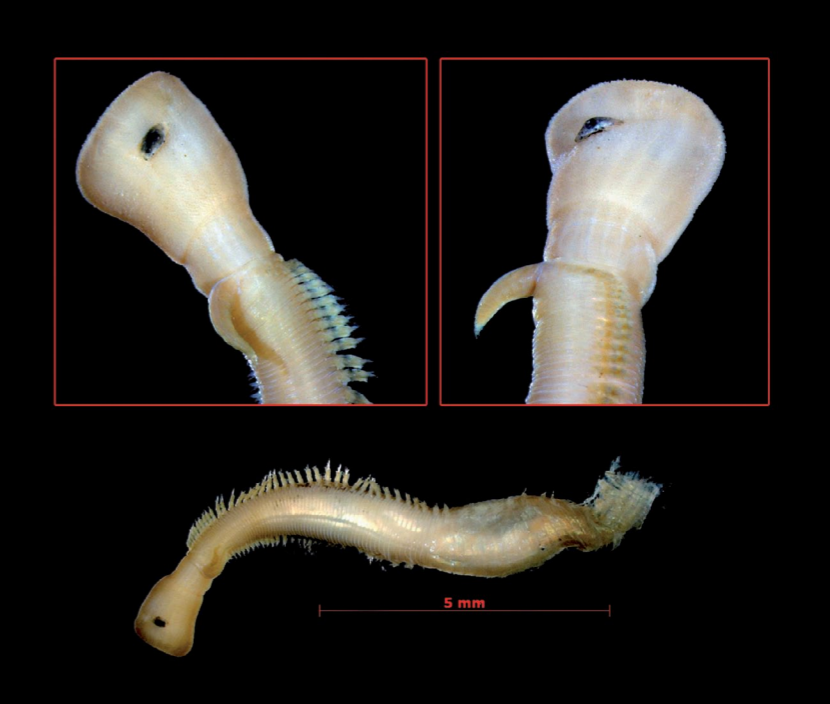
Figure 22. Diagnostic features in the Goniadidae.  
Source: <http://www.nhm.ac.uk/>



Plate 42A. *Goniada emerita* Audouin & Milne Edwards, 1833 species in Qatar marine sediments.

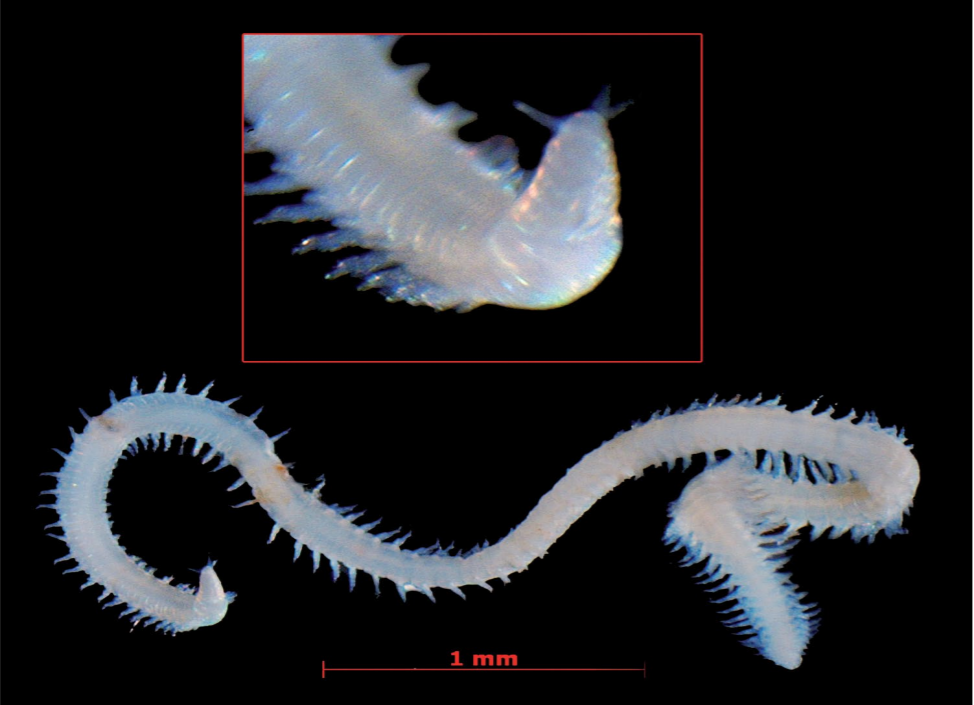


*Goniada emerita* Audouin & Milne Edwards, 1833

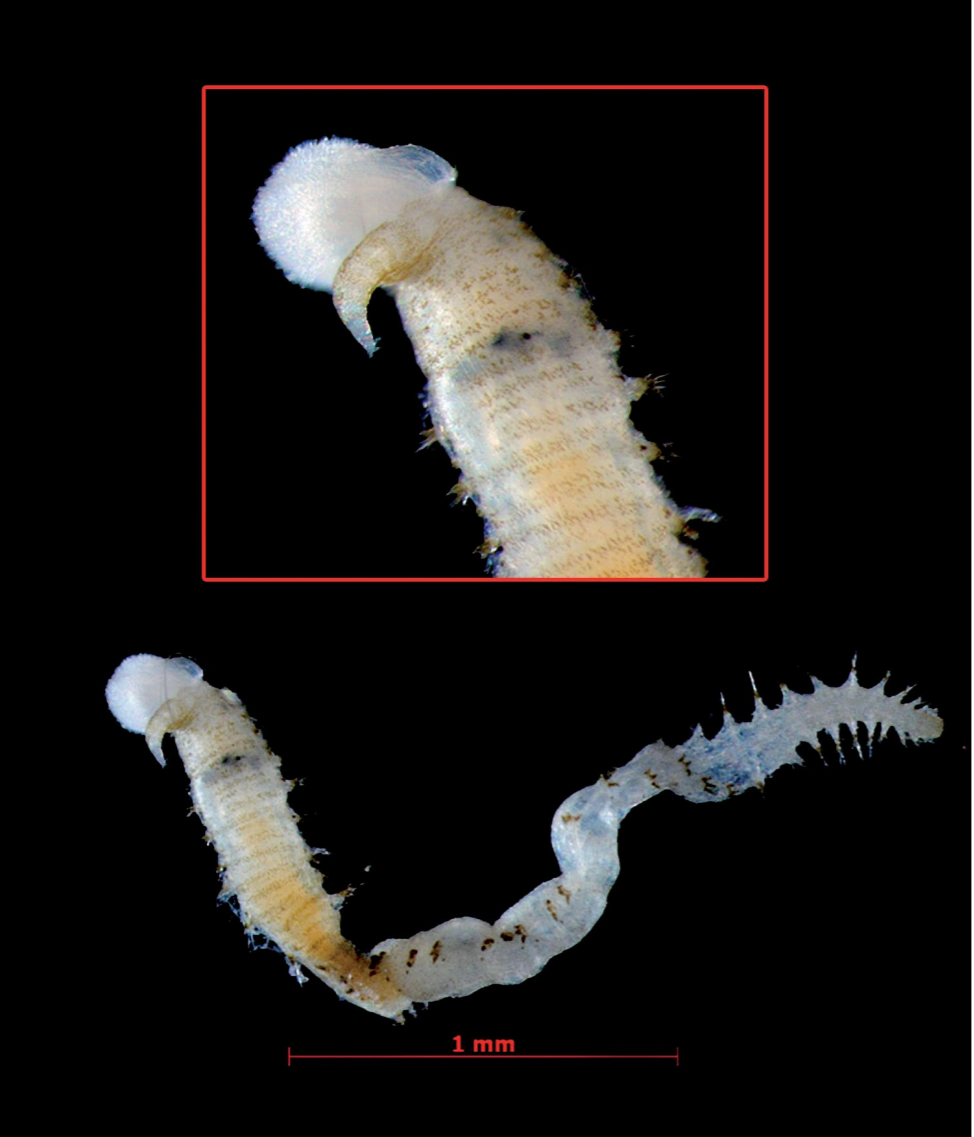


*Goniada maculata* Oersted, 1843

Plate 42B. *Goniada* species in Qatar marine sediments.



*Goniada* sp.1



*Goniada* sp.2

Plate 42C. *Goniada* species in Qatar marine sediments.

**FAMILY: Eunicidae** (Collar worms)

At least one but as many as 5 occipital antennae are present; No frontal antennae. One pair tentacular cirri in some species. Eversible pharynx with 5 pairs of maxillae. Parapodia have a reduced notopodium which might only be represented by a gill, dorsal cirrus and possibly a notoaciculum. Setae may include the following: simple winged, simple serrated, sub-acicular hooks, compound falcigers and compound spinigers. Twenty three species of the Collar worms genera *Eunice* (11 ), *Marphysa* (9), *Lysidice* (2) and *Nematonereis* (1) were obtained in Qatar marine sediments [Figures 23 A, B, C, D & E] and Plates [43, 44 (A,B,C&D),45, 46 (A&B),47, 48 and 49].

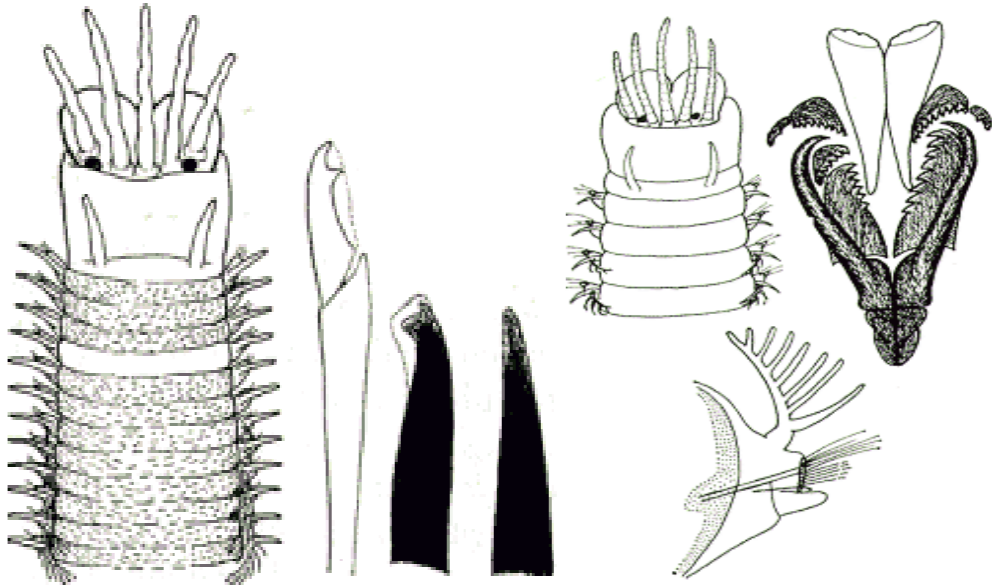


Figure 23A. Diagnostic features in the Eunicidae.  
Source:<http://www.nhm.ac.uk/>

**Table 5.** Main diagnostic charactes in the Collar worm:

Organs	<i>Eunice</i>	<i>Marphysa</i>	<i>Lysidice</i>	<i>Nematoneries</i>
Peristomia	5 occiptical tentacles. Tentacular cirri present.	5 tentacles, Tentacular cirri present.	3 antennae, No peristomial cirri.	1 antenna. 2 to 4 eyes. No peristomial cirri.
Branchiae (Gills)	+	+	–	–
Setae and Hooks	Setae limbate, pectinate; compound falcigers and subacicular hooks.	compound falcigers and subacicular hooks.	Blades of compound chaetae hooked.	Capillaries, comb-like setae, compound falcigers and subacicular hooks.

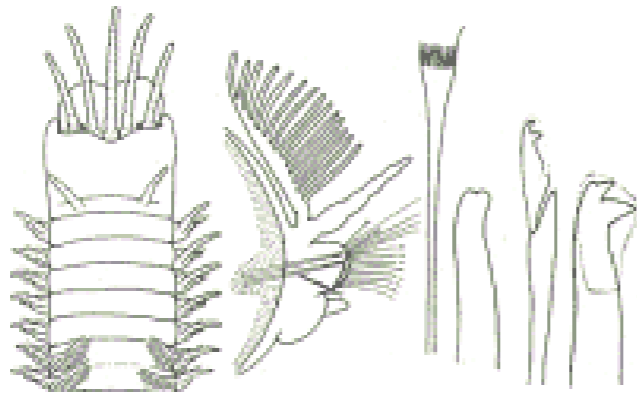


Figure 23B. Diagnostic features in the genus *Eunice*.

Source: <http://www.nhm.ac.uk/>



*Eunice siciliensis* (Grube, 1840)

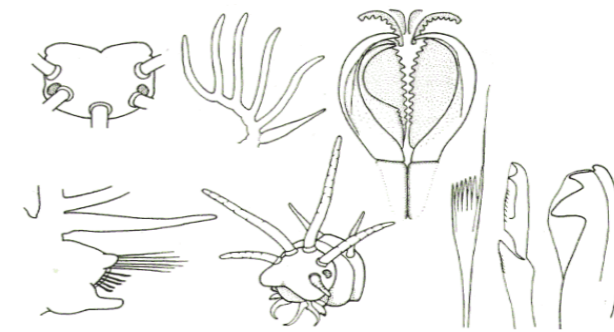


Figure 23C. Diagnostic features in the genus *Eunice*.

Source: <http://www.nhm.ac.uk/>

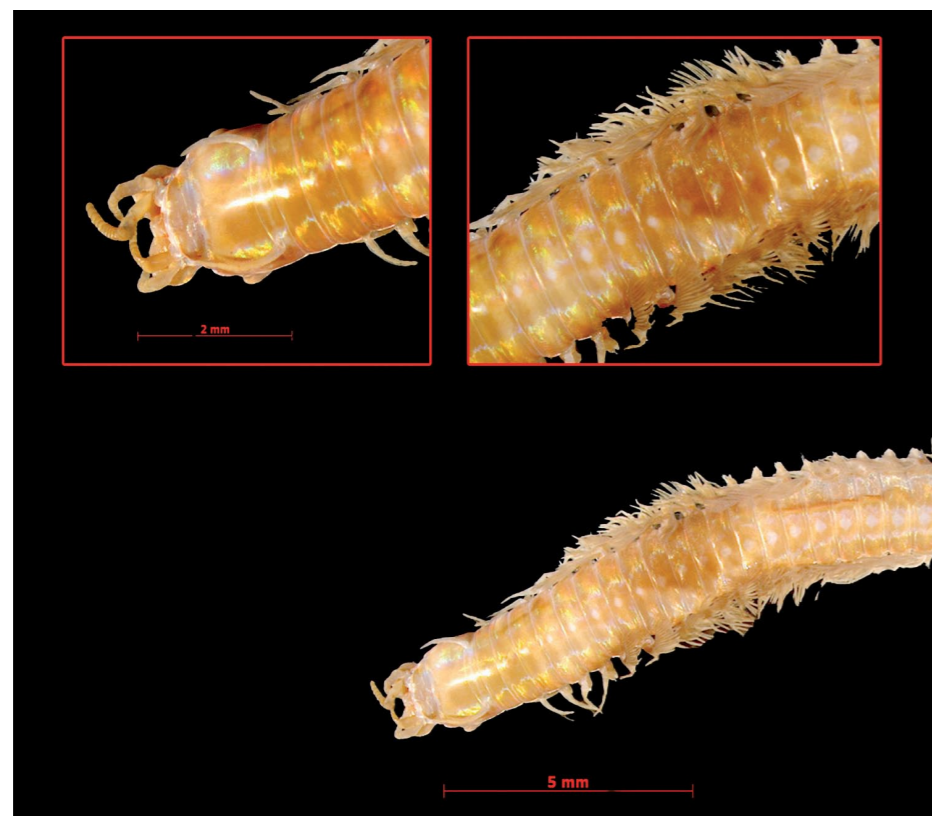


Plate 43 *Eunice antennata* (Savigny, 1820) in Qatar marine sediments.

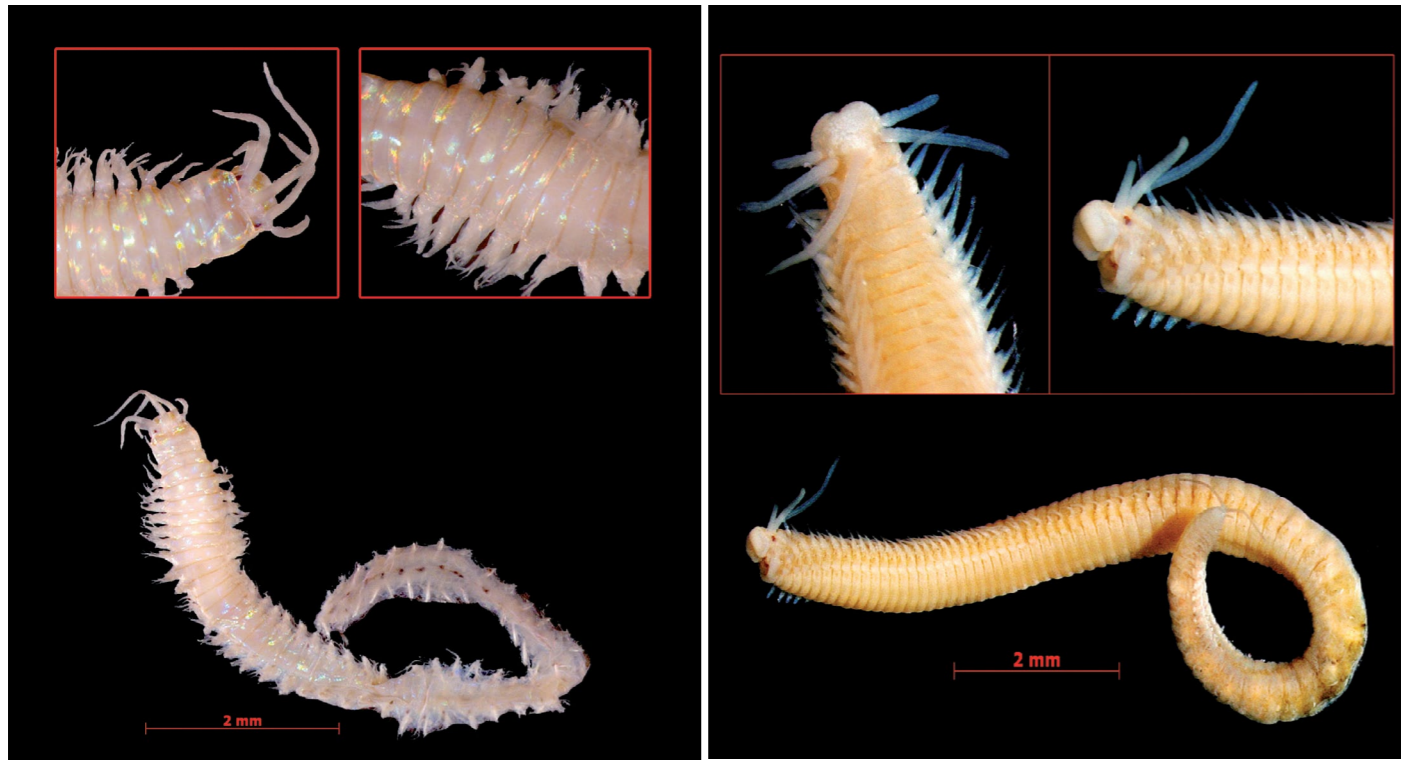


*Eunice* cf. *marovoi* Gibbs, 1971

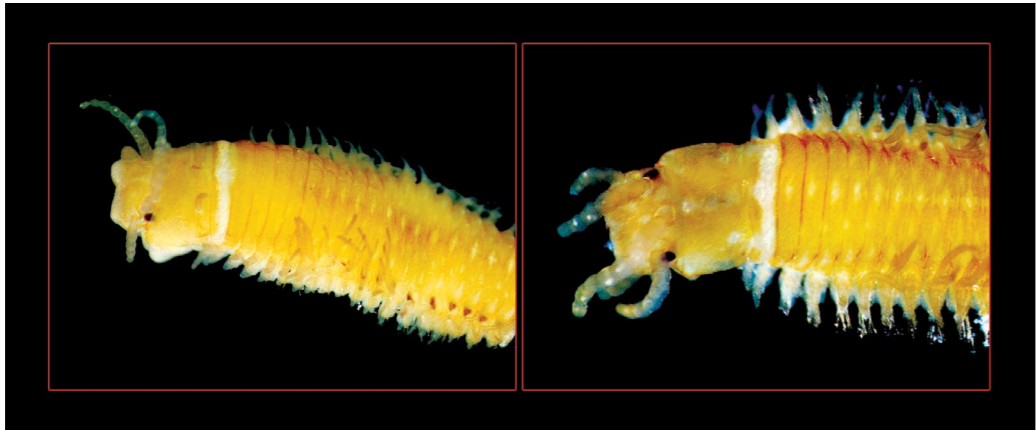


*Eunice* cf. (*Eunice*) *pennata* (O.F. Müller, 1776)

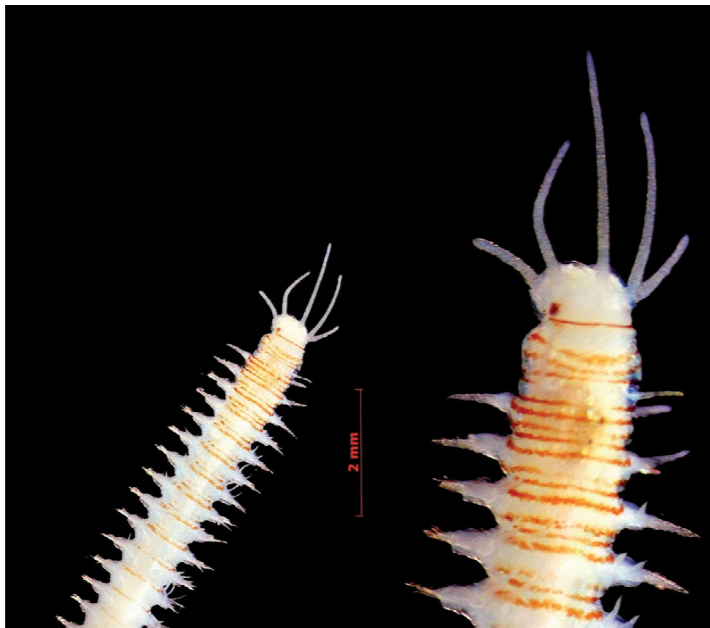
Plate 44A. *Eunice* species in Qatar marine sediments.



*Eunice indica* Kinberg, 1865

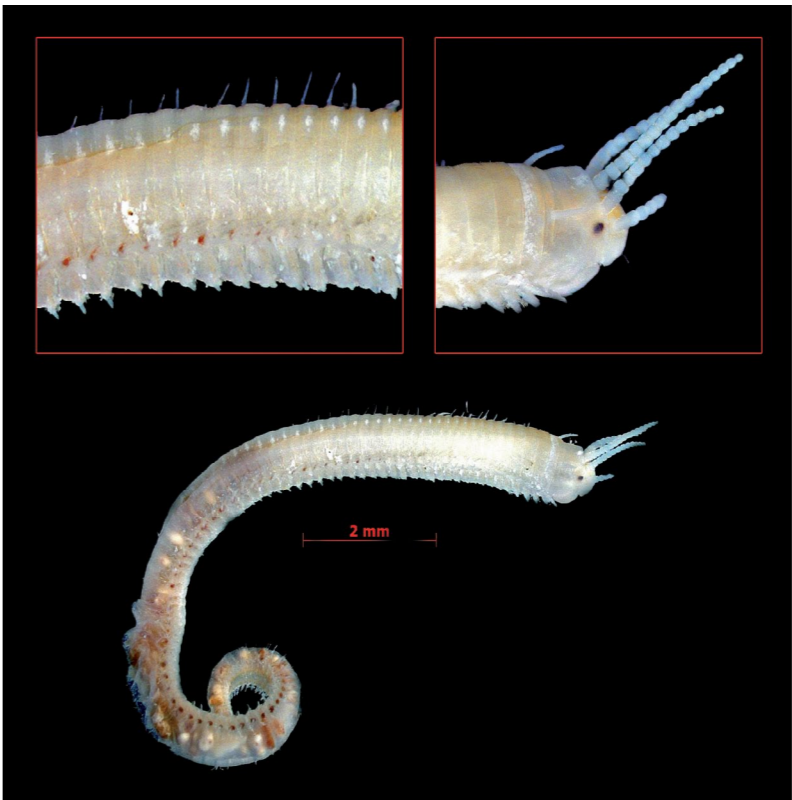


*Eunice aphroditois* (Pallas, 1788)



*Eunice* sp.1

Plate 44B. *Eunice* species in Qatar marine sediments.



*Eunice* sp.2



*Eunice* sp.3



*Eunice* sp.4

Plate 44C. *Eunice* species in Qatar marine sediments.



*Eunice* sp.5

Plate 44D. *Eunice* species in Qatar marine sediments.

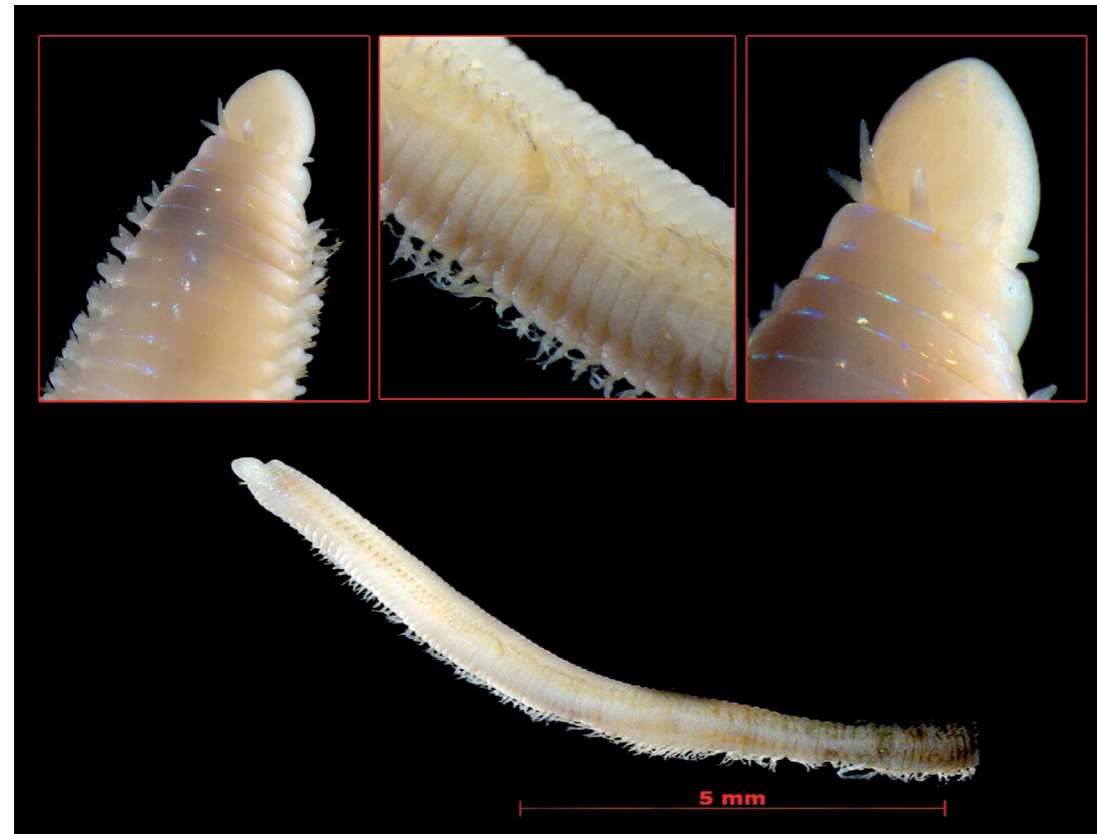
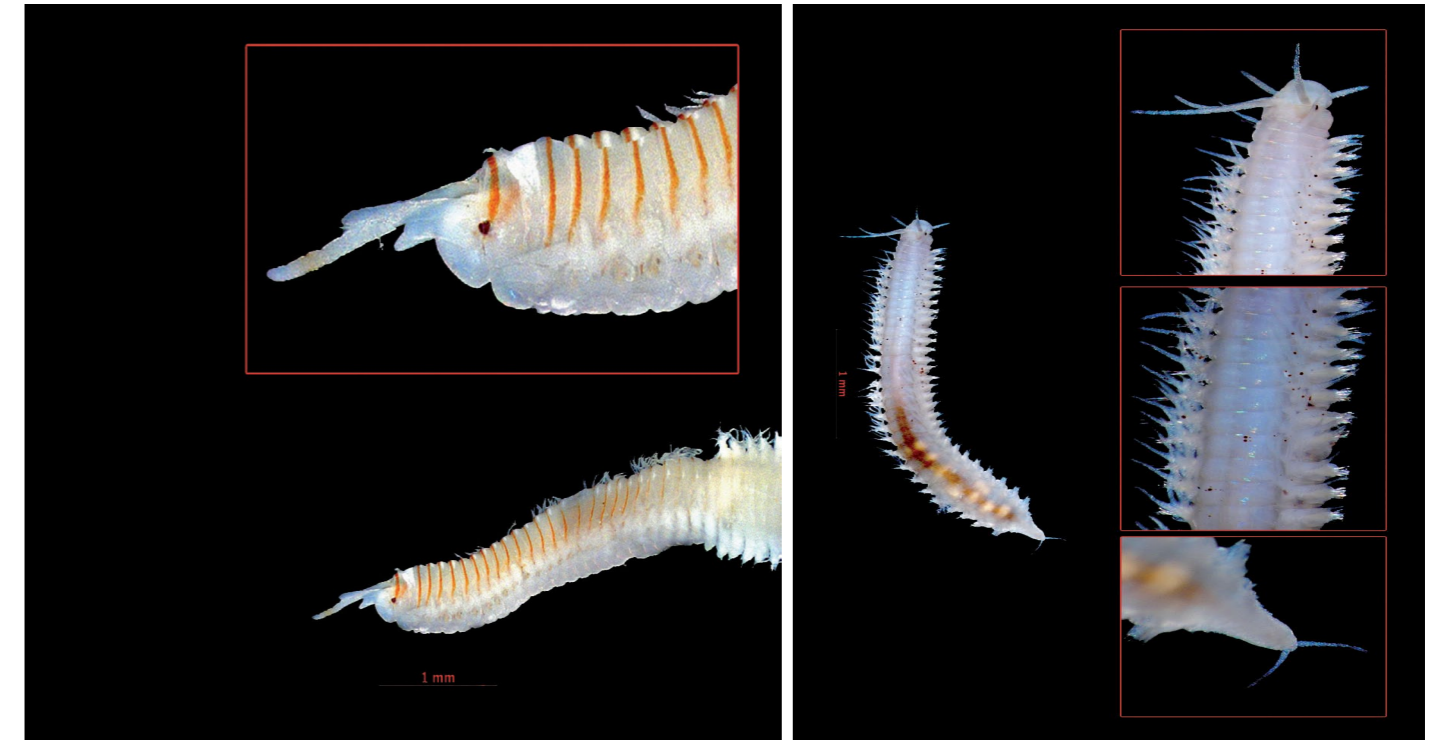


Plate 45. *Marphysa belli* (Audouin & Edwards, 1833) in Qatar marine sediments.



*Marphysa* cf. *macintoshi* Crossland, 1903

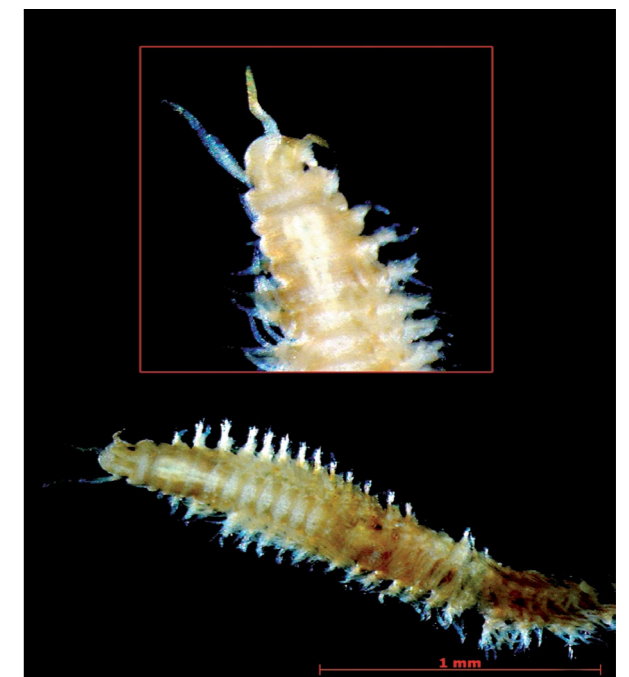


*Marphysa norvegica* (Linnaeus, 1767)

*Marphysa* cf. *orstedii*

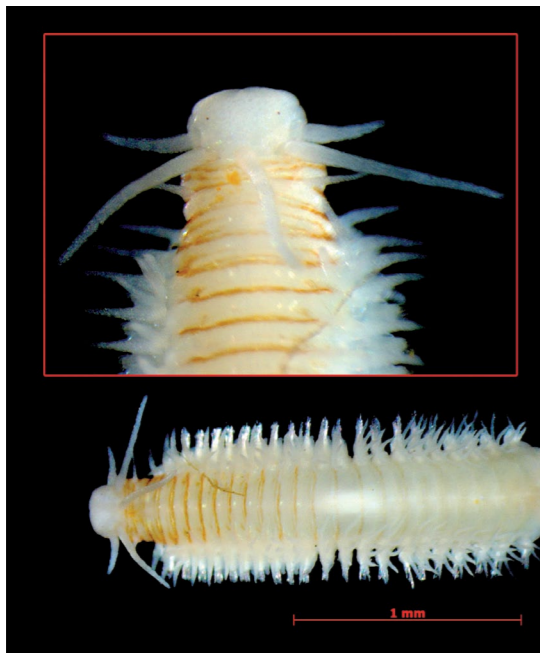


*Marphysa vittata* (Delle Chiaje, 1828)

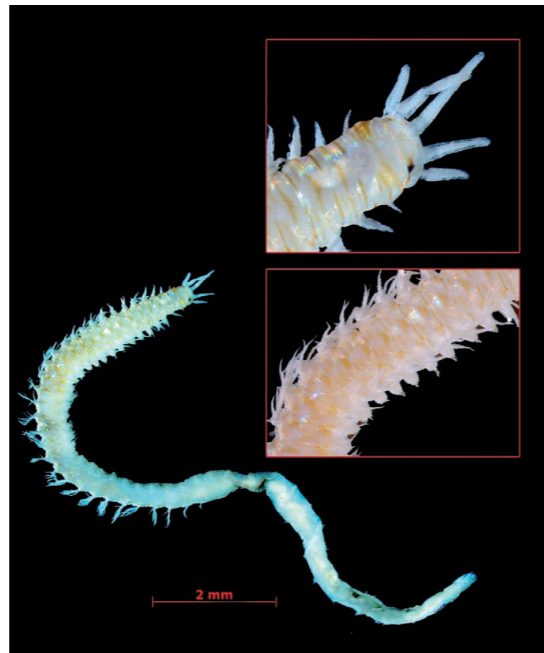


*Marphysa (Macduffia) bonhardi* (McIntosh, 1885)

Plate 46A. *Marphysa* species in Qatar marine sediments.



*Marphysa* sp.1



*Marphysa* sp.2



*Marphysa* sp.3

Plate 46B. *Marphysa* species in Qatar marine sediments.

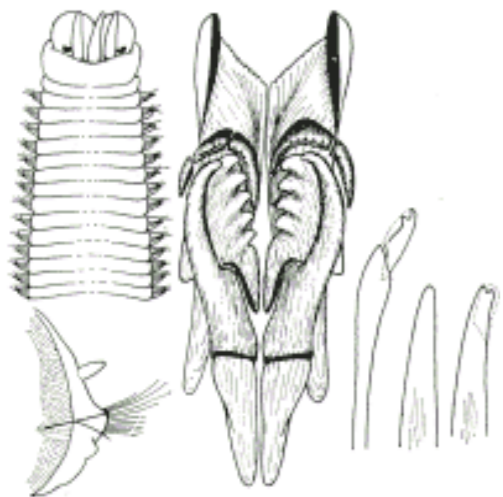


Figure 23D. Diagnostic features in the genus *Lysidice*.  
Source: <http://www.nhm.ac.uk/>



*Lysidice ninetta* Audouin & Milne-Edwards, 1833.

Plate 47. *Lysidice ninetta* in Qatar marine sediments.

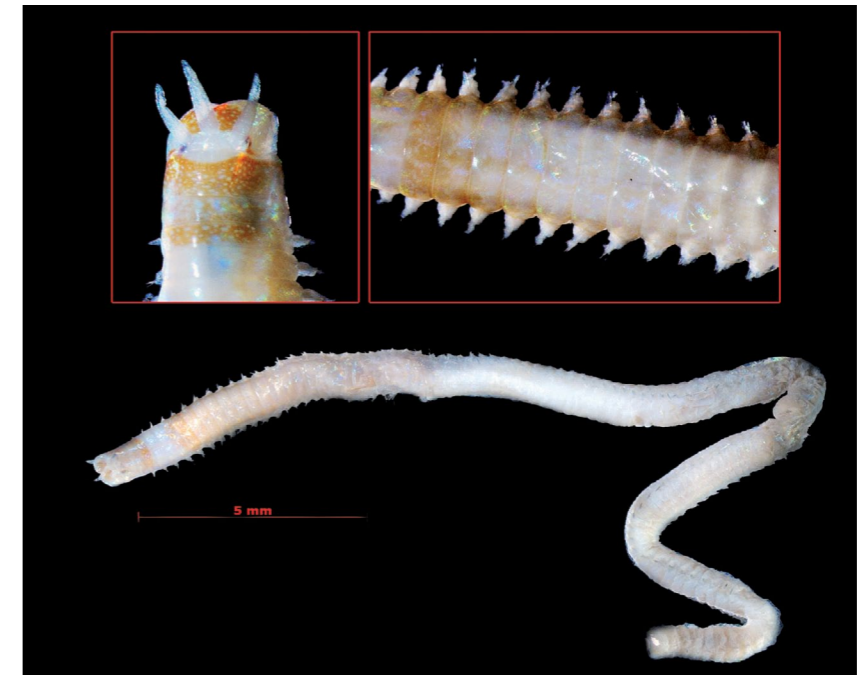


Plate 48 *Lysidice collaris* Grube, 1870 Qatar marine sediments.

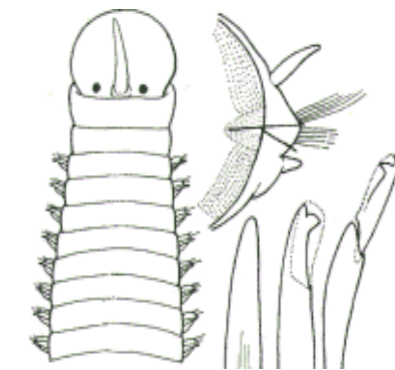
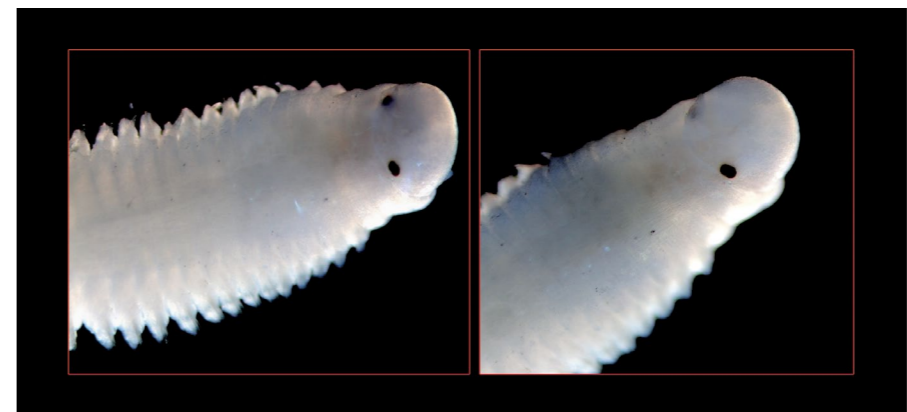


Figure 23 E. Diagnostic features in the genus *Nematoneis*.  
Source: <http://www.nhm.ac.uk/>



*Nematoneis unicornis* Schmarda, 1861

Plate 49. *Nematoneis* in Qatar marine sediments.

Family: Dorvilleidae

The Dorvilleidae belong to the Eunicida group [multiple jaw elements and 2 pairs of antennae]. Some species have well developed palps. Although parapodia are biramous, the notopodia are usually reduced. Neurosetae may be simple with serrations, compound falcigers or furcate [Figure 24]. Five species were encountered: *Dorvillea* sp. [Plate 50], *Schistomeringos* cf. *longicornis* Jumars, 1974 and *Schistomeringos rudolphi* (Delle Chiaje, 1828). [Plate 51], *Protodorvillea egena* (Ehlers, 1913), *Protodorvillea* sp. [Plate 52] were obtained in Qatar marine sediments.

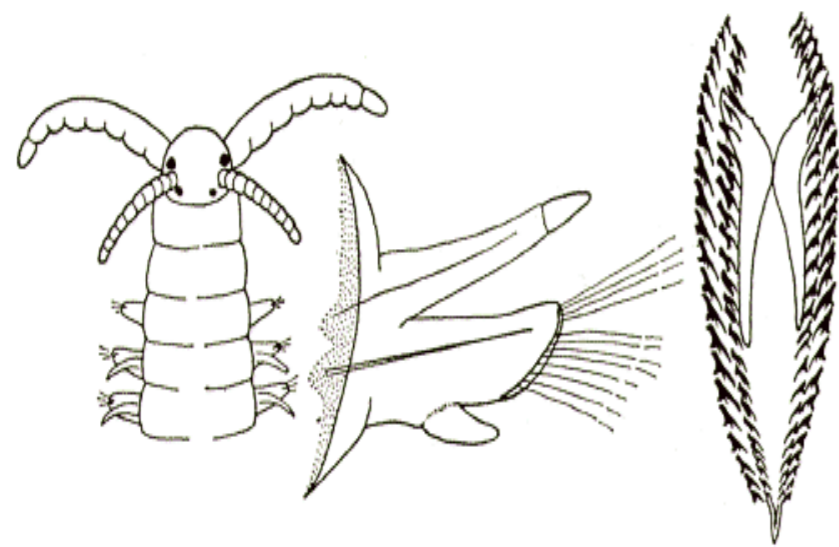


Figure 24. Diagnostic features in the Dorvilleidae.  
Source: <http://www.nhm.ac.uk/>, <http://personal.cityu.edu.hk/~bhworm/sedentary/photo.htm>

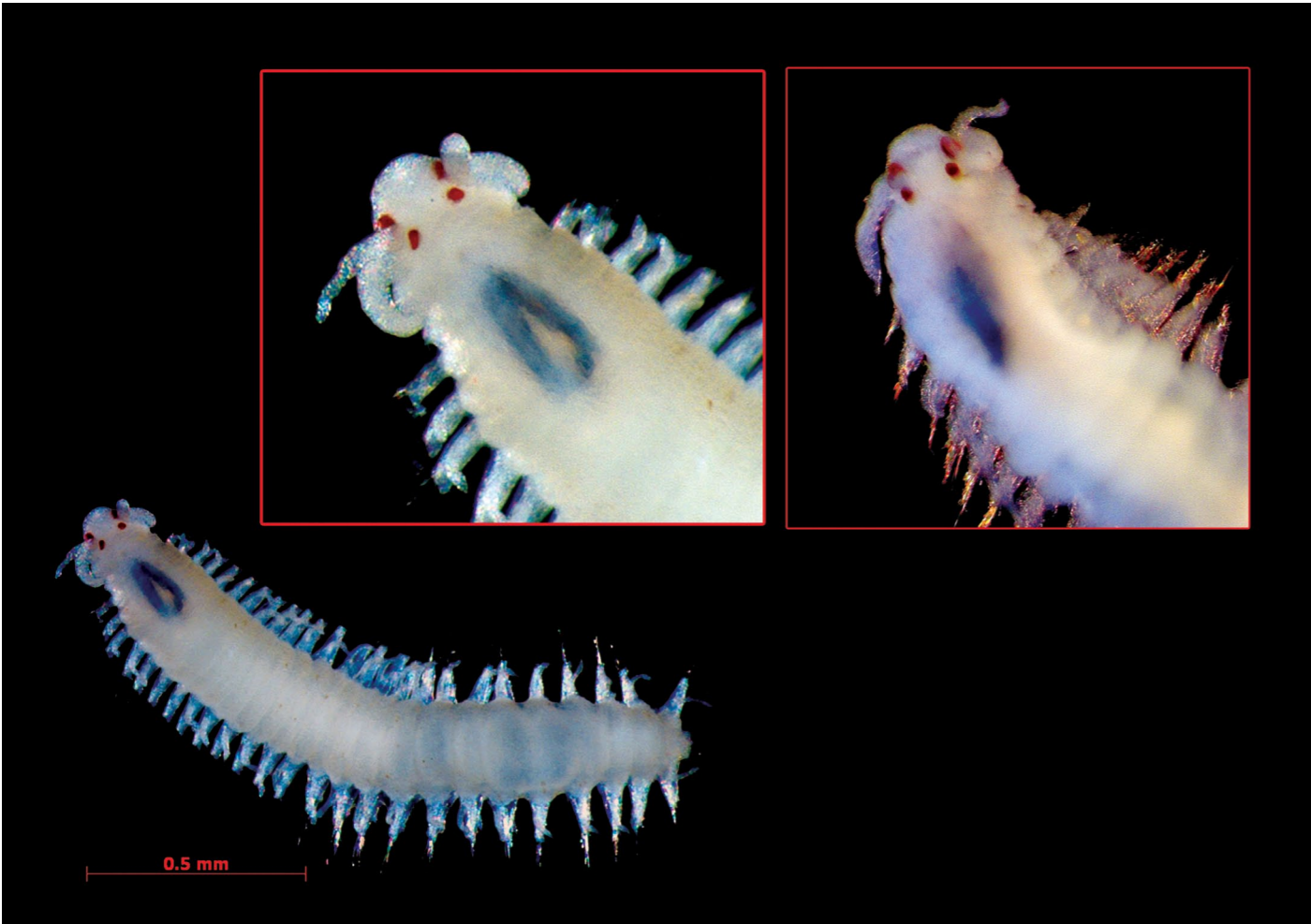
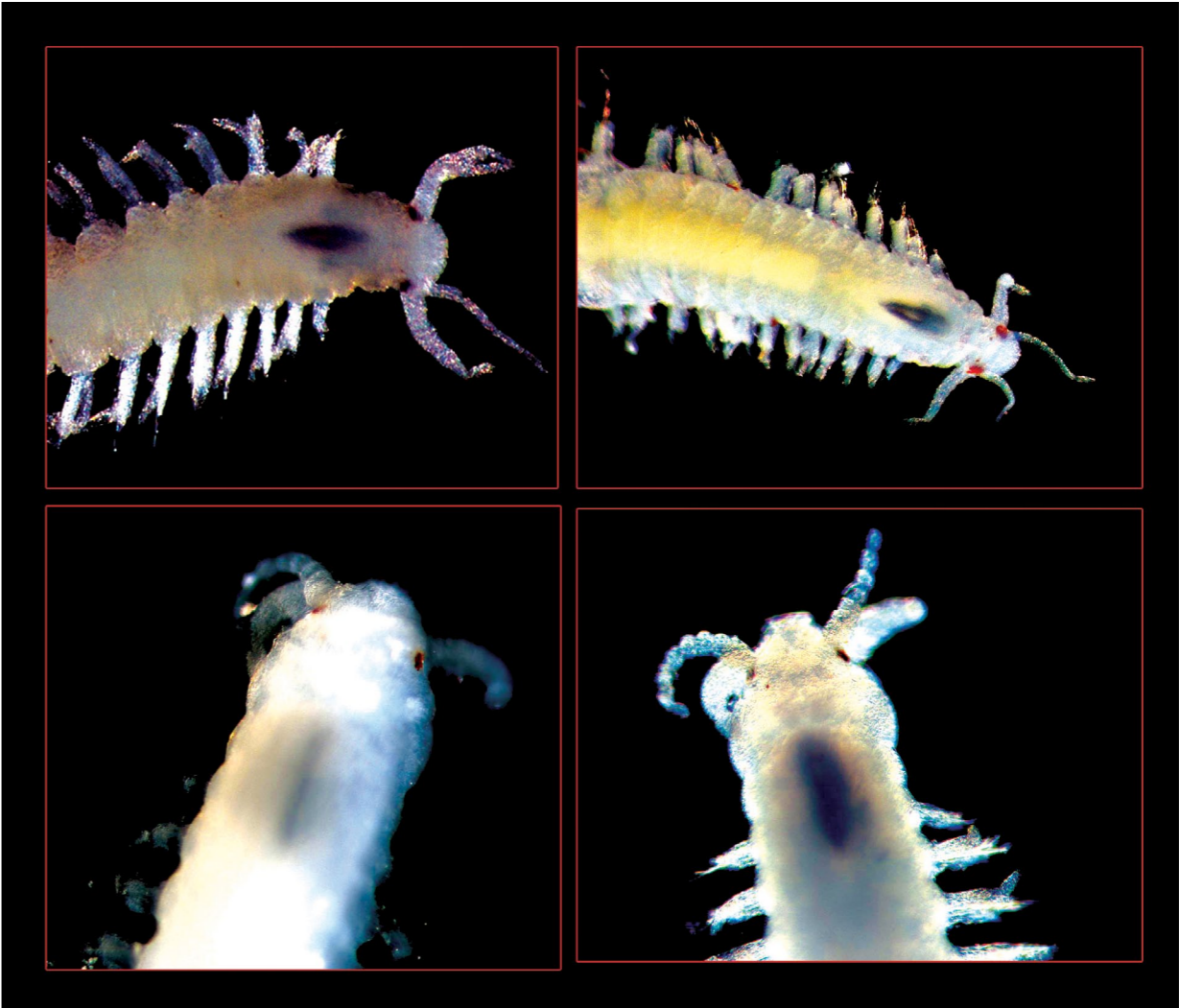


Plate 50. *Dorvillea* sp. in Qatar marine sediments.



*Schistomeringos* cf. *longicornis* Jumars, 1974



*Schistomeringos rudolphi* (Delle Chiaje, 1828)

Plate 51. *Schistomeringos* species in Qatar marine sediment.



*Protodorvillea egena* (Ehlers, 1913)



*Protodorvillea* sp.

Plate 52. *Protodorvillea* species in Qatar marine sediments.

## FAMILY: Onuphidae

The Onuphidae belong to the Eunicida-group. They possess 2 frontal and five occipital antennae in staggered positions and with basal annulations. One pair tentacular cirri may be present. Notopodia greatly reduced and represented only by branchae/dorsal cirri. Setae include compound hooks, spinigers, pectinate setae and subacicular hooks [Figure 25]. Five species of the genus *Diopatra* were obtained in Qatar marine sediments: *Diopatra cuprea cuprea* (Bosc, 1802), *Diopatra chiliensis* Quatrefages, 1865, *Diopatra* sp.1, *Diopatra* sp.2, and *Diopatra* sp.3 [Plate 53 and 54A & B]. Two species of the genus *Paradiopatra*: *Paradiopatra* cf. *quadricuspis* and *Paradiopatra* sp., one species of the genus *Nothria*: *Nothria* sp. and two species of the genus *Onuphis*: *Onuphis emerita* Audouin & Milne Edwards, 1833 and *Onuphis* sp. [Plate 55]. were obtained in Qatar marine sediments.

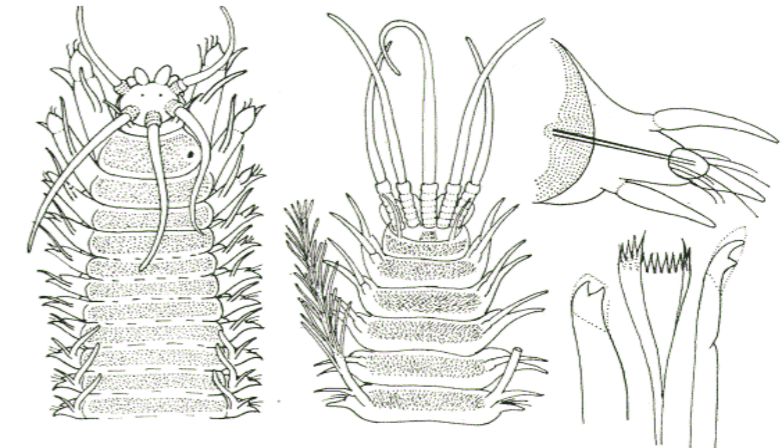
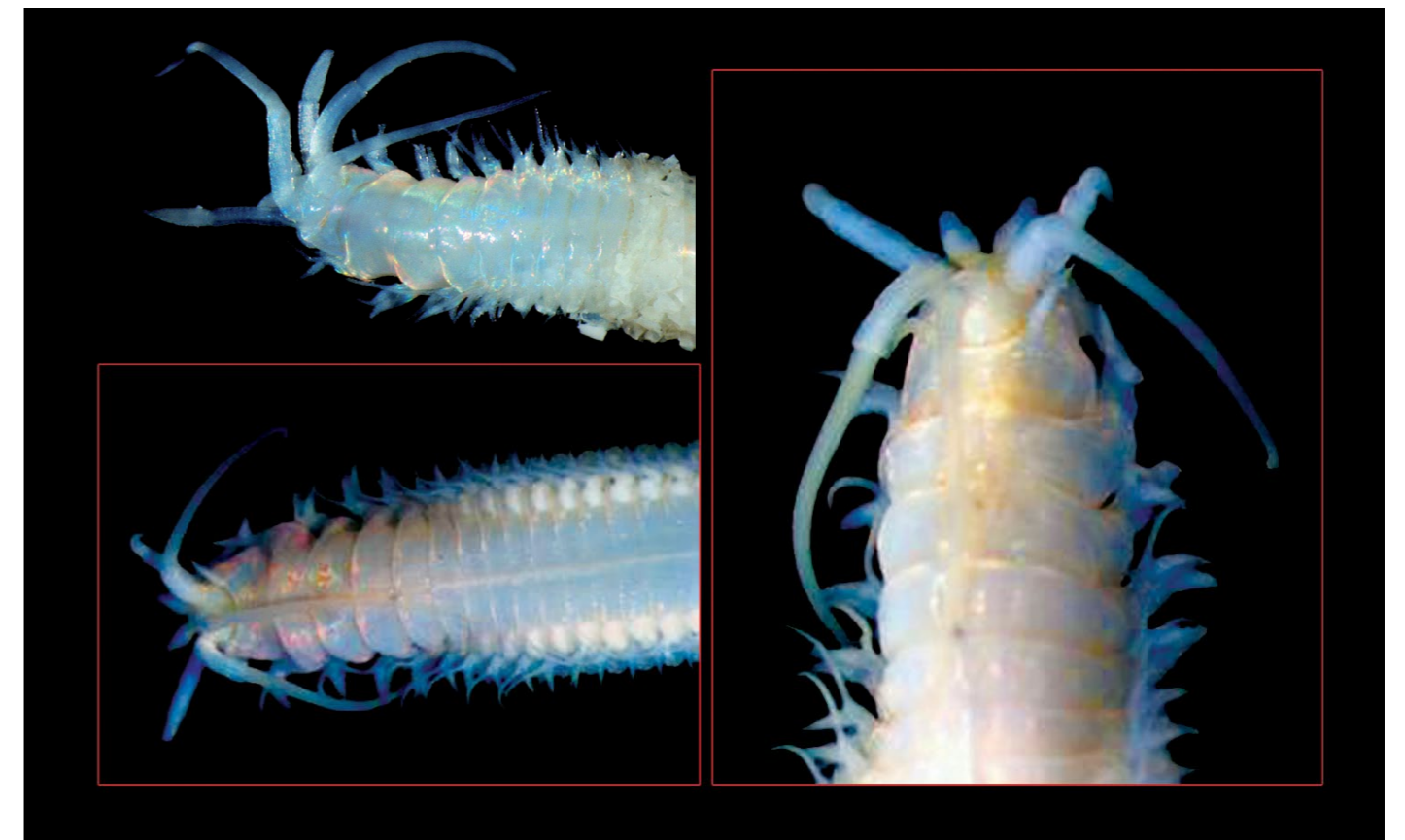


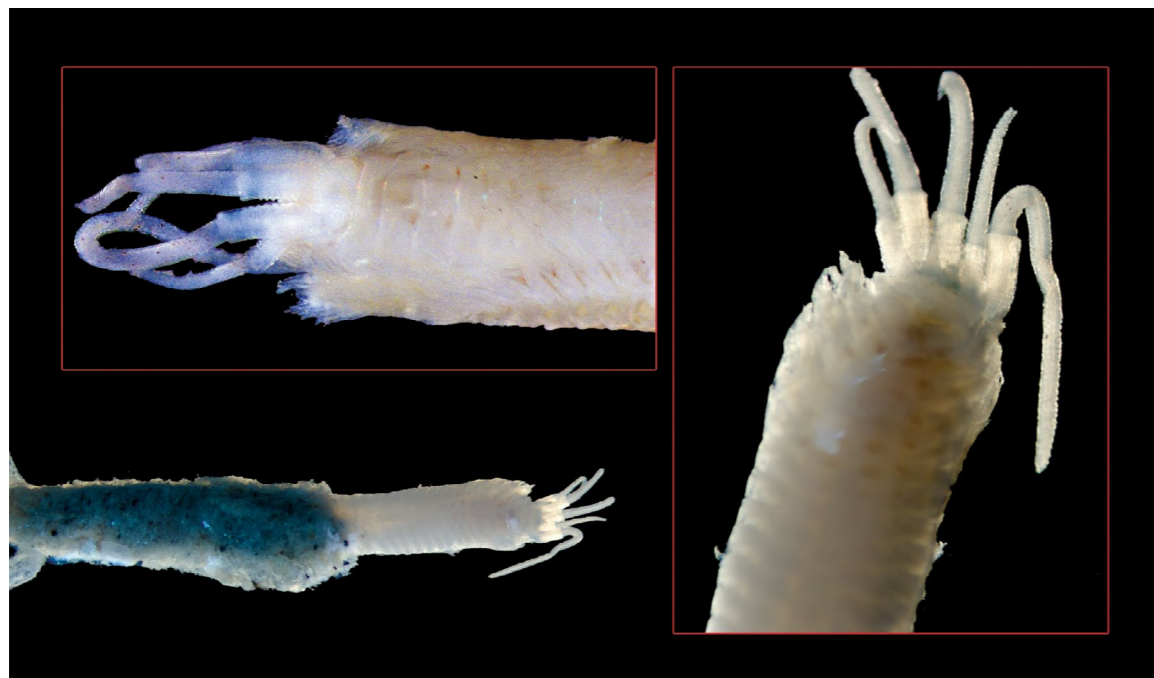
Figure 25. Diagnostic features in the Onuphidae..

Source:<http://www.nhm.ac.uk/>

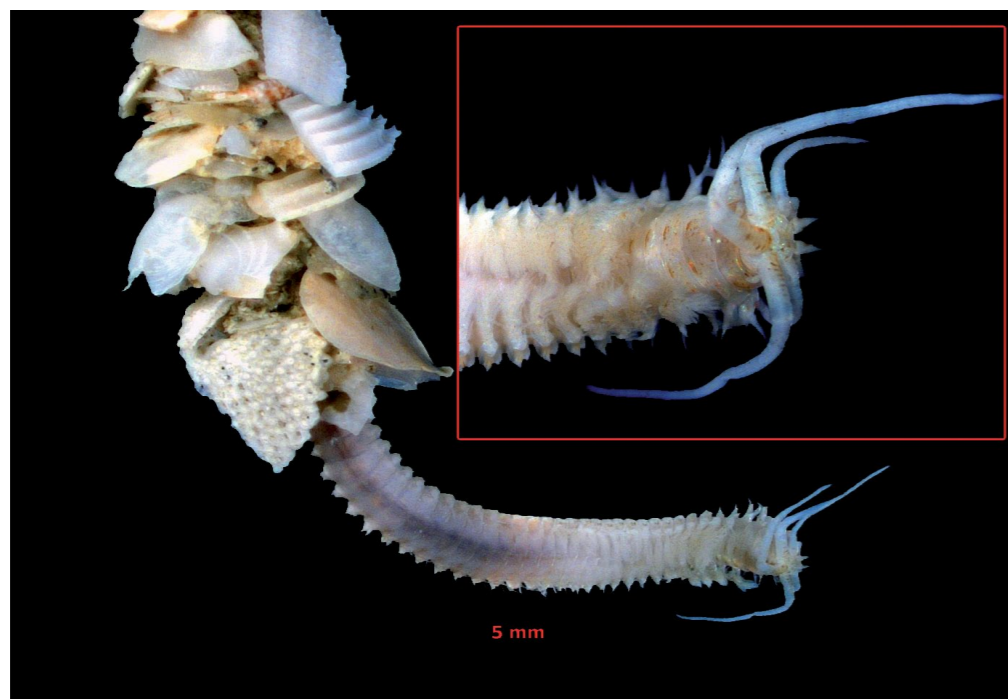


*Diopatra cuprea cuprea* (Bosc, 1802 )

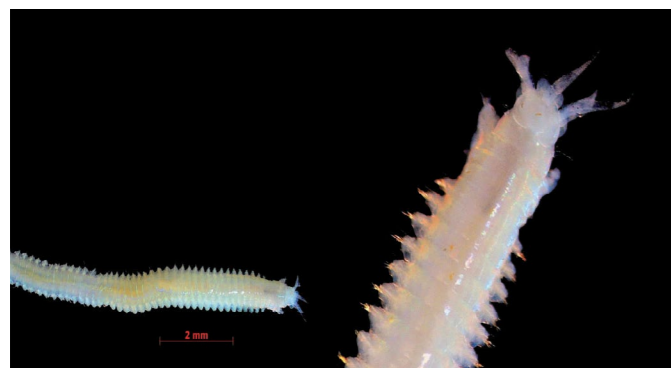
Plate 53 *Diopatra cuprea cuprea* in Qatar marine sediments.



*Diopatra chiliensis* Quatrefages, 1865



*Diopatra* sp.1

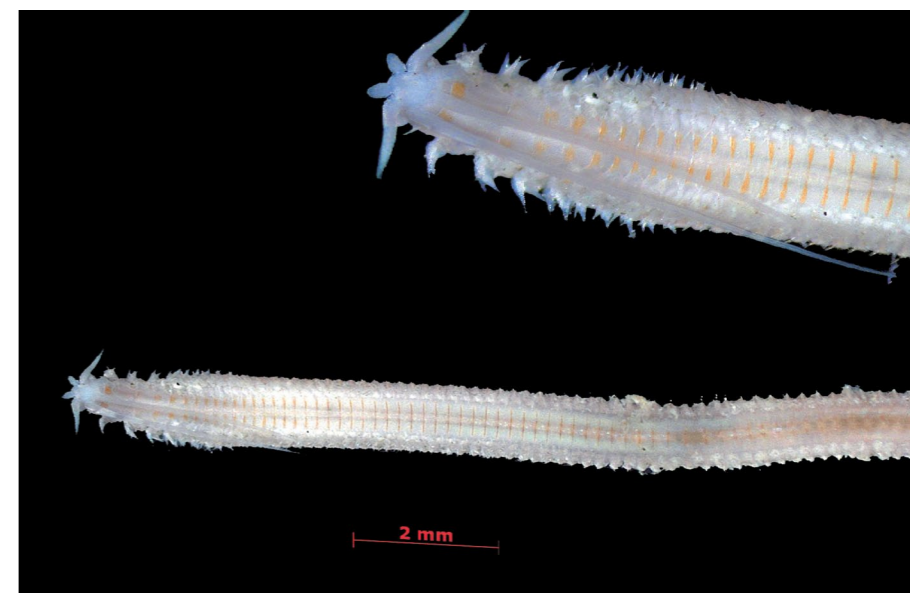


*Diopatra* sp.2



*Diopatra* sp.3

Plate 54A. *Diopatra* species encountered in Qatar marine sediments.



*Nothria* sp.



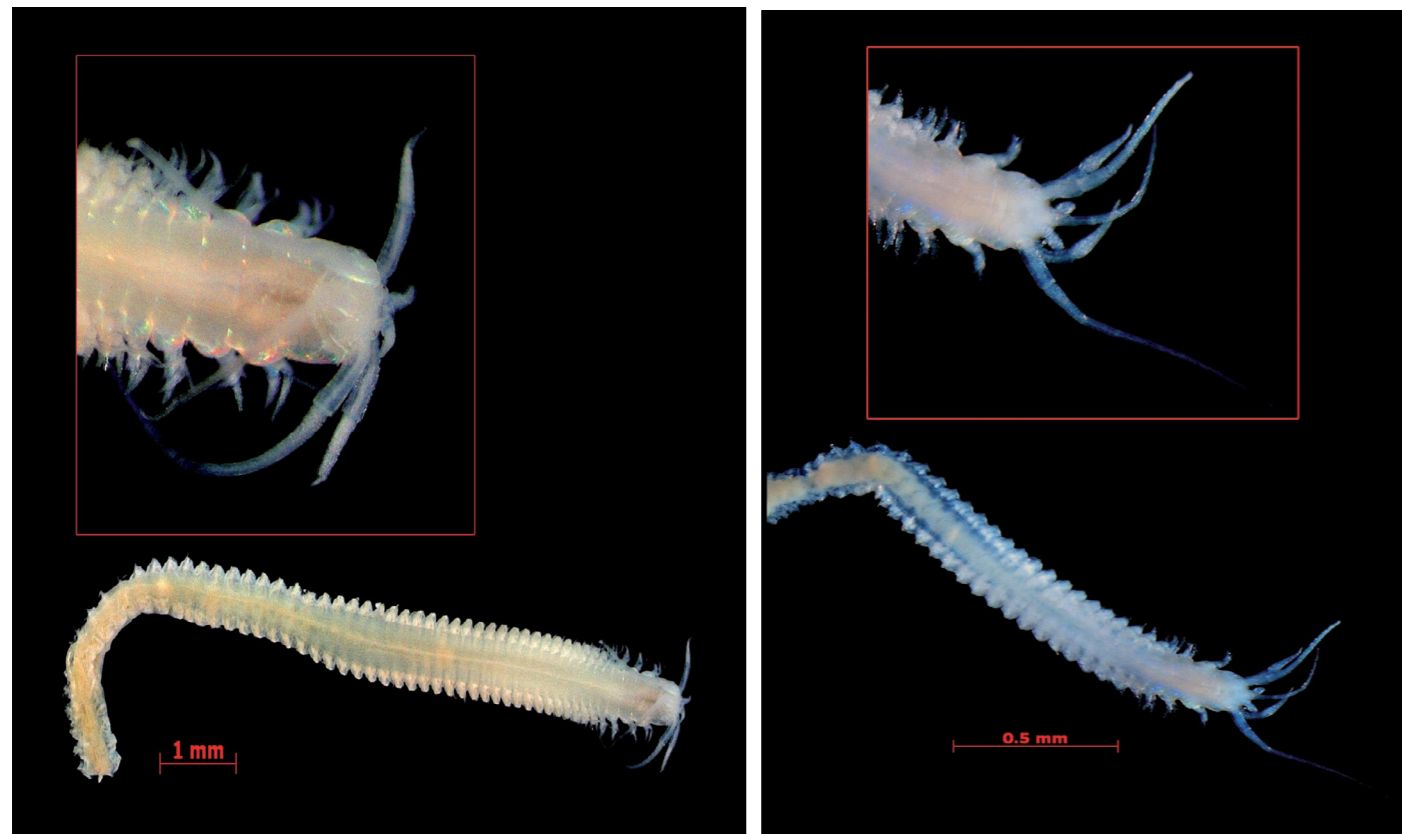
*Paradiopatra* sp.



*Paradiopatra* cf. *quadricuspis* (Sars, 1872)



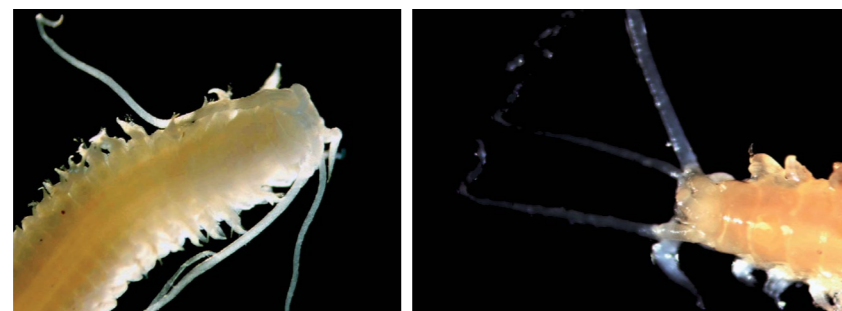
Plate 54B. *Nothria* and *Paradiopatra* species encountered in Qatar marine sediments.



*Paradiopatra* cf. *quadricuspis* (Sars, 1872)



*Onuphis emerita* Audouin & Milne Edwards, 1833



*Onuphis* sp.

Plate 55. *Paradiopatra* and *Onuphis* species encountered in Qatar marine sediments.

## FAMILY: Lumbrineridae

The Lumbrineridae belong to the Eunicida group. Appendages are rare on a round or conical prostomium but 4 pairs of maxillae and well developed mandibles occur. Parapodia uniramous with winged capillaries and simple or jointed hooded hooks. In *Lumbrineris* the prostomium is conical or rounded, without eyes or antennae. Dorsal cirri are absent and setae winged capillaries and mutidentate hooded hooks [Figure 26]. Sixteen species belonging to the genera *Lumbrineris* (13), *Lumbrinereiosis* (1) *Lumbrinerides* (1) and *Abyssoninoe* (1) were obtained [Plate 56 (A,B,C&D) and Plate 57].

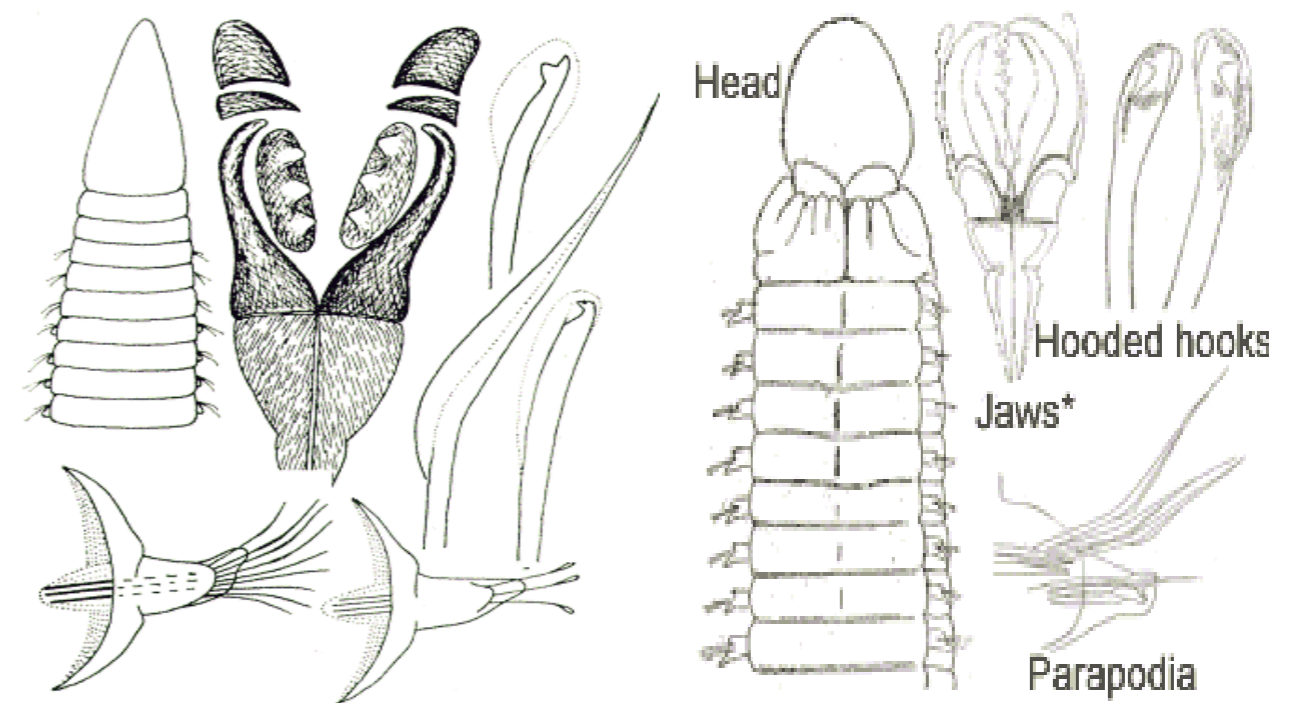
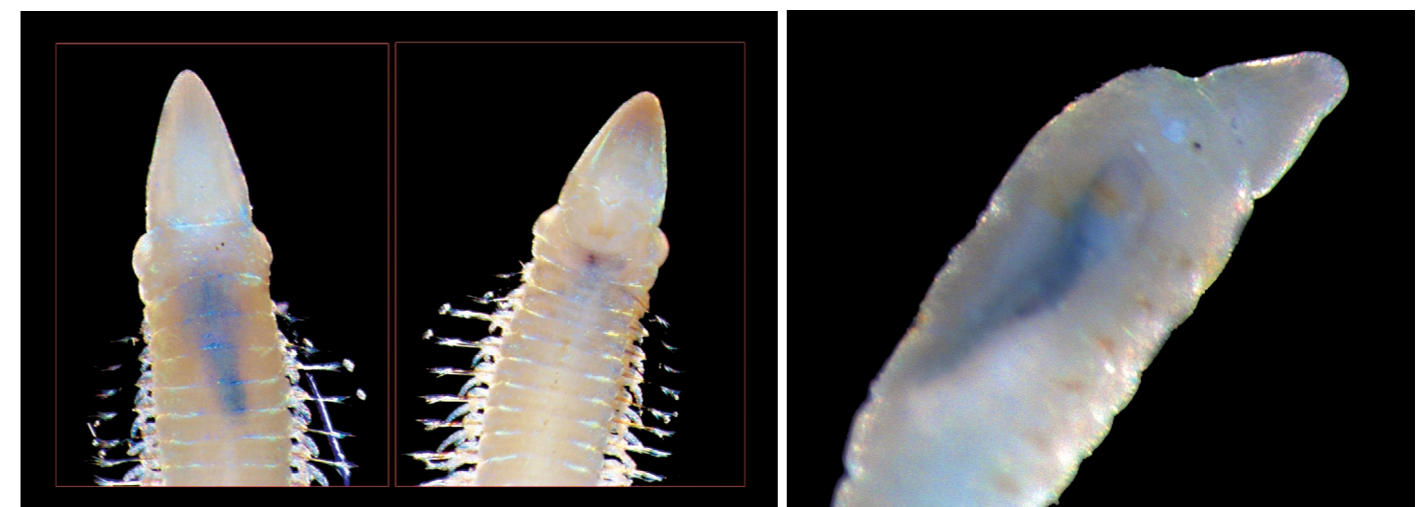


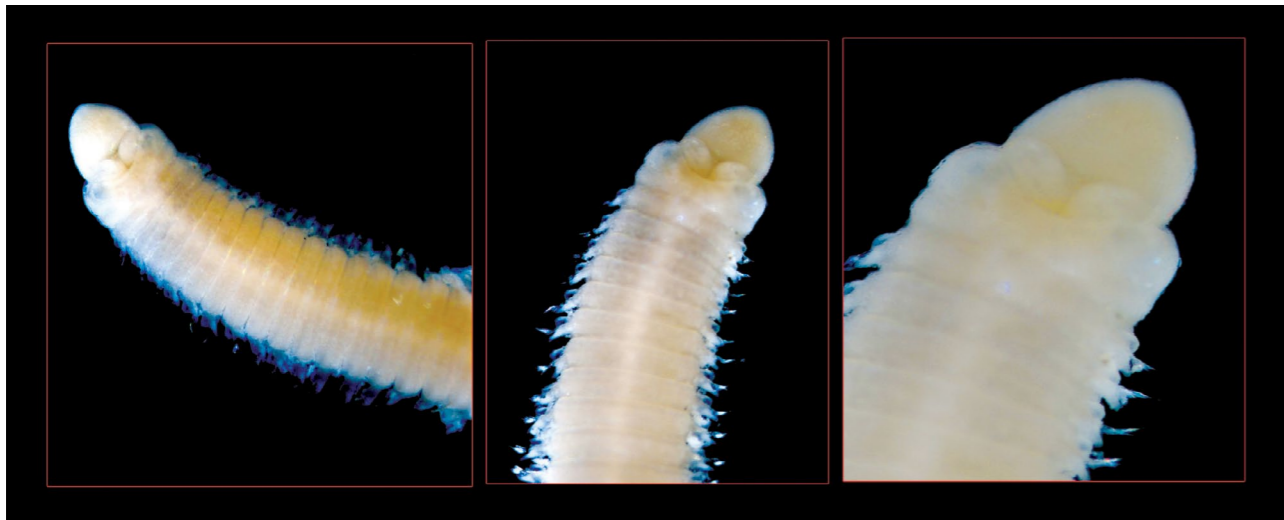
Figure 26. Diagnostic features in the *Lumbrineris*.  
Source: <http://www.nhm.ac.uk/>



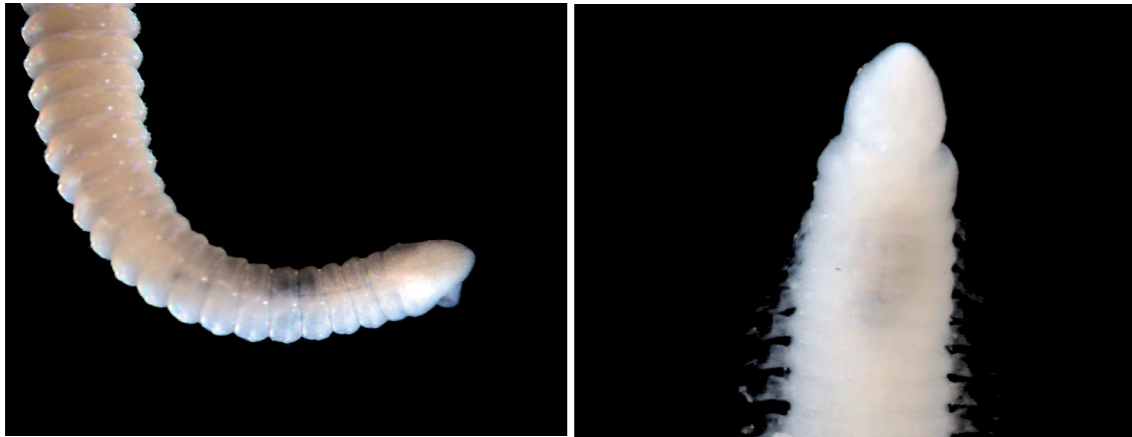
*lumbrineris bifurcata* McIntosh, 1885

*lumbrineris pettigrewi* McIntosh, 1885

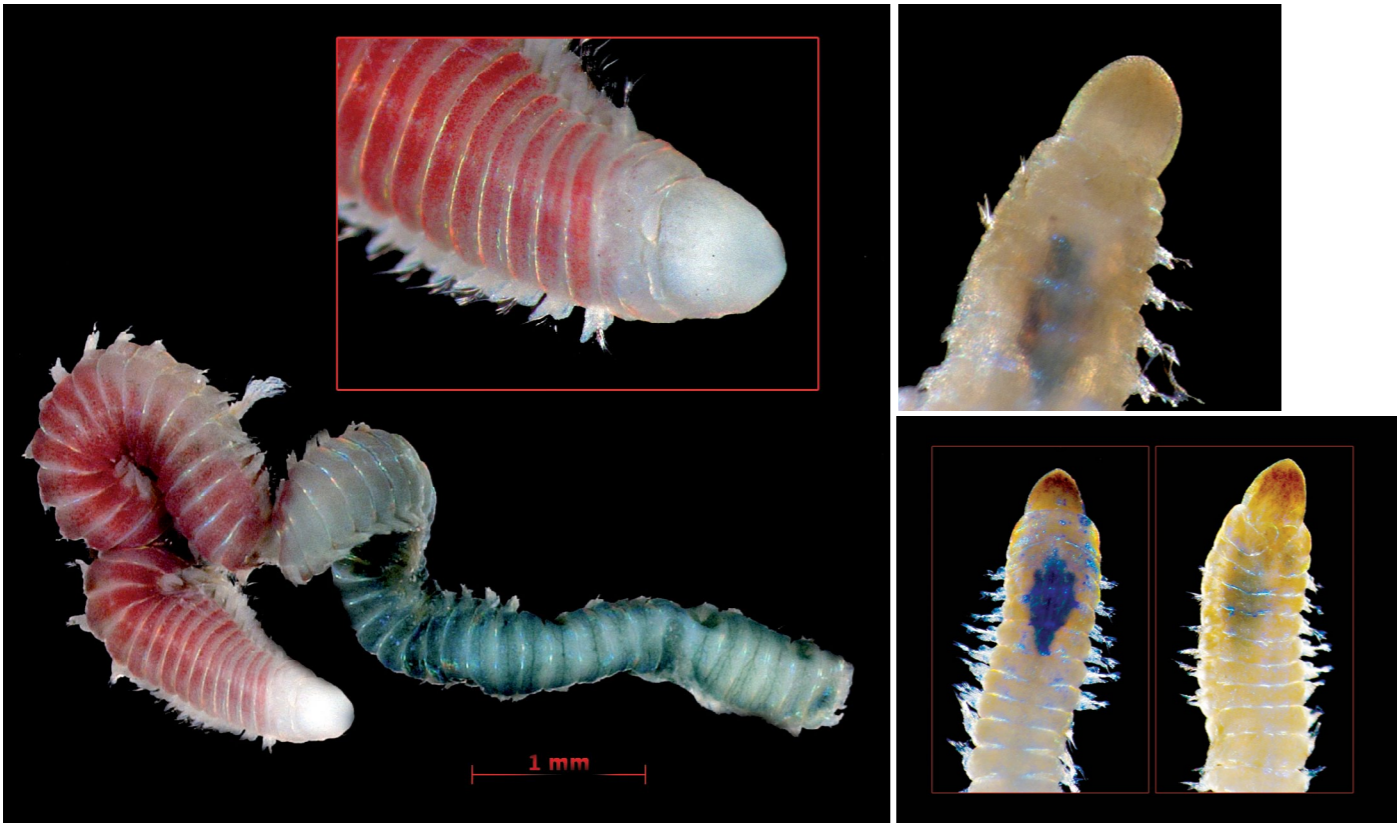
Plate56A. *Lumbrinereis* species encountered in Qatar marine sediments.



*Lumbrineris debilis* (Grube, 1878)



*Lumbrineris* cf. *lutei*



*Lumbrineris gracilis* (Ehlers, 1868)

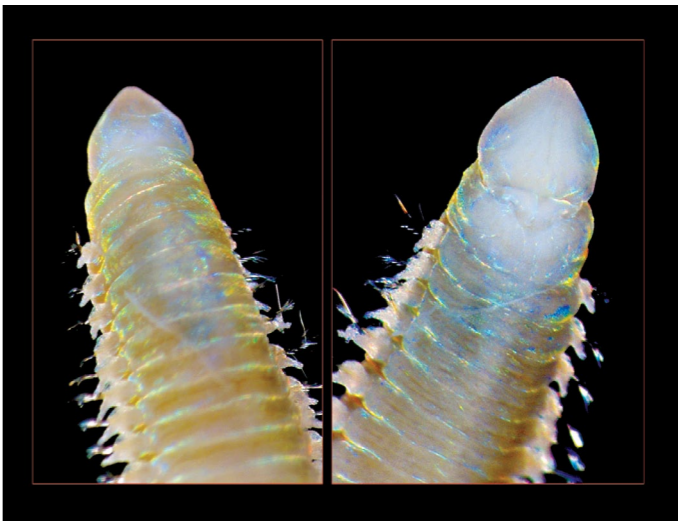
Plate 56B. *Lumbrineris* species encountered in Qatar marine sediments.



*Lumbrineris* cf. *heteropoda*

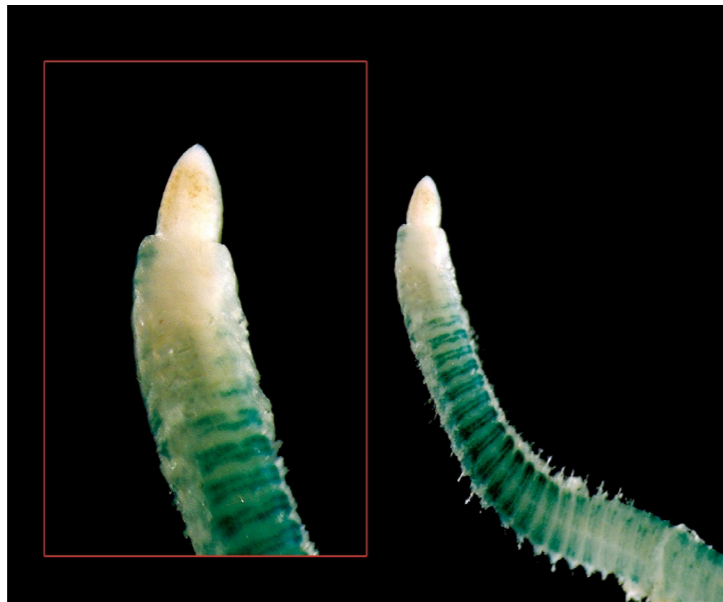


*Lumbrineris* cf. *latreilli* Audouin & Milne Edwards, 1834

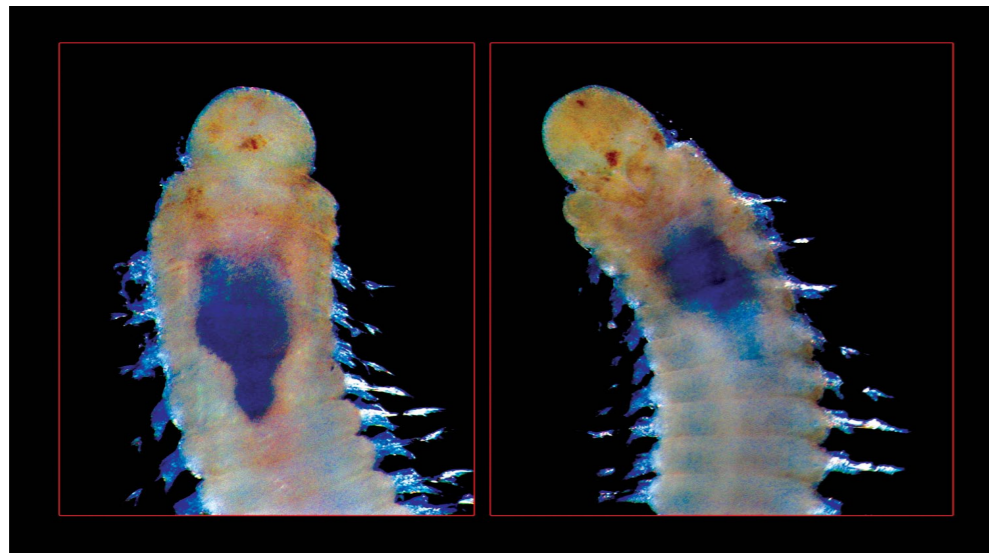


*Lumbrineris fragilis* (O. F. Müller, 1976)

Plate 56C. *Lumbrineris* species encountered in Qatar marine sediments.



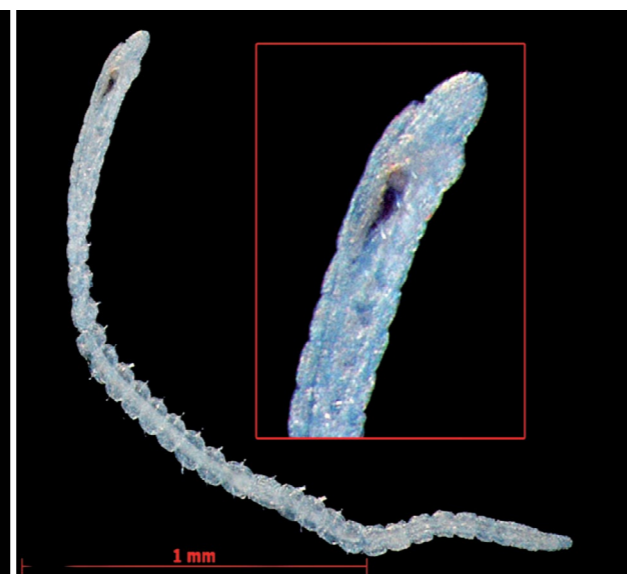
*Lumbrineris* sp.1



*Lumbrineris* sp.2

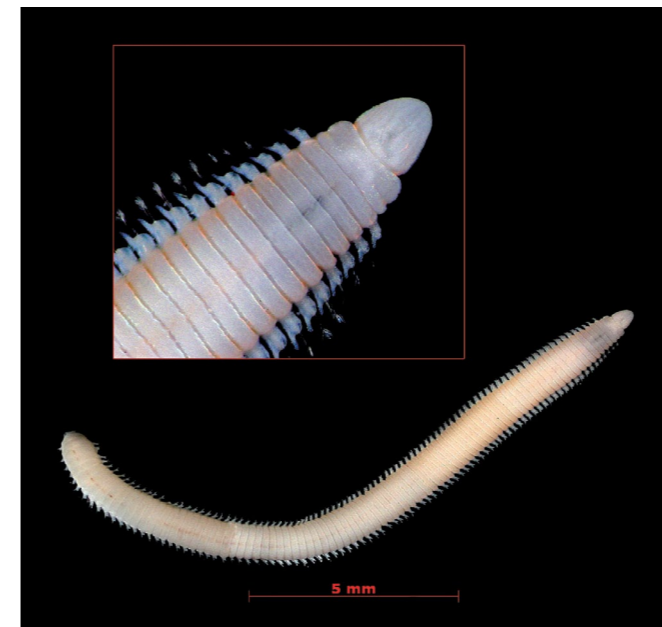


*Lumbrineris* sp.3



*Lumbrineris* sp.4

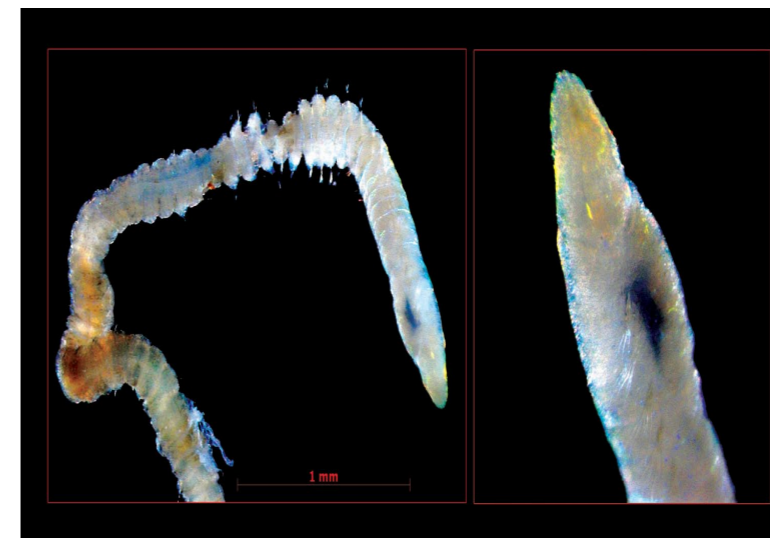
Plate 56D. *Lumbrineris* species encountered in Qatar marine sediments.



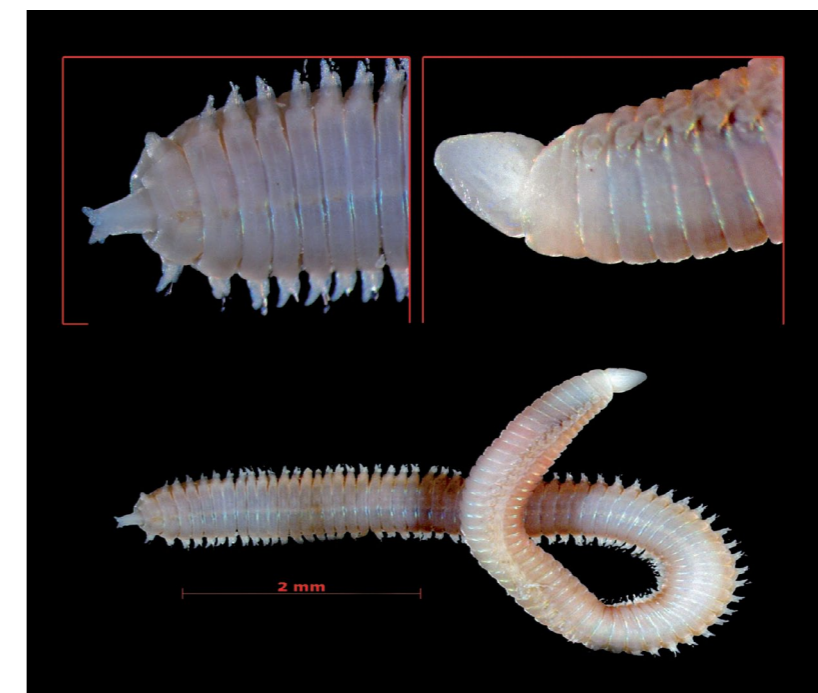
*Lumbrineris* sp.5



*Lumbrinereiosis* sp.



*Lumbrinerides acuta* (Verrill, 1875)



*Abyssoninoe hibernica* (Mc Intosh, 1903)

Plate 57. *Lumbrinereiosis* , *Lumbrinerides* and *Abyssoninoe* species encountered in Qatar marine sediments.

FAMILY: Oeononidae

Elongate worms with uniramous paprapodia. Prostomium usually conical and bears eyes. Some species are parasitic. Free living animals with well developed maxillae consisting of 5 pairs of toothed plates above elongate slender carriers. Where mandibles are present, they tend to be X-shaped . Setae are all winged capillaries, never with hooded hooks. The genus Arabella was obtained. Arabella is characterized by a conical prostomium with four eyes, 5 pairs of maxillae, mandibles present, no ventral cirri, and only simple winged capillaries,[ no projecting acicular spines or hooks] (Figure 27). Five species Arabella portomutanus, Arabella iricolor iricolor (Montagu, 1804), Arabella sp.1, Arabella sp.2 and Arabella sp.3 were obtained [Plate 58], [Plate 59] and [Plate 60].

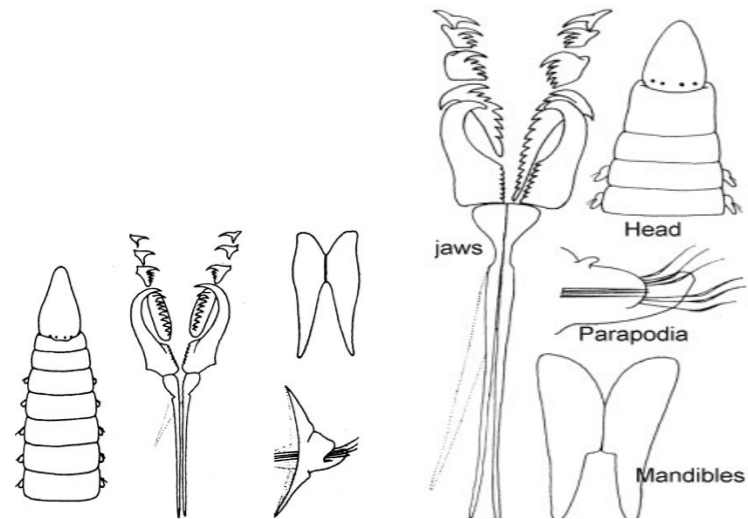


Figure 27. Diagnostic features in the Oeononidae .  
Source:<http://www.nhm.ac.uk/>, <http://personal.cityu.edu.hk/~bhworm/sedentary/photo.htm>

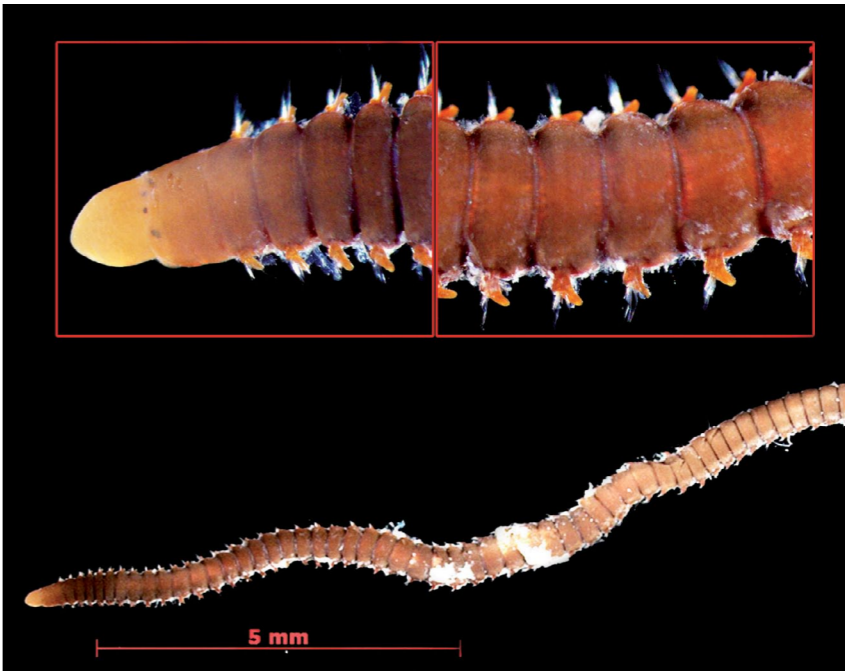
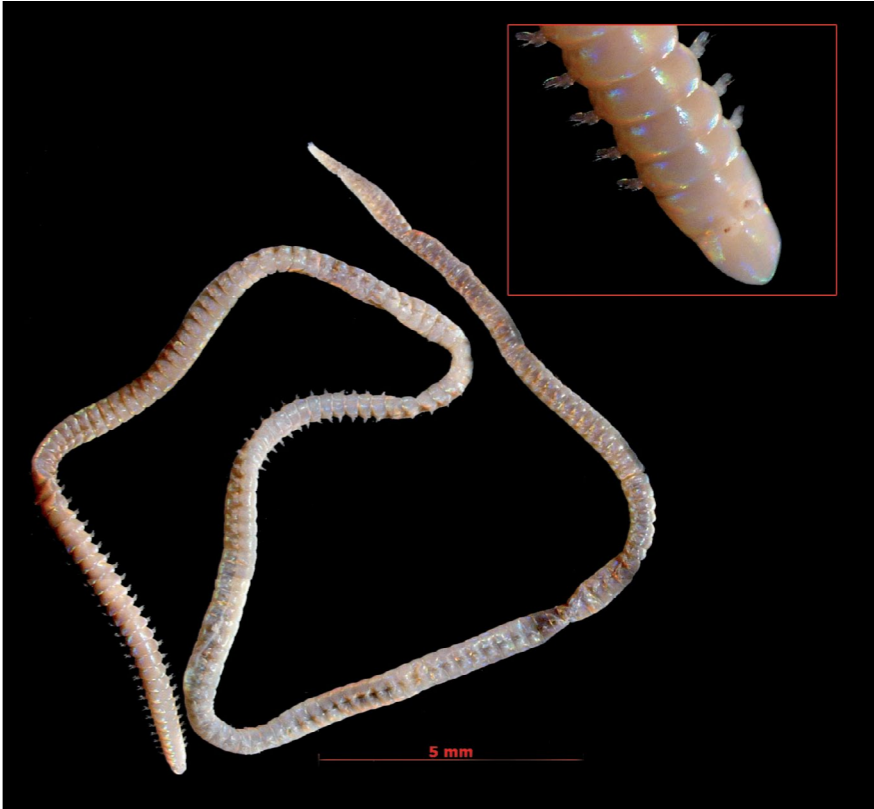
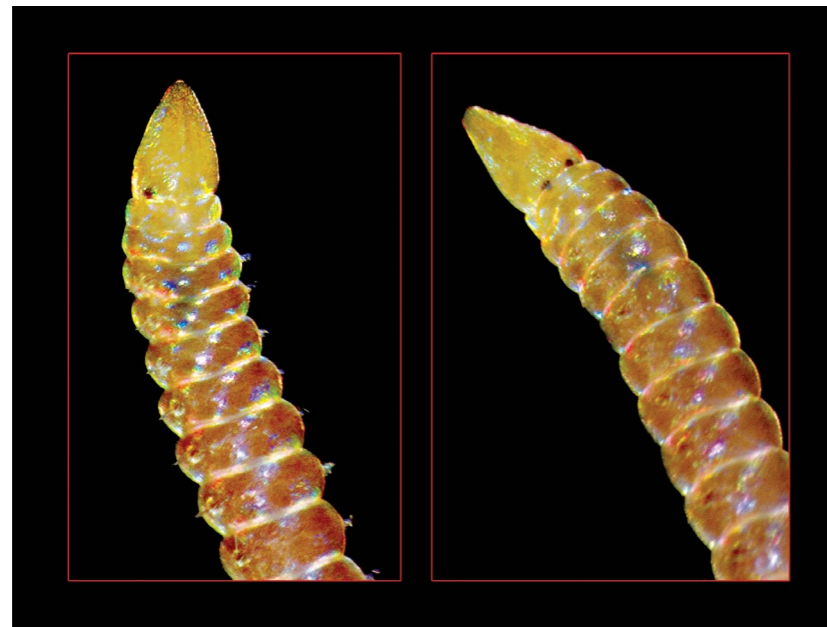
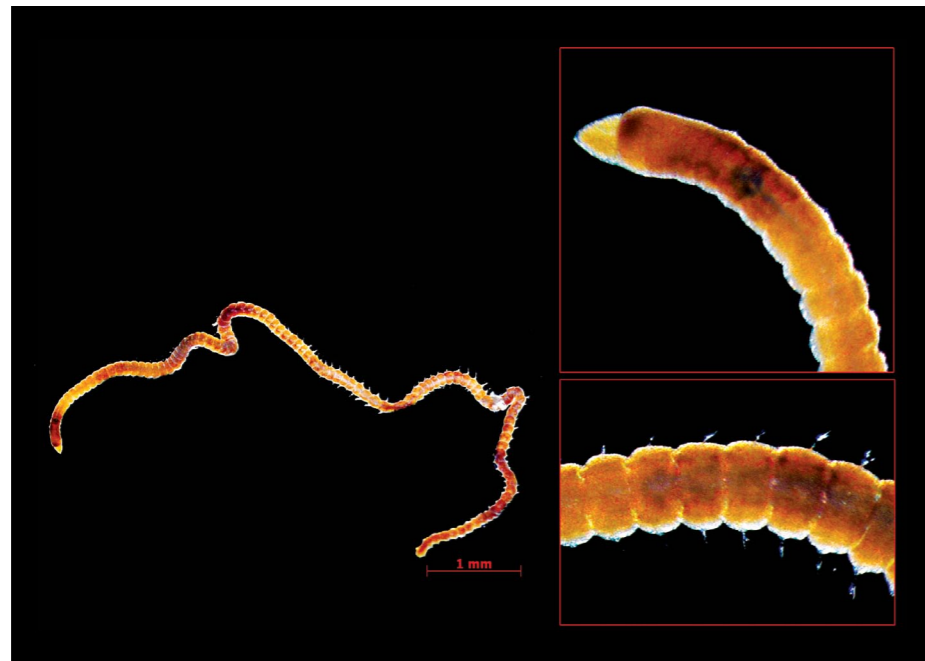


Plate 58. Arabella portomutanus encountered in Qatar marine sediments.

Plate 59. Arabella iricolor iricolor (Montagu, 1804) encountered in Qatar marine sediments.



*Arabella* sp.1



*Arabella* sp.2



*Arabella* sp.3

Plate 60. *Arabella* encountered in Qatar marine sediments.

# **FAMILY: Hesionidae (Errant Worms)**

Errant worms, often dorsoventrally flattened. 2-3 antennae and as many as 8 pairs of tentacular cirræ. Palps with 1-3 articles. Jaws are sometimes present. Parapodia either biramous or uniramous but notopodium always somewhat reduced. Long slender dorsal cirri [Figure 28]. Five species were found belonging to the genera *Hesiocaeca* (3): [*Hesiocaeca* sp.1, *Hesiocaeca* sp.2 and *Hesiocaeca* sp.3 ] and *Gyptis* (2) : [*Gyptis* sp.1 and *Gyptis* sp.2] [ Plates 61A & B].

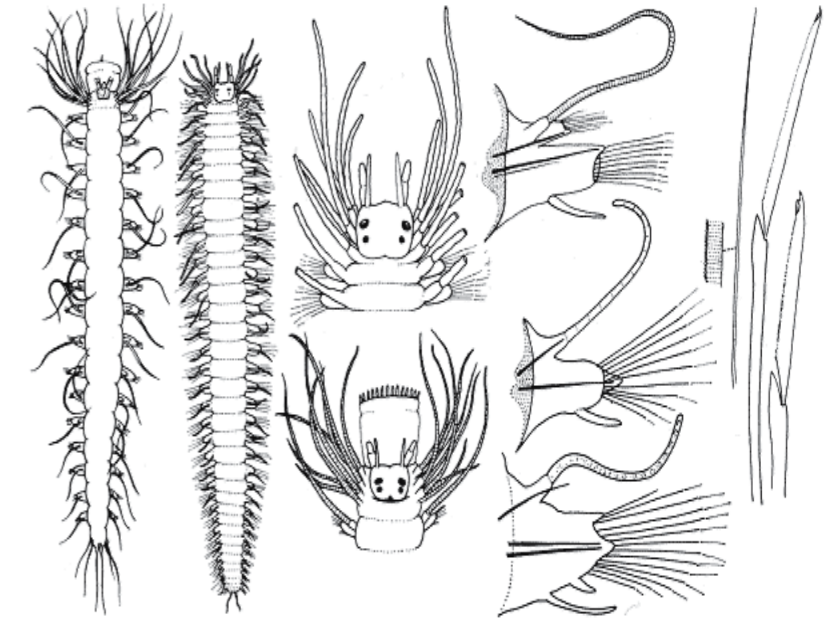
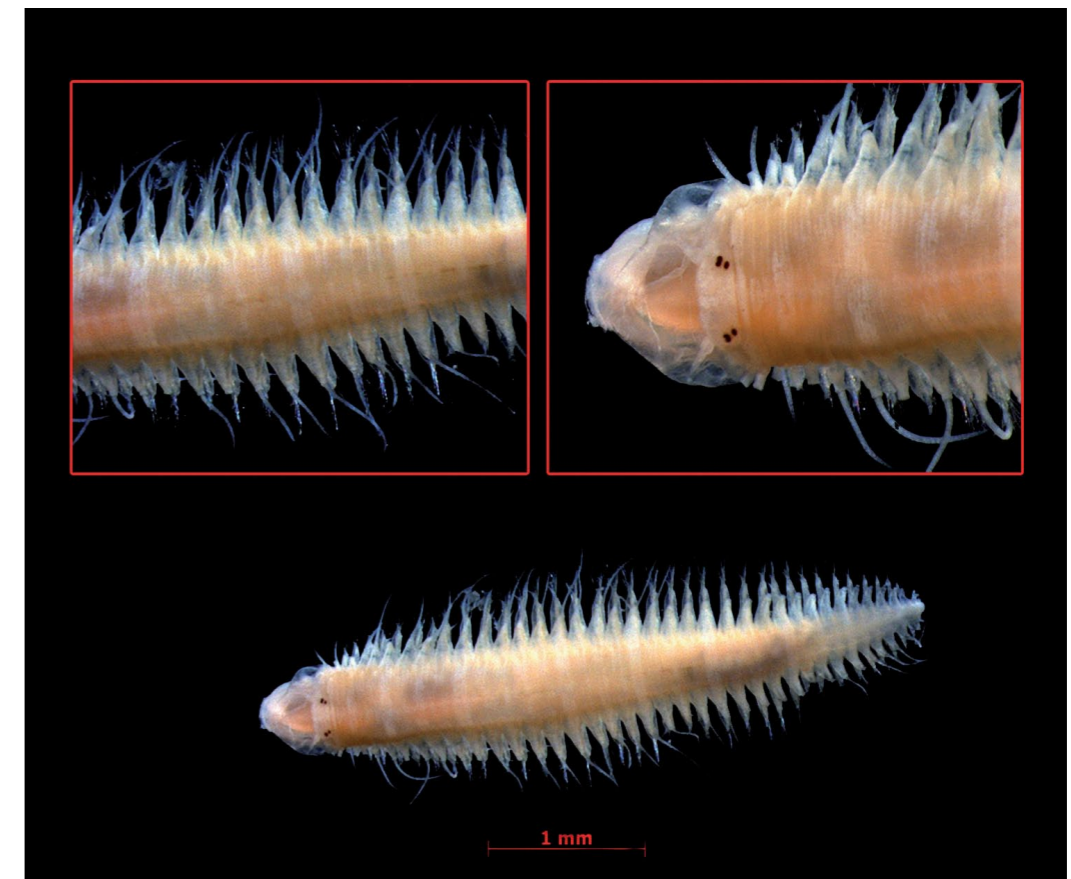
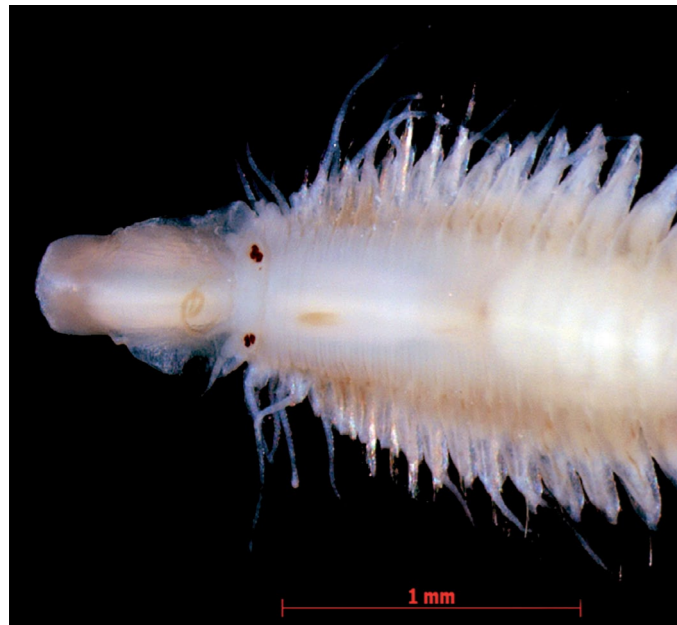


Figure 28. Main diagnostic features of the family Hesionidae.  
Source: <http://www.nhm.ac.uk/>

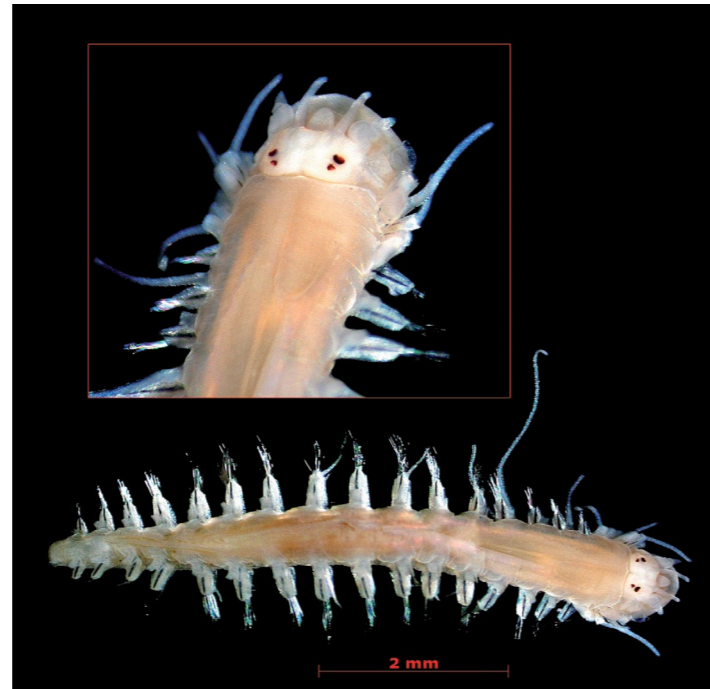


*Hesiocaeca* sp.1

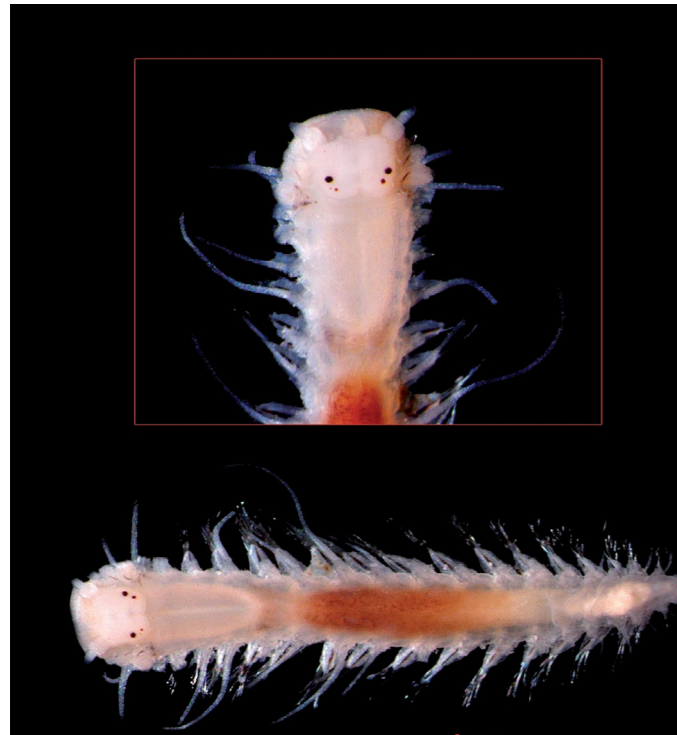
Plate 60A. *Hesiocaeca* encountered in Qatar marine sediments.



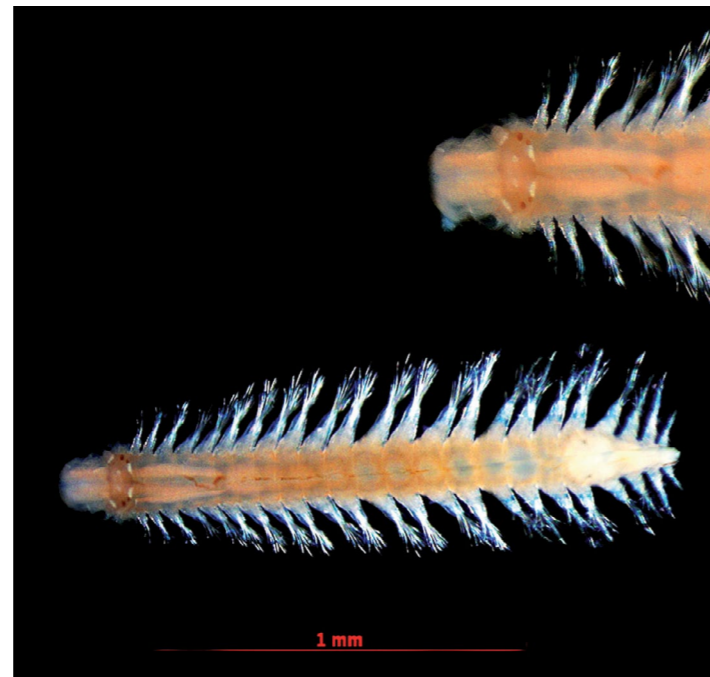
*Hesiocaeca* sp.2



*Hesiocaeca* sp.3



*Gyptis* sp.1



*Gyptis* sp.2

Plate 61B. *Hesiocaeca* and *Gyptis* encountered in Qatar marine sediments.

## ORDER: Canalipalpata

### FAMILY: Spionidae (Palp Worms)

The family Spionidae known as the Palp Worms belongs to the order Canalipalpata. These have elongate bodies. Prostomium may be blunt, with frontal horns or pointed. A pair of long grooved palps are present (although these are easily lost during collection/processing) and occasionally an occipital tentacle may occur. Parapodia are biramous and contain simple capillaries and hooded hooks. Dorsal digitate branchae are usually present on a variable number of segments [Figure 29]. Twentyone species were found belonging to the genera *Aonides* (2), *Minuspio* (1) *Polydora* (4), *Prionospio* (10), *Spiophanes* (1), *Scoloplos* (1) and *Spio* (2) [ Plates 62, 63,64 (A,B,C & D), 65. 66 and 67].

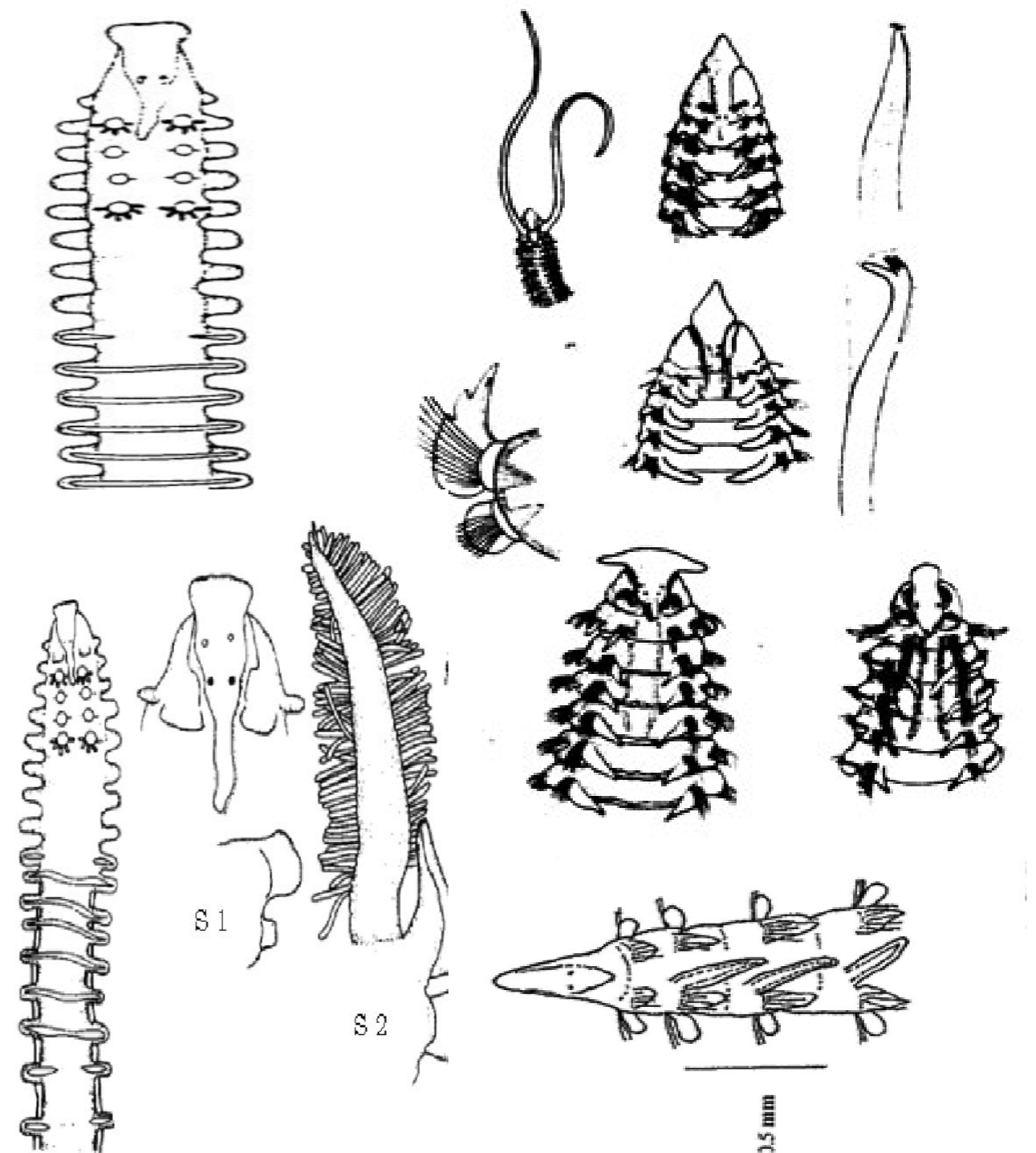
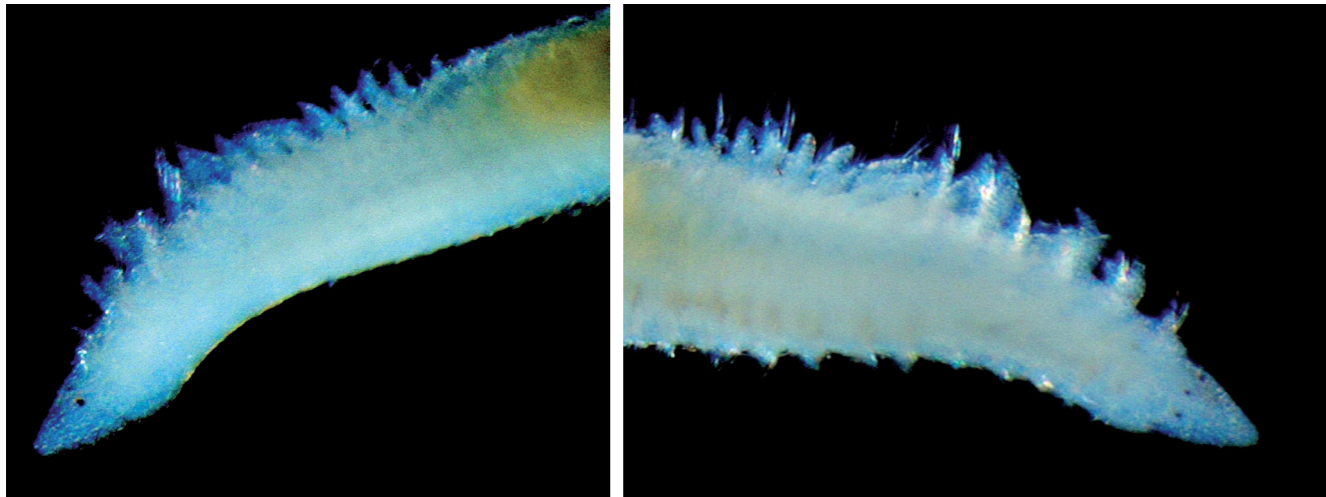
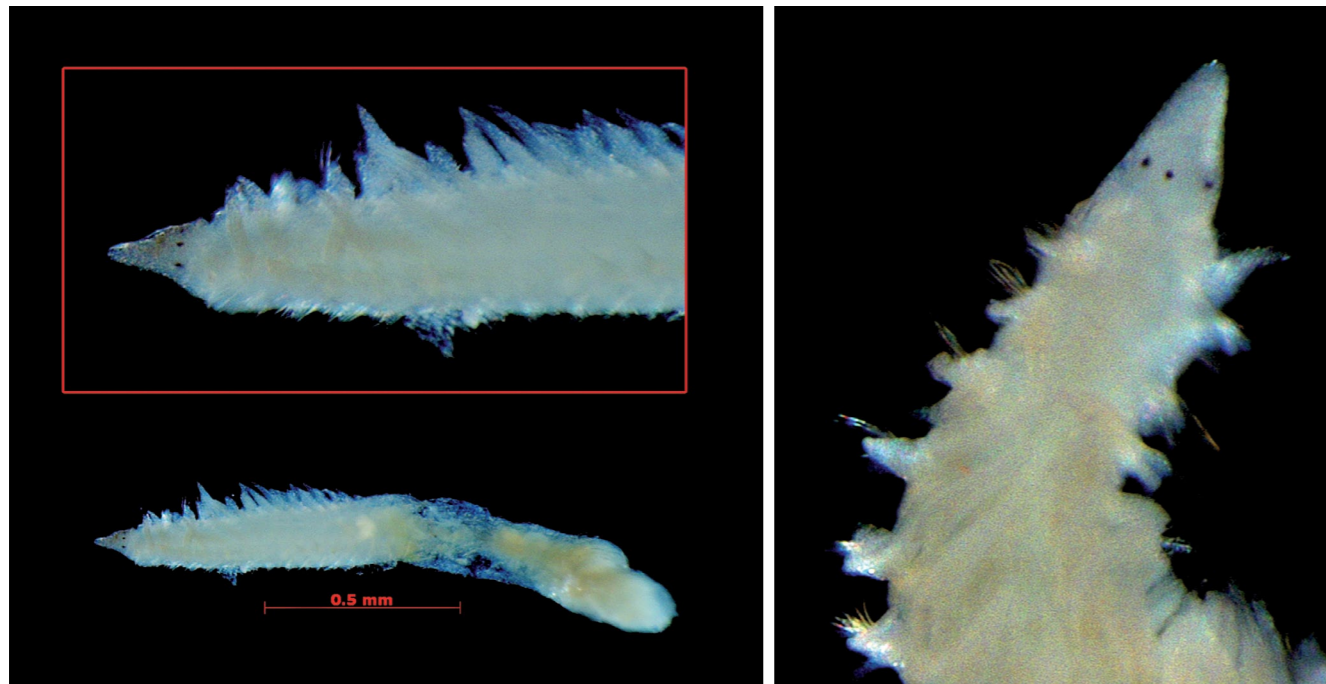


Figure 29. Main diagnostic features of the family Spionidae.

Source: <http://www.nhm.ac.uk/>



*Aonides paucibranchiata* Southern, 1914

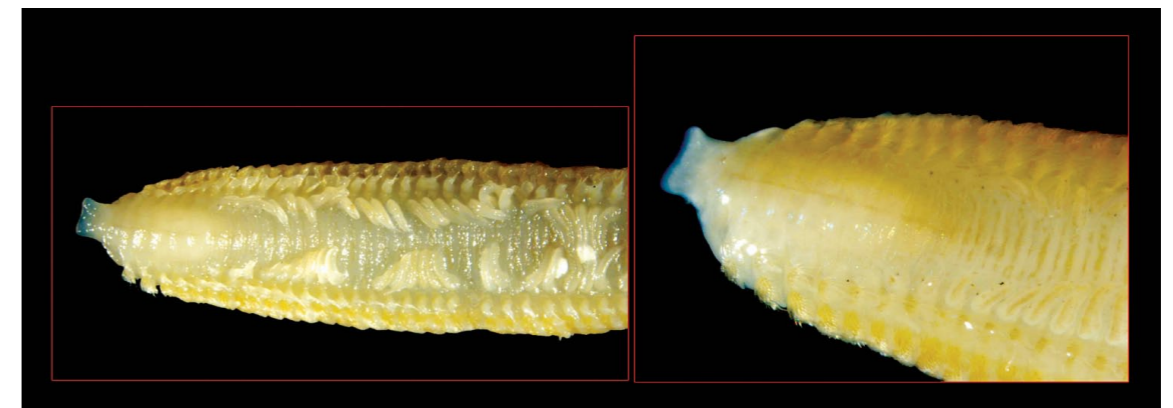


*Aonides oxycephala* (Sars, 1862)

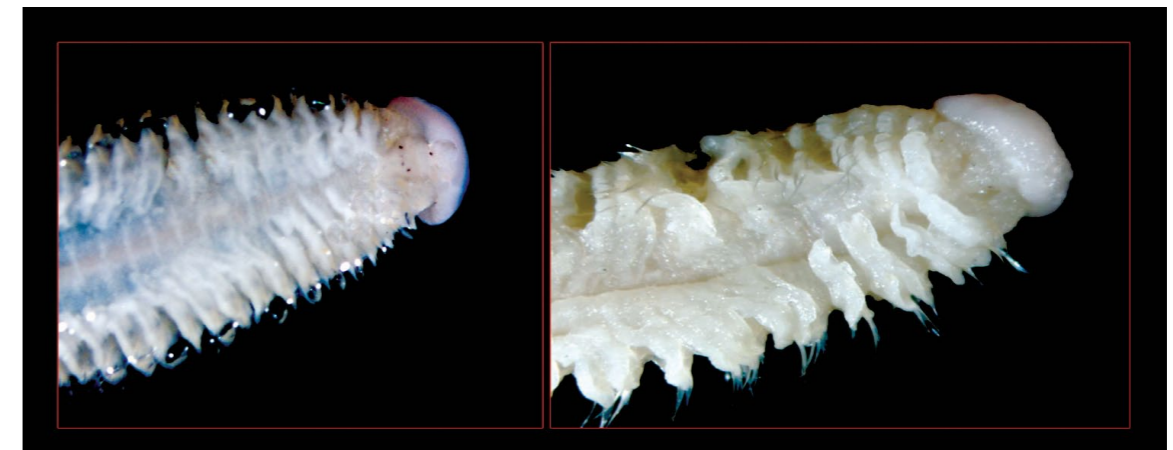
Plate 62. *Aonides* encountered in Qatar marine sediments.



*Minuspio cirrifera* (Wirén, 1883).



*Polydora* cf. *socialis*



*Polydora* sp.1



*Polydora* sp.2

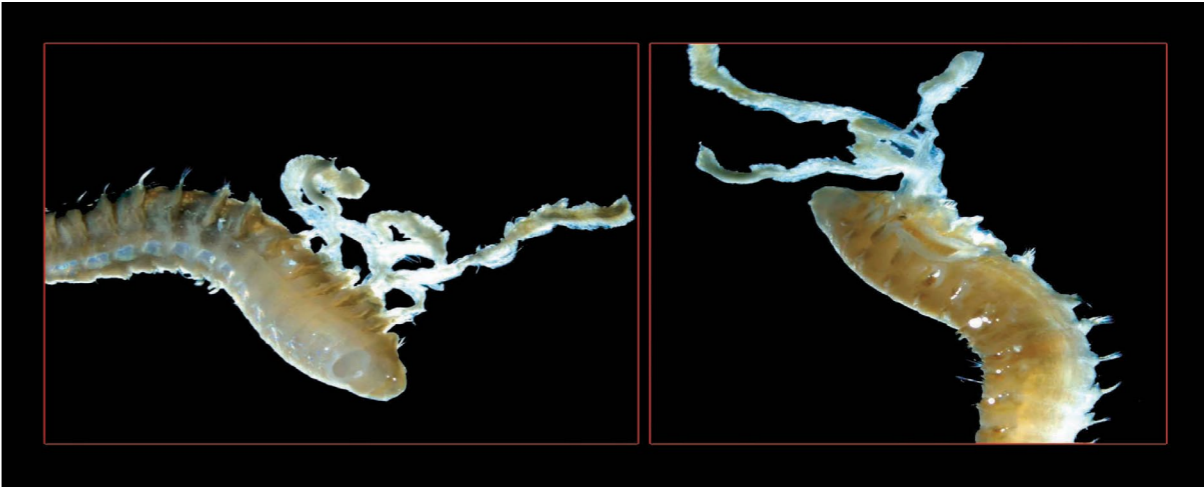


*Polydora* sp.3

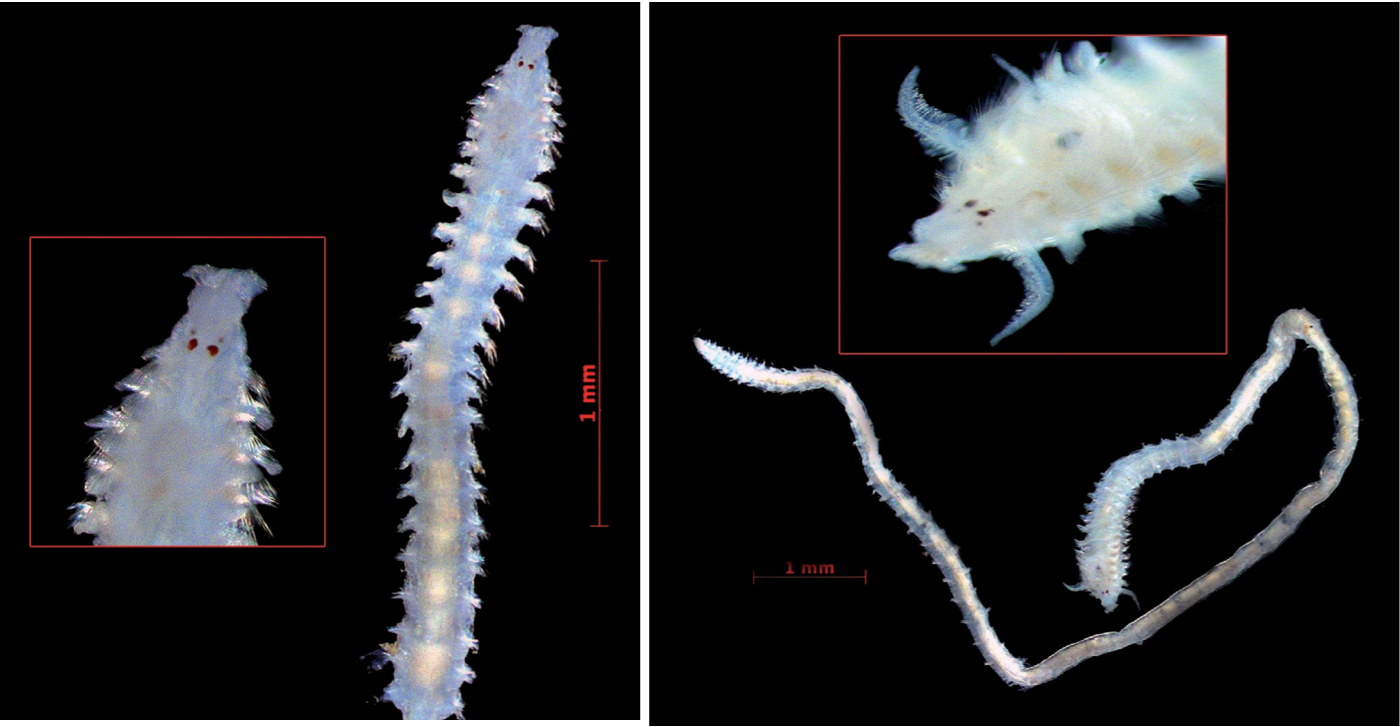
Plate 63. *Polydora* species encountered in Qatar marine sediments.



*Prionospio* cf. *cornuta* (Hylleberg & Nateewathana, 1991)



*Prionospio pinnata* (Ehlers, 1901)



*Prionospio rotalia* (Ehlers, 1901)

Plate 64A. *Prionospio* species encountered in Qatar marine sediments.

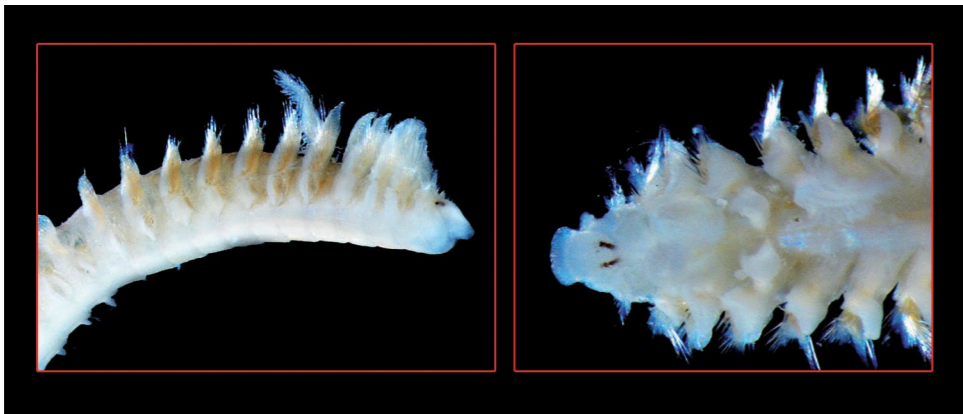


*Prionospio fallax* Söderström, 1920

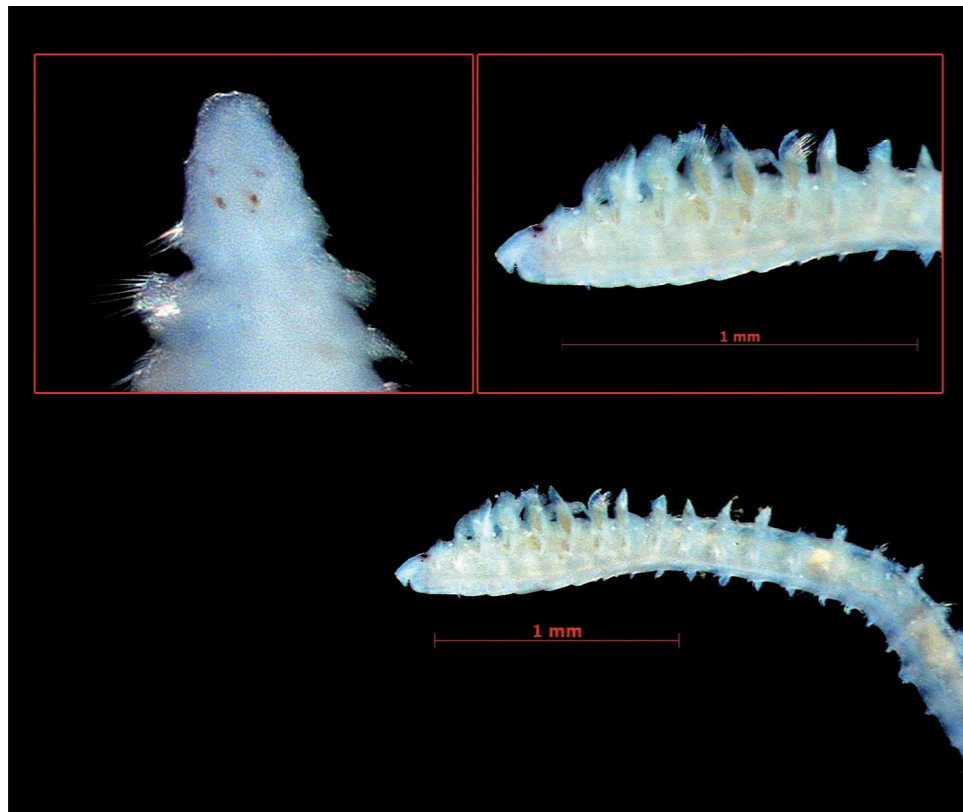


*Prionospio* cf. *multibranchiata* Berkeley, 1927

Plate 64B. *Prionospio* species encountered in Qatar marine sediments.



*Prionospio* cf. *henriki* (Hylleberg & Nateewathana, 1991)

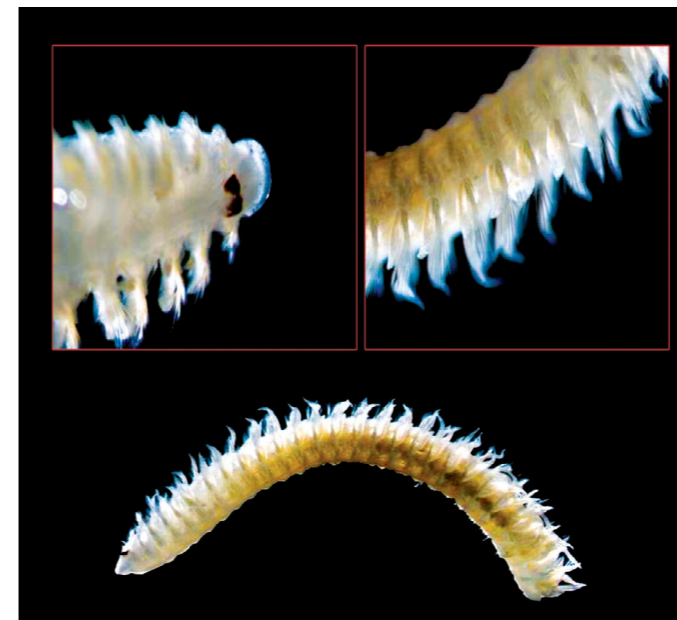


*Prionospio sexoculata* Augener, 1918

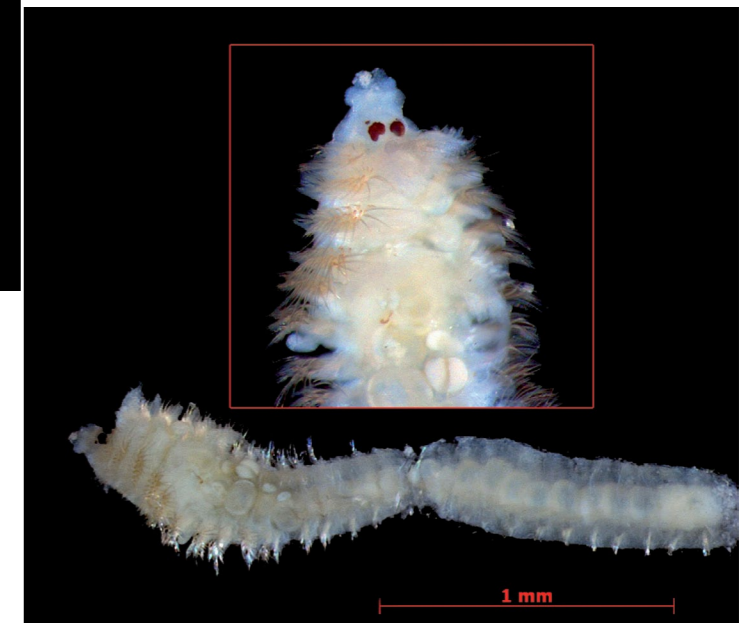
Plate 64C. *Prionospio* species encountered in Qatar marine sediments.



*Prionospio japonica* (Imajima, 1989)



*Prionospio banyulensis* Laubier, 1868



*Prionospio* sp.

Plate 64D. *Prionospio* species encountered in Qatar marine sediment.

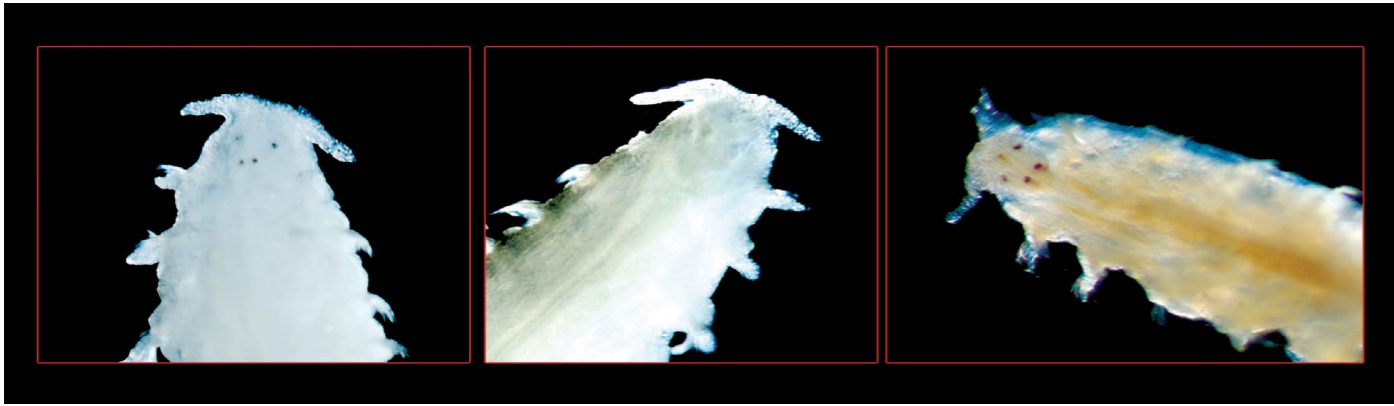


Plate 65. *Spiophanes bombyx* Claparède, 1870 in Qatar marine sediments.



*Scolelepis squamata* (Müller, 1806)

Plate 66. *Scolelepis squamata* (Muller) encountered in Qatar marine sediments.



*Spio* cf. *martinensis* Mesnil, 1896



*Spio* sp.

Plate 67. *Spio* species encountered in Qatar marine sediments.

**FAMILY: Magelonidae (Shovel Headed Worm)**

Body clearly divided into 2 regions. Shovel-like head lacking antennae but with a pair of long papillose palps (easily lost). Parapodia biramous with simple capillaries anteriorly and mainly hooded hooks further back [Figure 30]. Five species of the genus *Magelona* [ *Magelona alleni* Wilson, 1958 , *Magelona cincta* (Ehlers), *Magelona cf. heteropoda* Mohammad, *Magelona* sp.1 and *Magelona* sp.2 [Plate 68 A & B] ;were obtained in Qatar marine sediment.

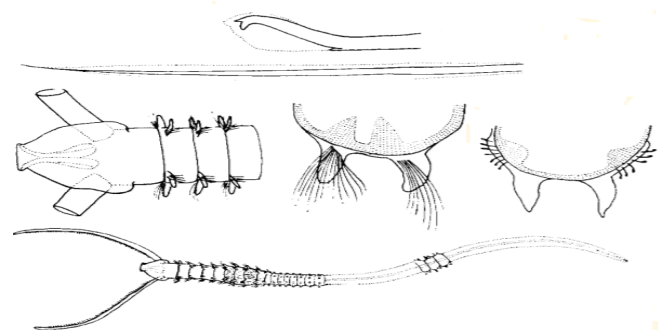
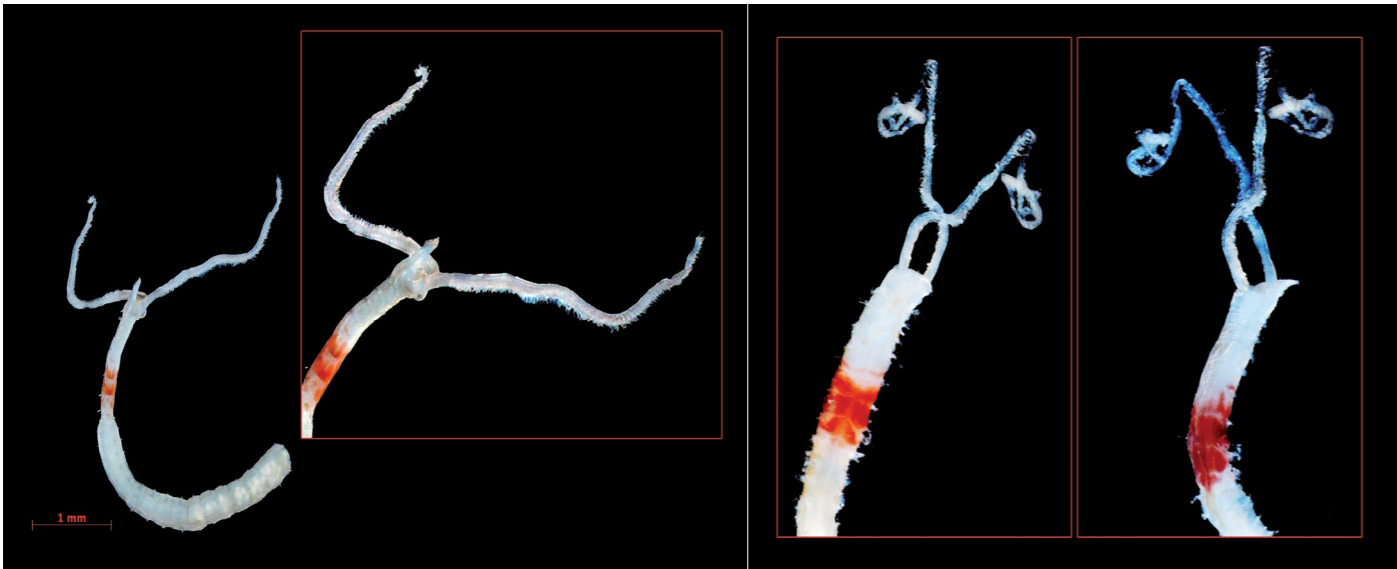


Figure 30. Diagnostic features of the family Magelonidae.  
Source: <http://www.nhm.ac.uk/>

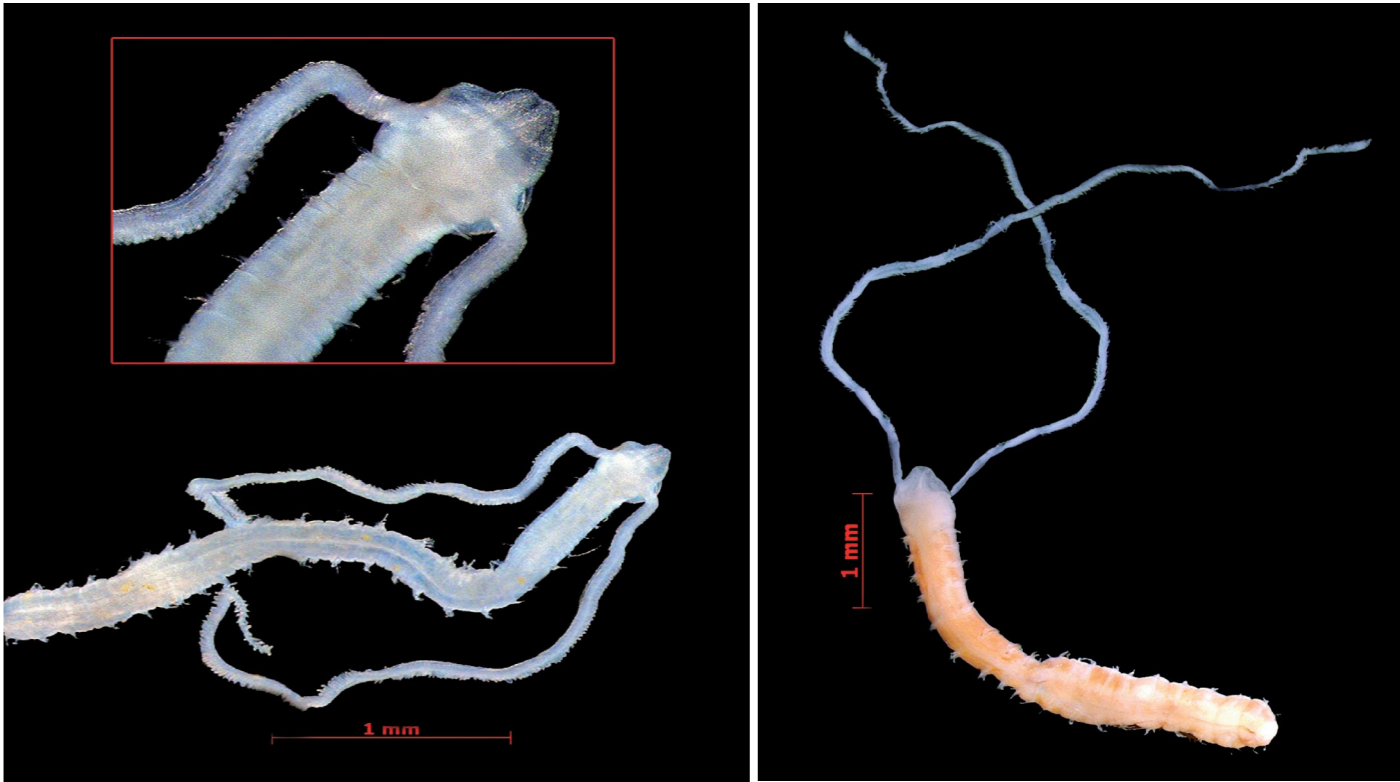


*Magelona alleni* Wilson, 1958



*Magelona cincta* Ehlers, 1908

Plate 68A *Magelona* species encountered in Qatar marine sediments.



*Magelona cf. heteropoda* Mohammad, 1973



*Magelona* sp.1

*Magelona* sp.2

Plate 68B. *Magelona* species encountered in Qatar marine sediments.

FAMILY: Chaetopteridae

These worms have many distinct sections of segments. The notopodia (parapodia are leg-like appendages - the notopodia is the upper portion) on the 12th segment is modified into long wing-like structures which secrete a mucus, forming a bag. The notopodia on segments 14, 15, and 16 are fused to form large flexible circles which fit inside the tube like a piston [Figure 31]. These three notopodia move in a synchronous, wave-like motion and draw water through the tube. This water passes through the fine mesh of the mucus bag trapping any particulates. The mucus bag is rolled into a ball and when it reaches a certain size is detached and moved to the mouth where it is engulfed. Two species *Chaetopterus variopedatus* (Renier, 1804) and *Mesochaetopterus minutus* Potts, 1914 of the family Chaetopteridae was obtained in Qatar marine sediment[Plate 69 & 70].

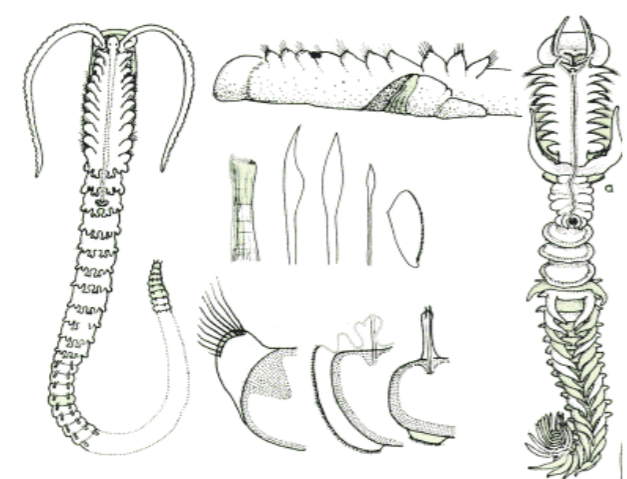


Figure 31. Diagnostic features of the family Chaetopteridae .  
Source: <http://www.nhm.ac.uk/>

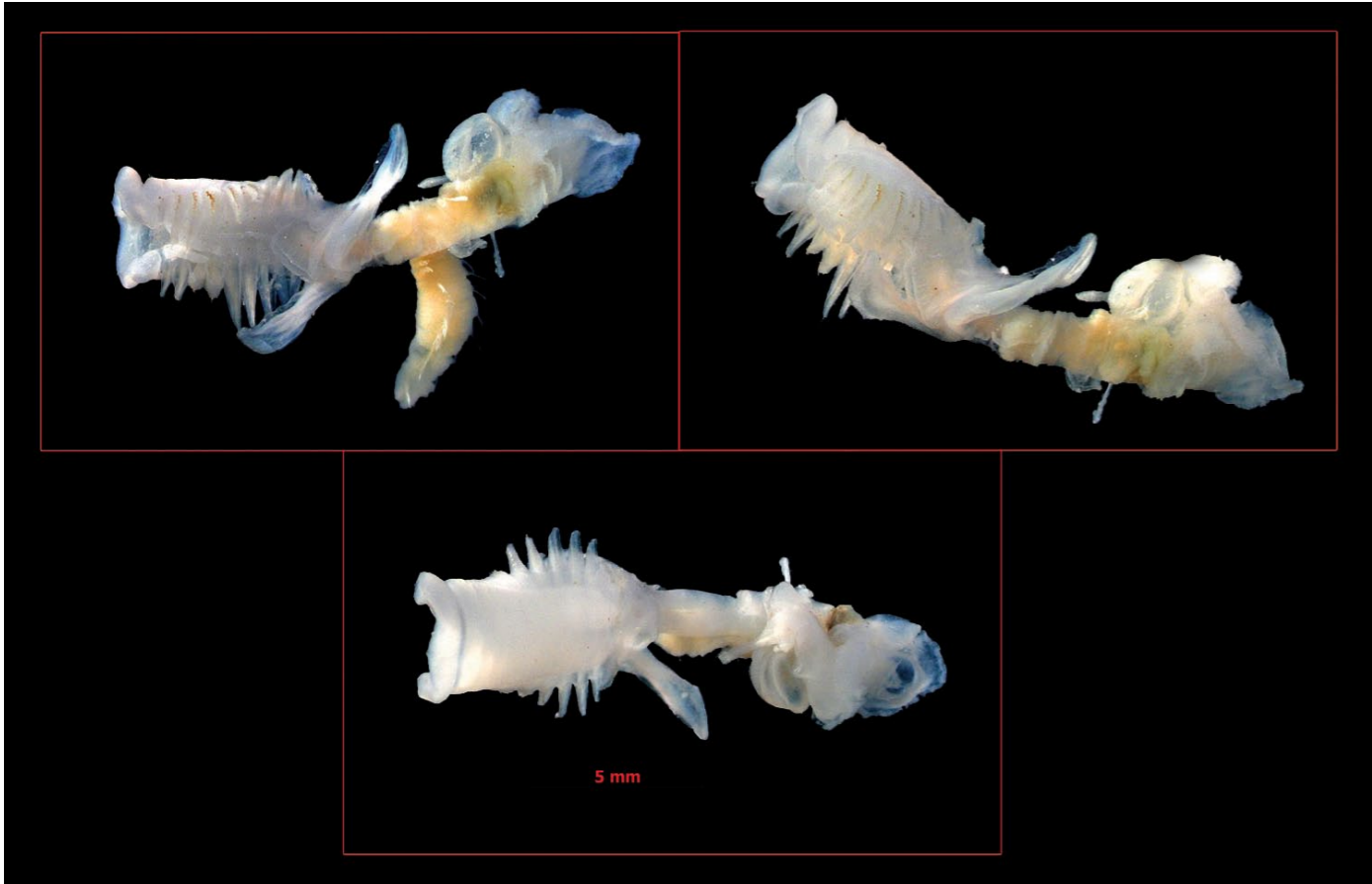


Plate 69. *Chaetopterus variopedatus* (Renier, 1804) species encountered in Qatar marine sediments.

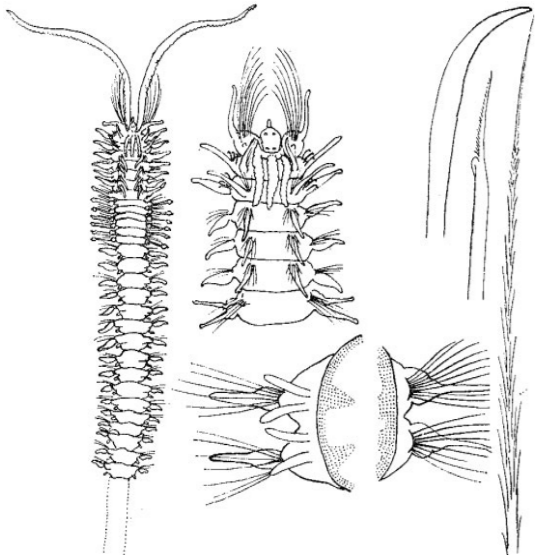


*Mesochaetopterus minutus* Potts, 1914

Plate 70. *Mesochaetopterus minutus* species encountered in Qatar marine sediments.

FAMILY: Poecilochaetidae

Distinctive worms with most species having long forward pointing chaetae forming a cephalic cage [Figure 32]. The prostomium is small with a single antenna and with palps at its corners; First segment with 1 or 2 pairs of tentacular cirri. Setae may be capillary, pectinate, plumose or acicular. Tow species *Poecilochaetus tropicus* Okuda, 1937 and *Poecilochaetus serpens* Allen of the family Poecilochaetidae was obtained in Qatar marine sediment[Plate 71].



*Poecilochaetus tropicus* Okuda, 1937

Figure 32. Diagnostic features of the family Poecilochaetidae .

Source: <http://www.nhm.ac.uk/>



Plate 71. *Poecilochaetus serpens* Allen, 1904 retrieved from Qatar marine sediments.

FAMILY: Cirratulidae (Orange Fringe Worm)

Body cylindrical with reduced parapodia. Feeding palps inserted dorsally in many species, but others have only tentacular cirri. Slender filiform branchae present in undamaged specimens but easily lost. Chaetae capillaries, but acicular or curved spines are characteristic of some genera [Figure 33]. Ten species (*Cauleriella alata* (Southern, 1914), *Cirriformia tentaculata* (Montagu, 1808), *Cirriformia* sp.1, *Cirriformia* sp.2, *Cirriformia* sp.3, *Cirratulus* sp.1, *Cirratulus* sp.2, *Cirratulus* sp.3, *Chaetozone* cf. *setosa* Malmgren (1867) and *Raricirrus* sp. of the family Cirratulidae was obtained in Qatar marine sediment [Plate 72, 73 (A,B), 74, 75 and 76].

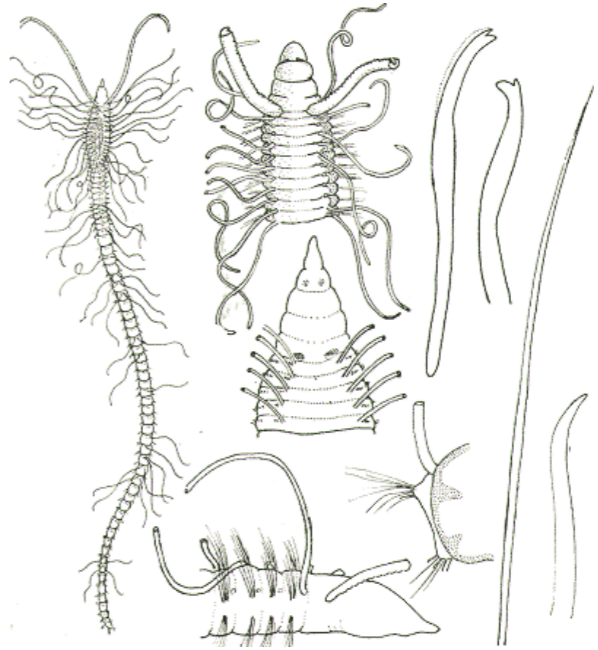
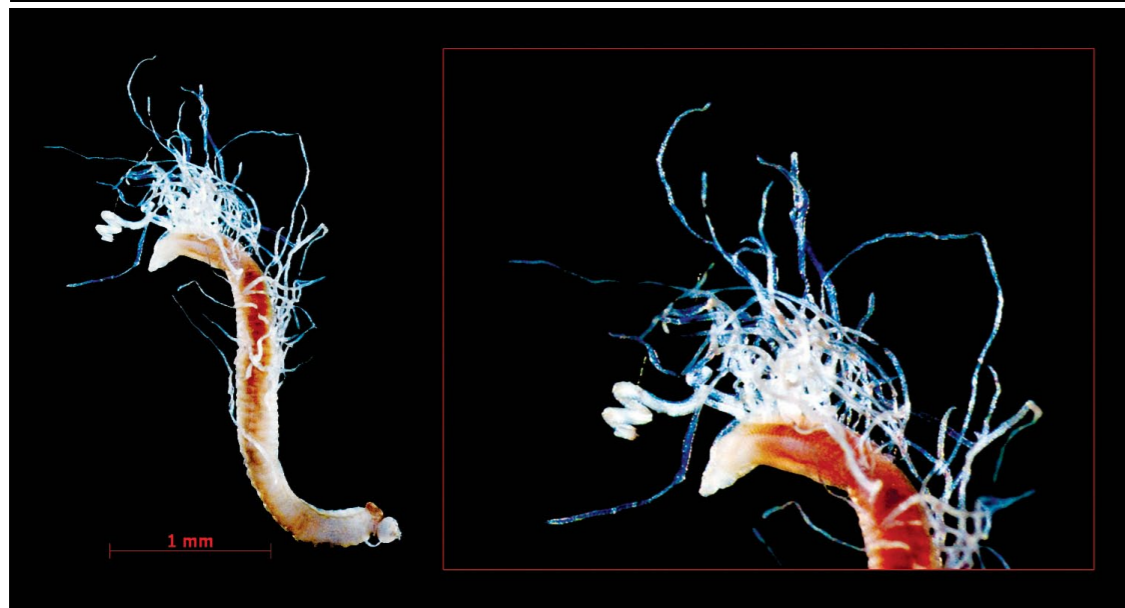


Figure 33. Diagnostic features of the family Cirratulidae.

Source: <http://www.nhm.ac.uk/>



Plate 72. *Cauleriella alata* (Southern, 1914) encountered in Qatar marine sediments.

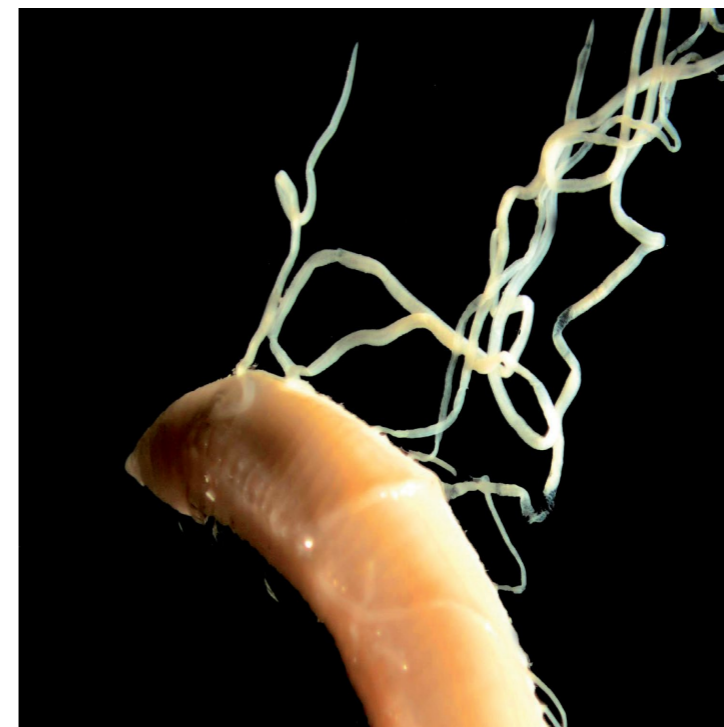


*Cirriformia tentaculata* (Montagu, 1808)

Plate73A. *Cirriformia tentaculata* (Montagu, 1808) encountered in Qatar marine sediments.



Plate73A. *Cirriformia tentaculata* (Montagu, 1808) encountered in Qatar marine sediments.

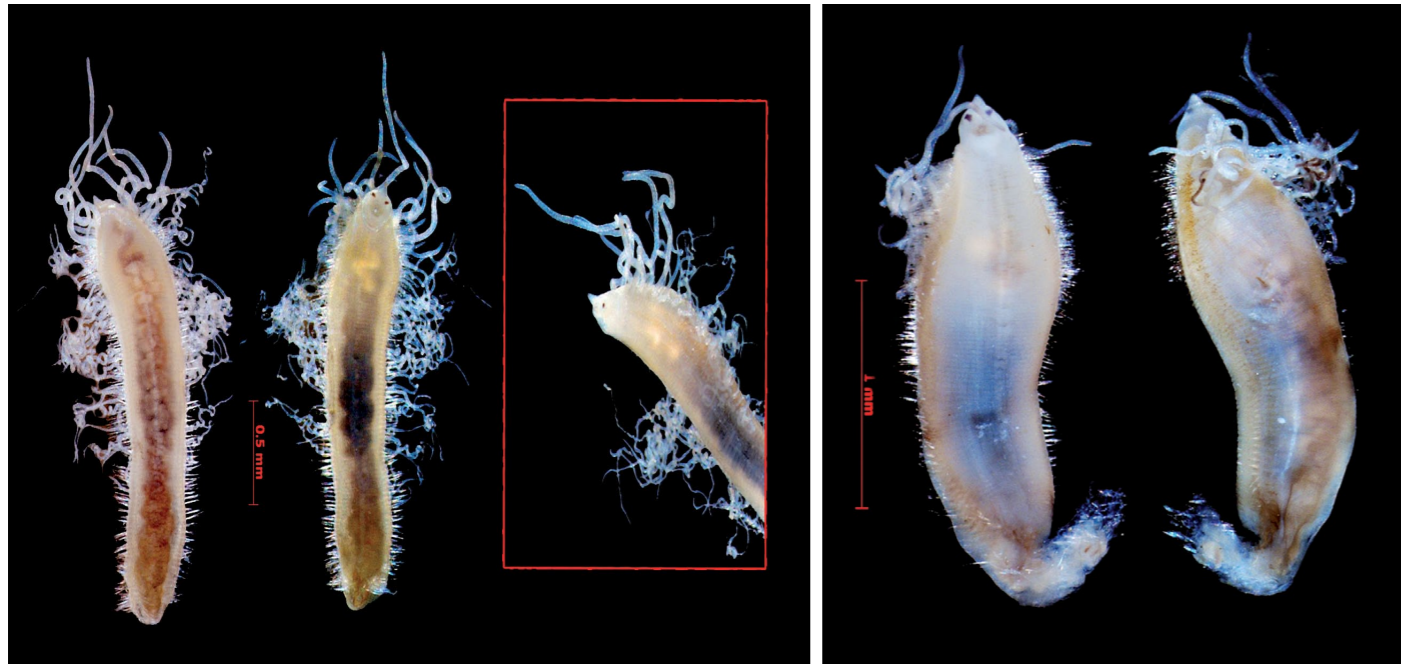


*Cirriformia* sp.1



*Cirriformia* sp.2

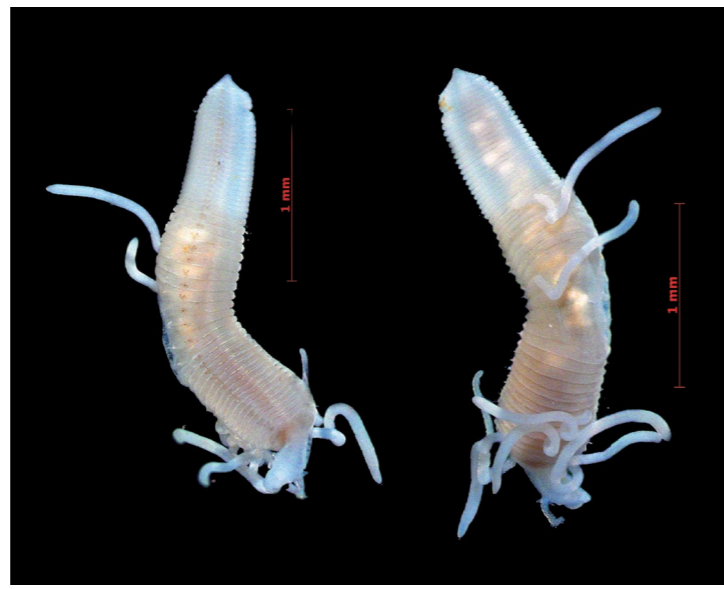
Plate74. *Cirriformia* species encountered in Qatar marine sediments.



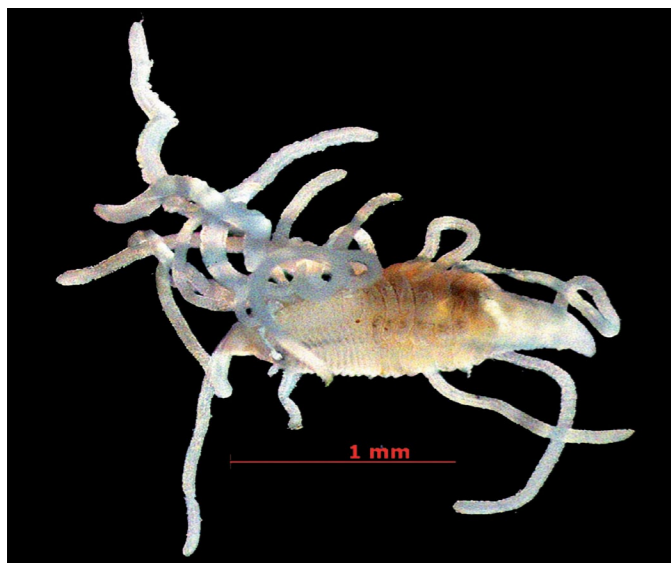
*Cirriformia* sp.3



*Cirriformia* sp.3



*Cirratulus* sp.1

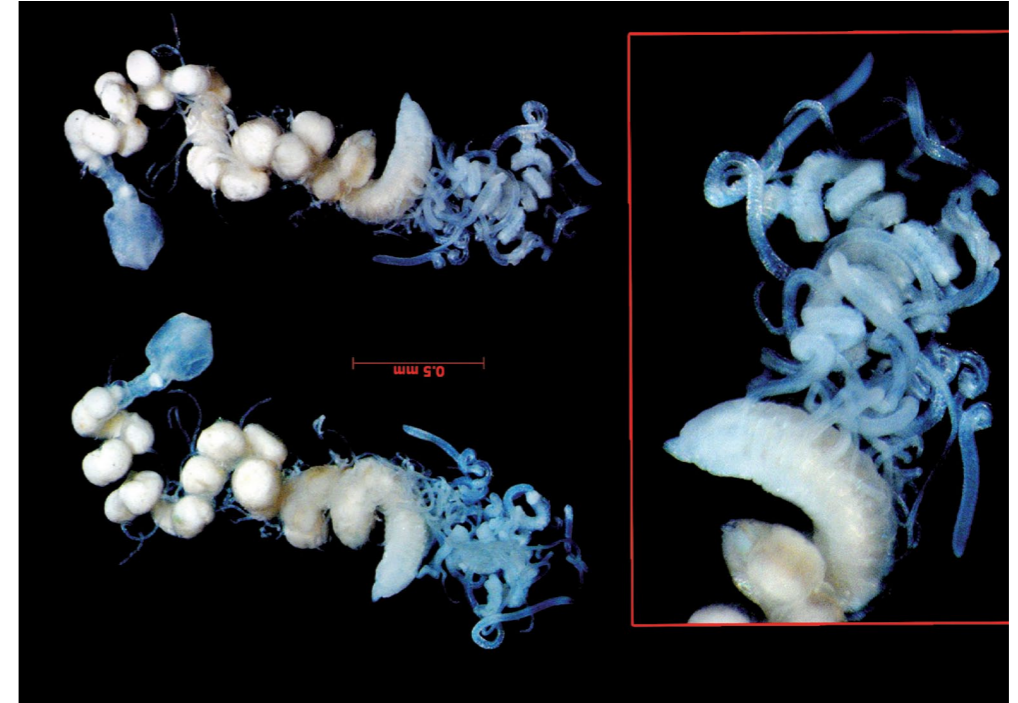


*Cirratulus* sp.2

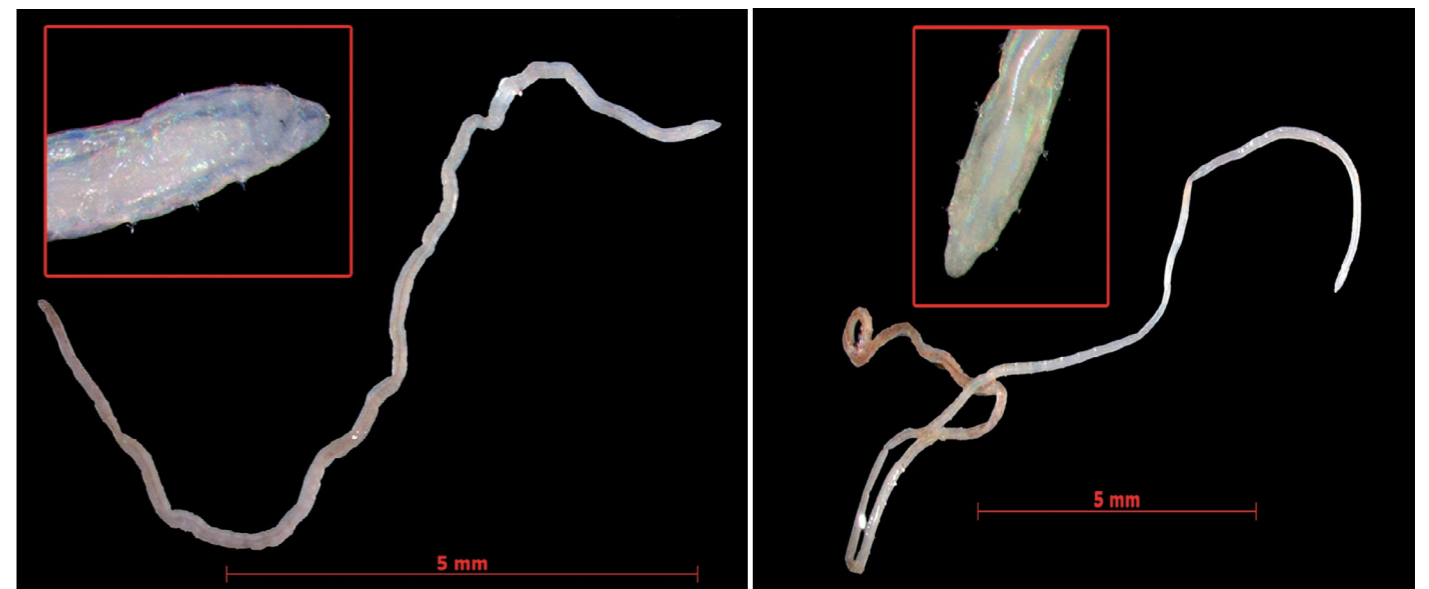


*Cirratulus* sp.3

Plate 75. *Cirrophorus* and *Cirratulus* species encountered in Qatar marine sediments.



*Chaetozone* cf. *setosa* Malmgren, 1867



*Raricirrus* sp.

Plate 76. *Chaetozone* and *Raricirrus* species encountered in Qatar marine sediments.

FAMILY: Heterospionidae (Longosomatidae )

Body long and slender, divided into 2 regions: the anterior of short segments and the posterior of elongate ones. The thorax has long filiform branchae on all segments. All setae capillaries or acicular spines and these may form complete belts around the body [Figure 34]. One species only was found ( *Heterospio* cf. *sinica* Wu & Chen, 1966 [Plate 77] ).

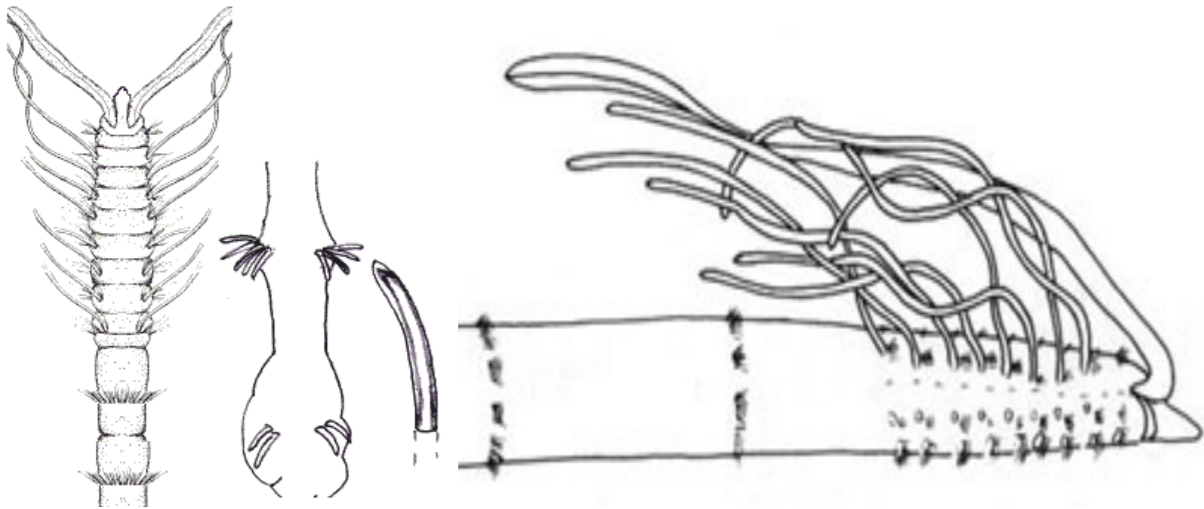


Figure 34. Diagnostic features of the family Heterospionida.  
Source: <http://www.nhm.ac.uk/>

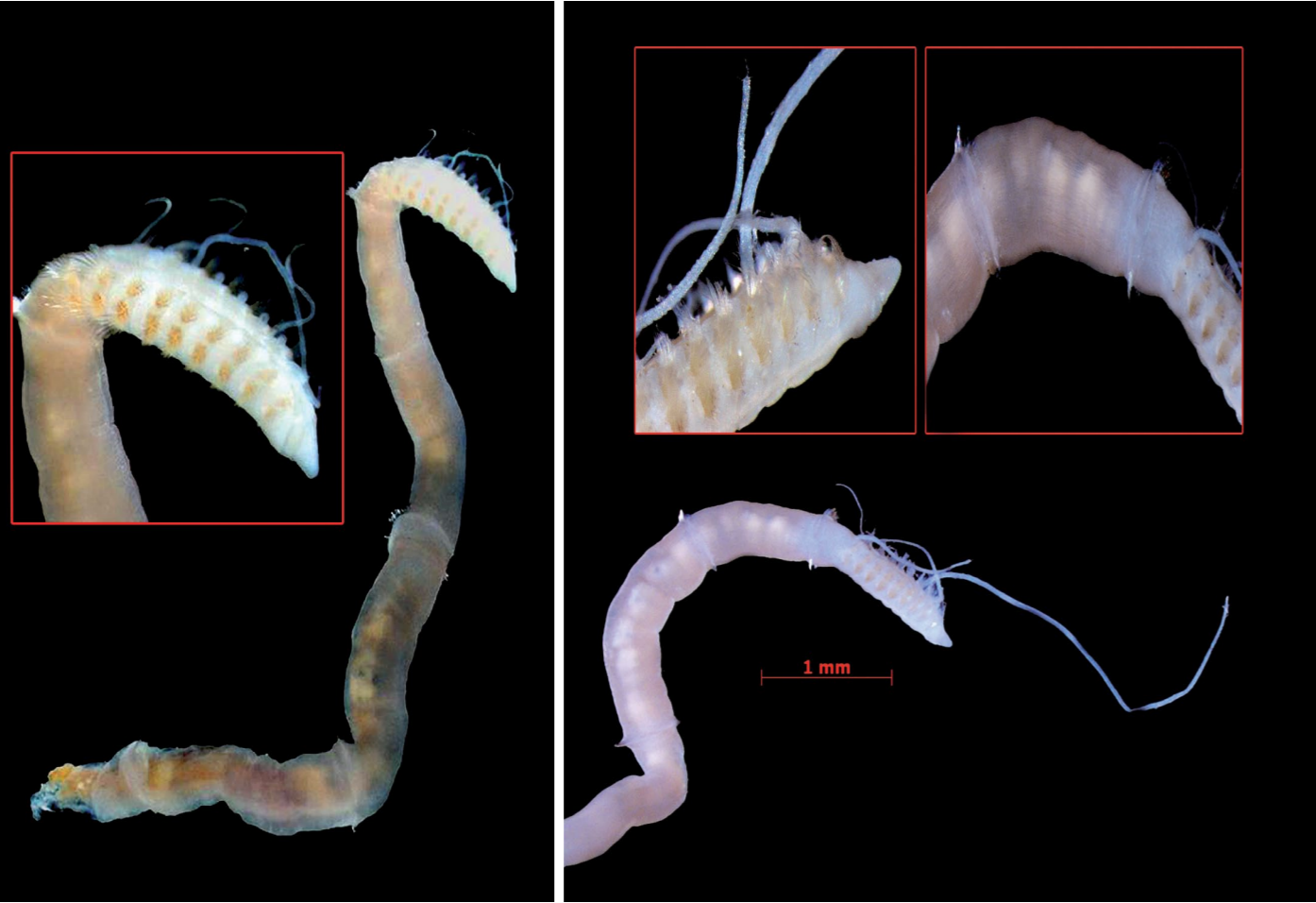


Plate 77. *Heterospio* cf. *sinica* Wu & Chen, 1966 retrieved from Qatar marine sediments.

FAMILY: Orbiniidae

Body clearly divided into a muscular flattened thorax with reduced parapodia followed by a more cylindrical abdomen. The prostomium is usually conical but may sometimes be a rounded lobe; there are no sensory appendages or palps. Eversible pharynx is unarmed. Cirriform branchae extend over most of the body. Setae are crenulate capillaries and acicular spines in the thorax (Figure 35). Four species were obtained *Scolaricia capensis* Day, 1961, *Scoloplos armiger* (Müller, 1776), *Scoloplos chevalier* (Fauvel, 1902) and *Leodamus* sp. [Plate 78].

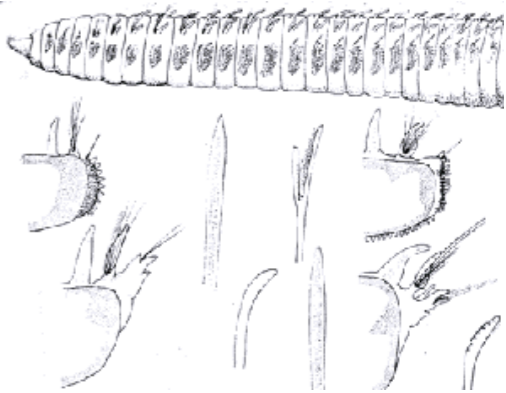
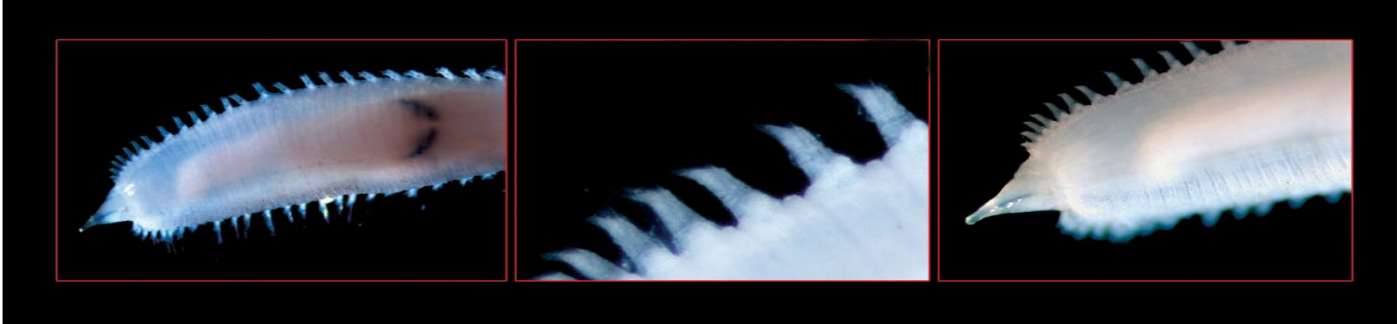
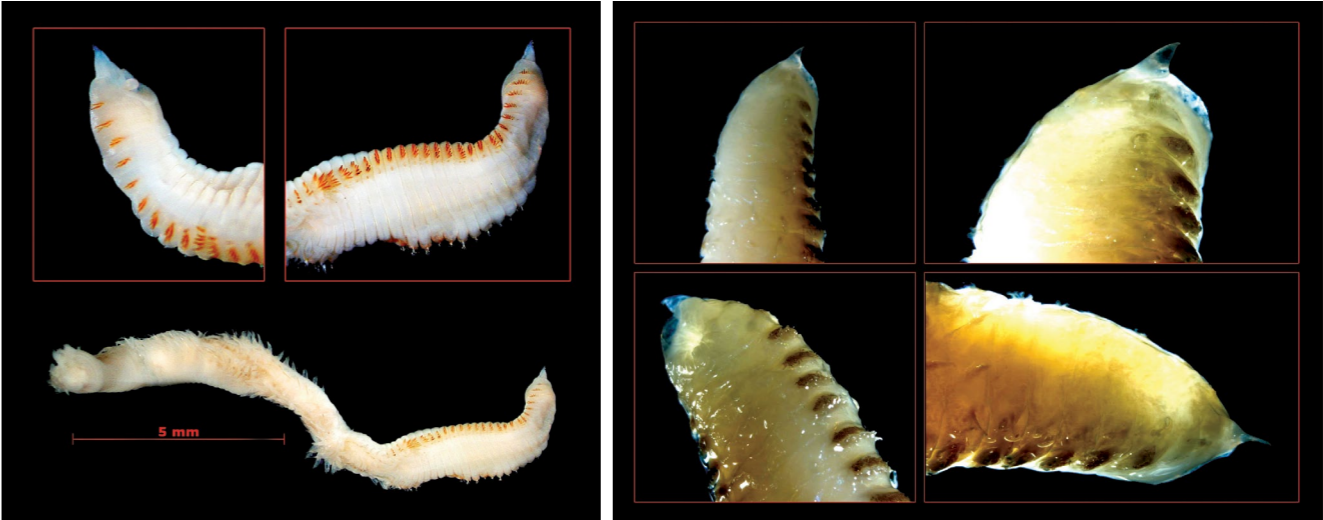


Figure 35. Diagnostic features of the family Orbiniidae.  
Source: <http://www.nhm.ac.uk/>

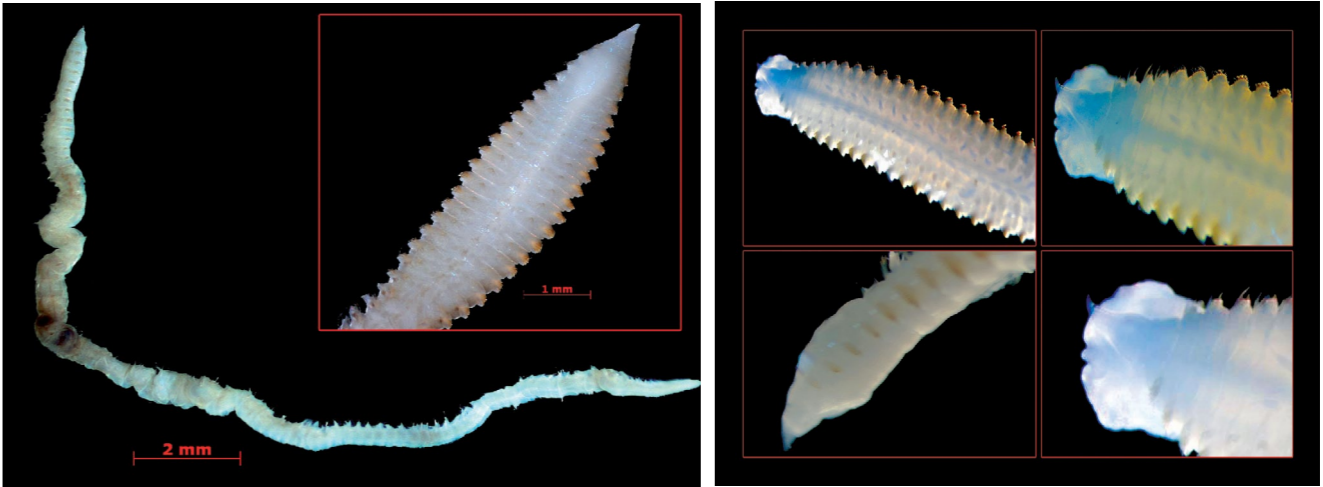


*Scolaricia capensis* Day, 1961



*Scoloplos armiger* (Müller, 1776)

*Scoloplos chevalier* (Fauvel, 1901)



*Leodamus* sp.

Plate 78. *Scolaricia*, *Scoloplos* and *Leodamus* encountered in Qatar marine sediments.

**FAMILY: Opheliidae** (Lancelet worms)

Torpedo or grub-shaped with relatively few segments and often a ventral groove. Cirriform branchae usually present above some of the notopodia of the poorly developed parapodia; lateral segmental eyes are sometimes present. The prostomium is pointed and the proboscis unarmed. The pygidium is often elongated and tubular. Setae are simple capillaries throughout [Figure 36]. Twelve species were found: *Armandia intermedia* Fauvel, 1902 [Plate 79], *Armandia brevis* (Moore, 1906), *Armandia leptocirrus* Grube, 1878, *Armandia* sp.1, *Armandia* sp.2, *Armandia* sp.3, *Armandia* sp.4 and *Armandia* sp.5 [Plate 80A & B]. *Ophelia rullieri* Bellan, 1975, and *Ophelia* cf. *bicornis* Savigny, 1818, *Ophelina* cf. *cylindricaudata* Jirkov, 2001, *Ophelina acuminata* Örsted, 1843 and *Ophelina* sp. [Plate 81A&B].

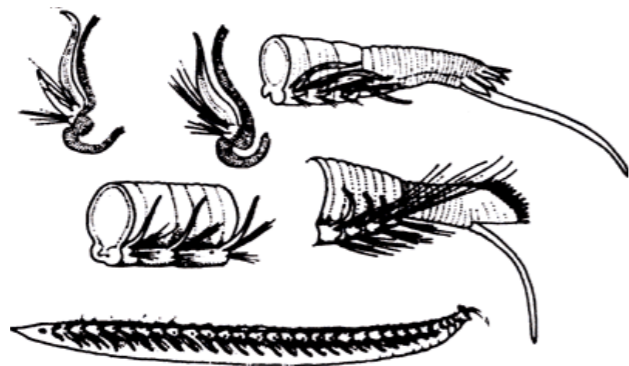


Figure 36. Diagnostic features of the family Opheliidae.  
Source: <http://www.nhm.ac.uk/>



*Armandia brevis* (Moore, 1906)

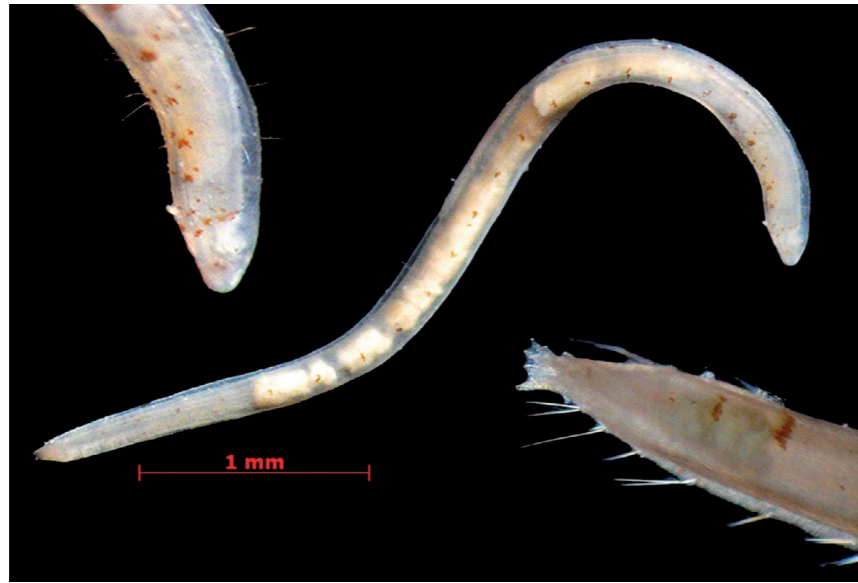


Plate 79. *Armandia intermedia* Fauvel, 1902 encountered in Qatar marine sediments.



*Armandia leptocirrus* Grube, 1878

Plate 80A. *Armandia* species in Qatar marine sediments.



*Armandia* sp.2



*Armandia* sp.3

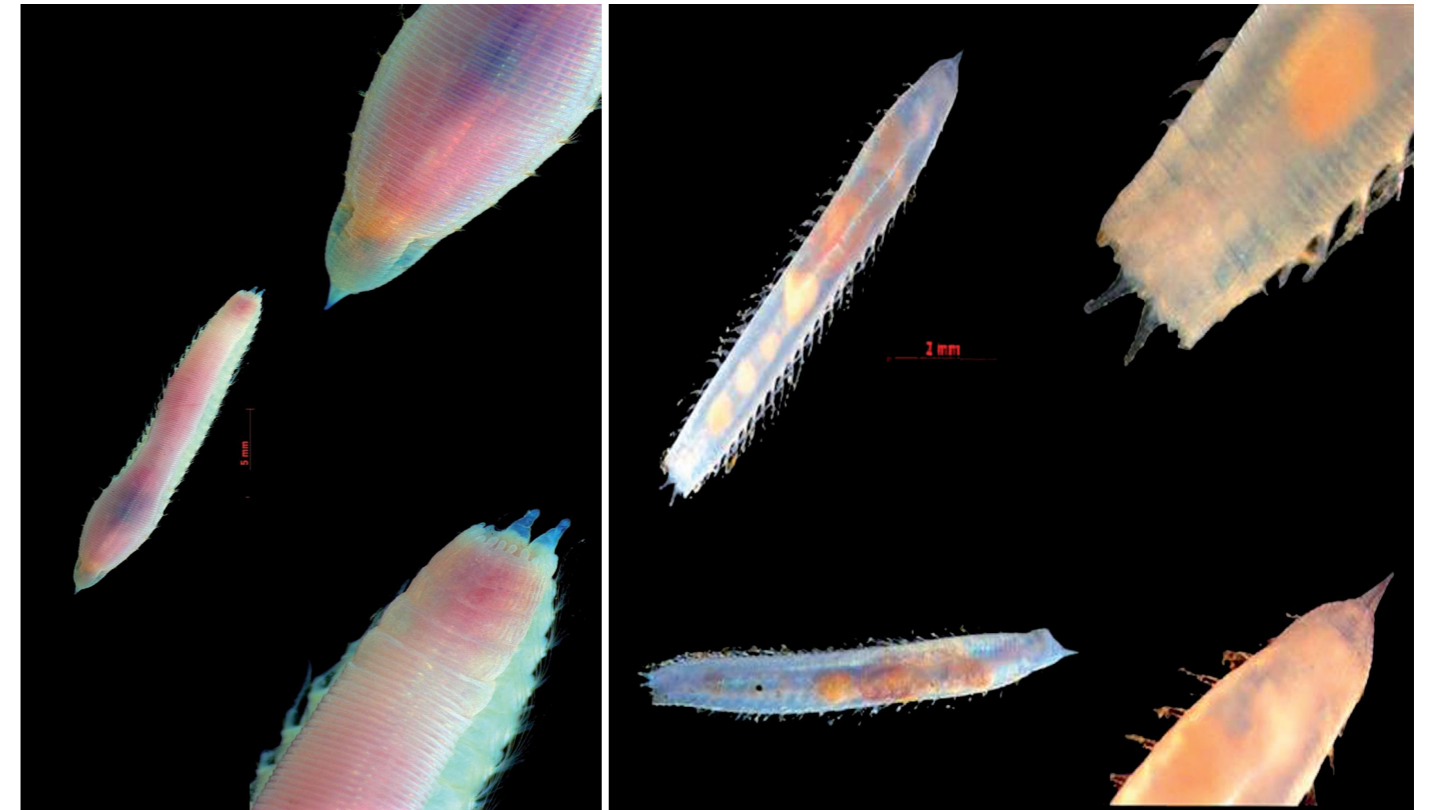


*Armandia* sp.4

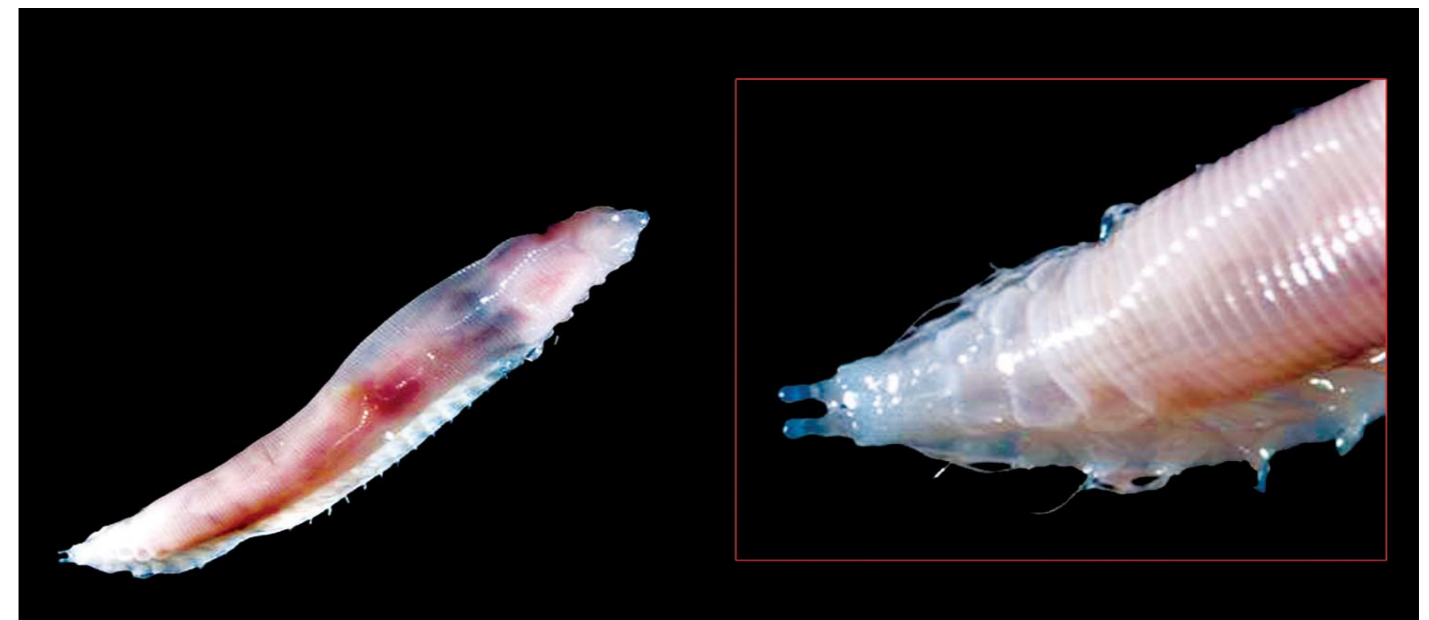


*Armandia* sp.5

Plate 80B. *Armandia* species in Qatar marine sediments.

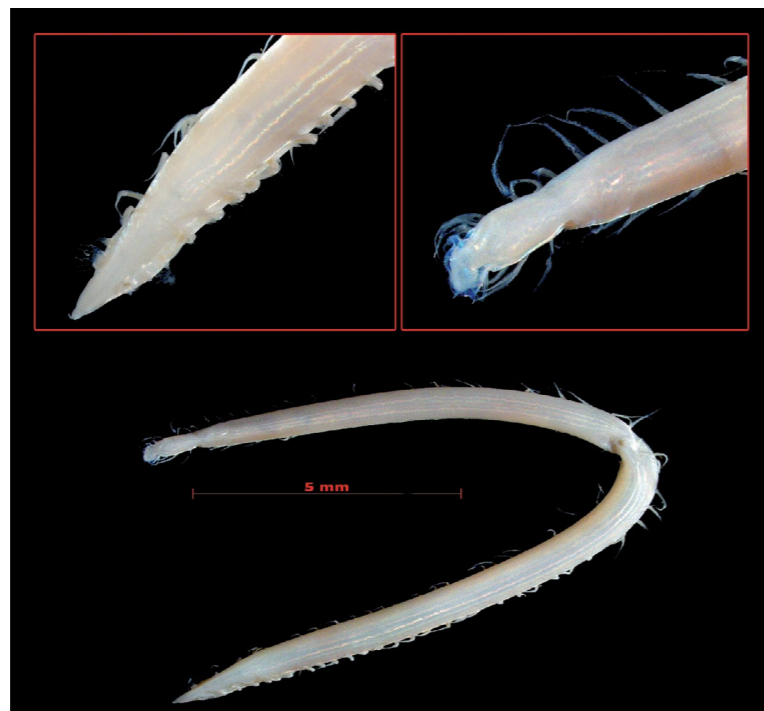


*Ophelia* cf. *bicornis* Savigny, 1818



*Ophelia* *rullieri* Bellan, 1975

Plate 81A. *Ophelia* species in Qatar marine sediments.



*Ophelina* cf. *cylindricaudata* Jirkov, 2001



*Ophelina acuminata* Örsted, 1843



*Ophelina* sp.

Plate 81B. *Ophelina* species in Qatar marine sediments.

# **FAMILY: Capitellidae** (Maitre d' Worm)

Conical prostomium without appendages followed by a well developed peristomium. Thorax with capillary setae and rostrate hooded hooks. No capillaries in the abdomen, only hooks [Figure 37]. Eight species belonging to three genera *Capitella* (2) [Plate 82], *Dasybranchus* (2) [Plate 83], and *Notomastus* (5) [Plate 84 A & B] were obtained.

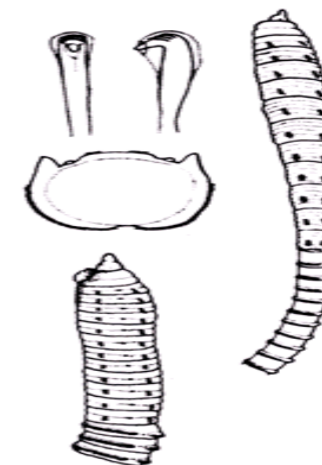


Figure 37. Diagnostic features of the family Capitellidae.

Source: <http://www.nhm.ac.uk/>

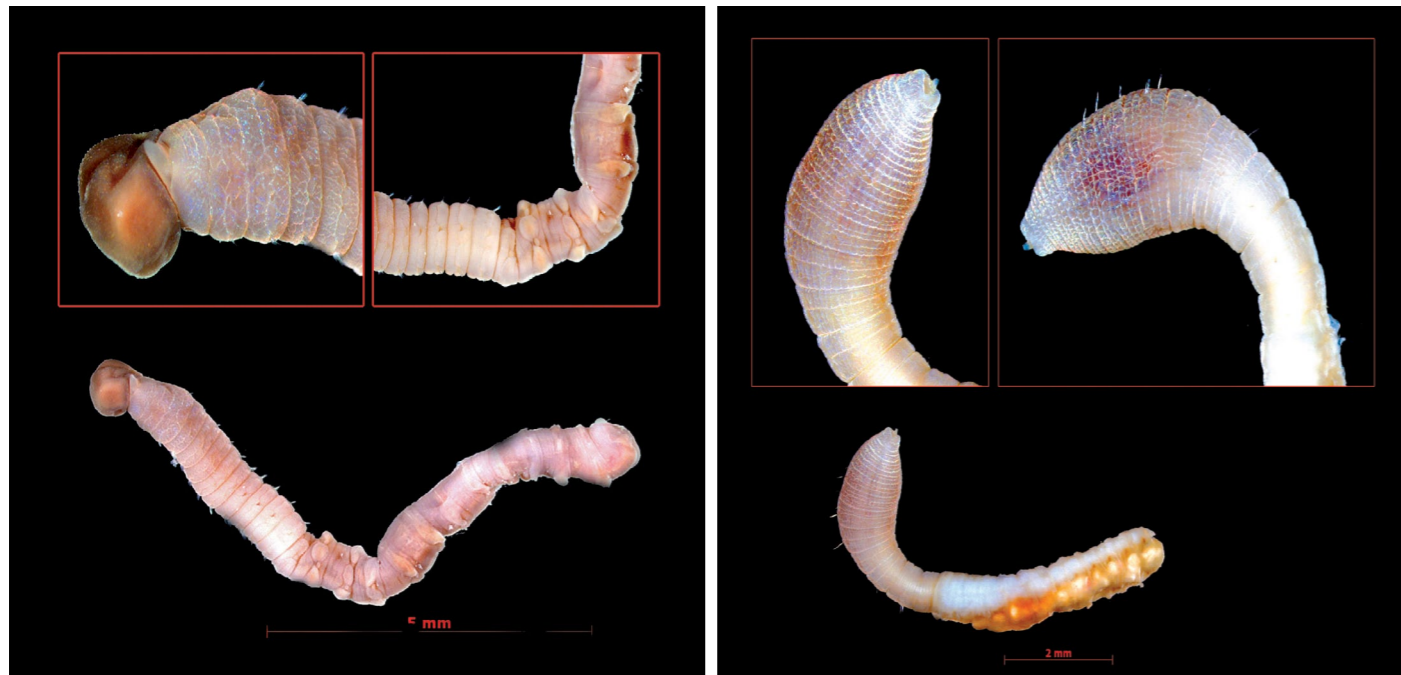


*Capitella capitata* (Fabricius, 1780)

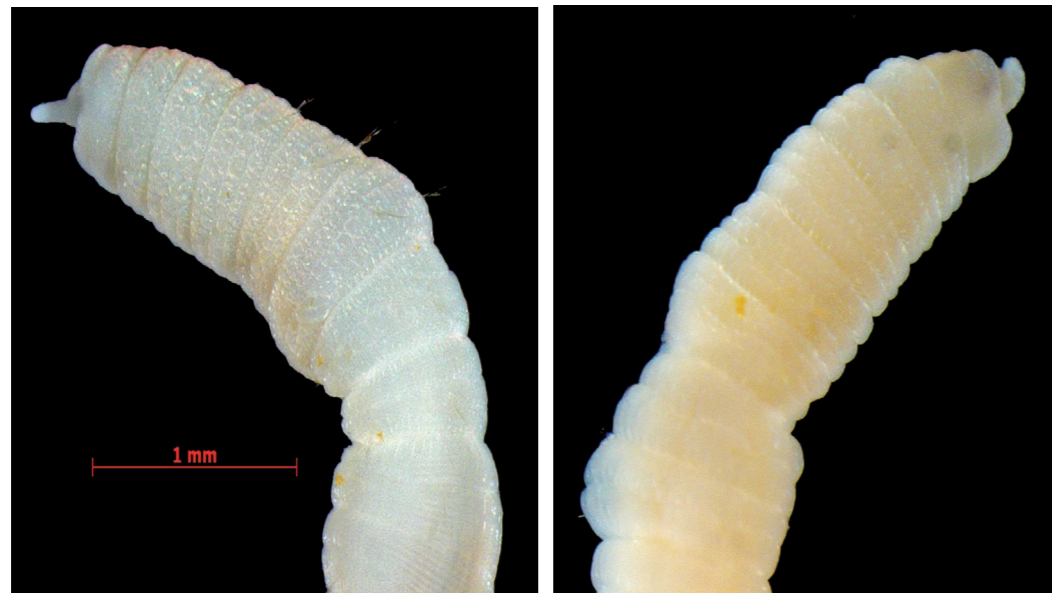


*Capitella* sp.

Plate 82. *Capitella* in Qatar marine sediments.

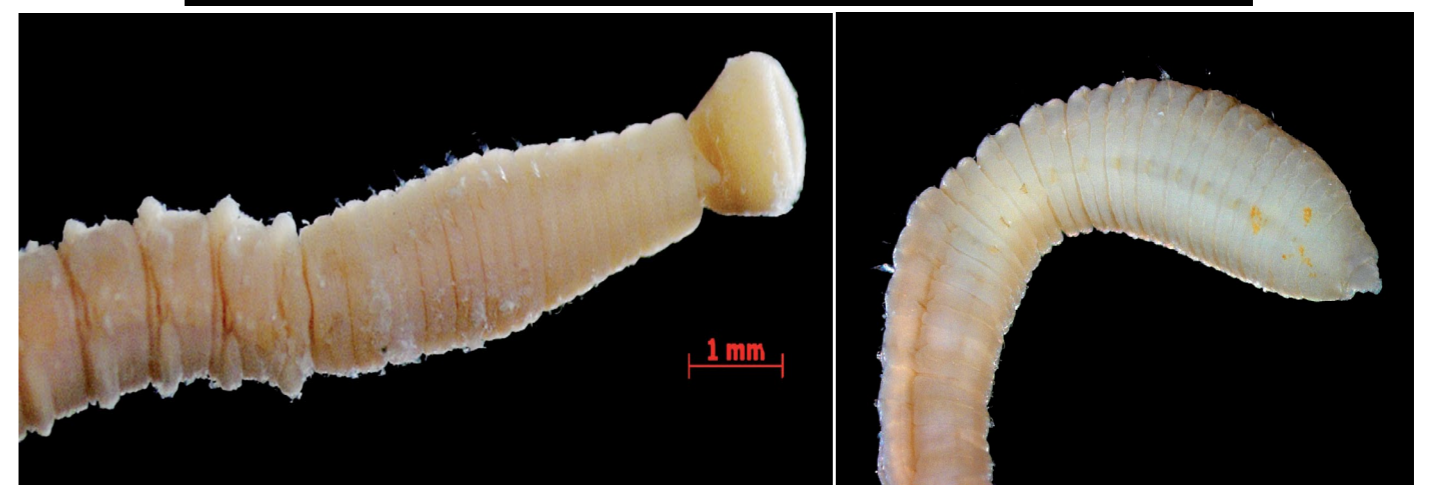
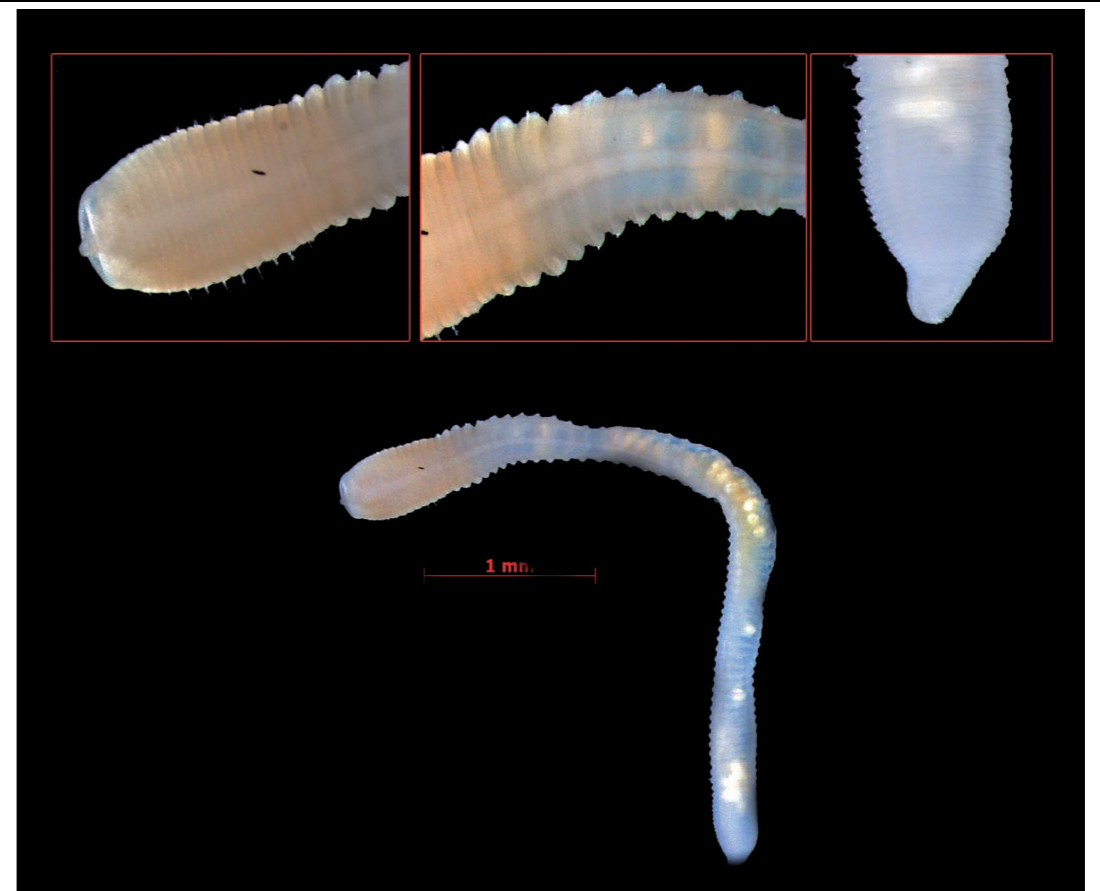
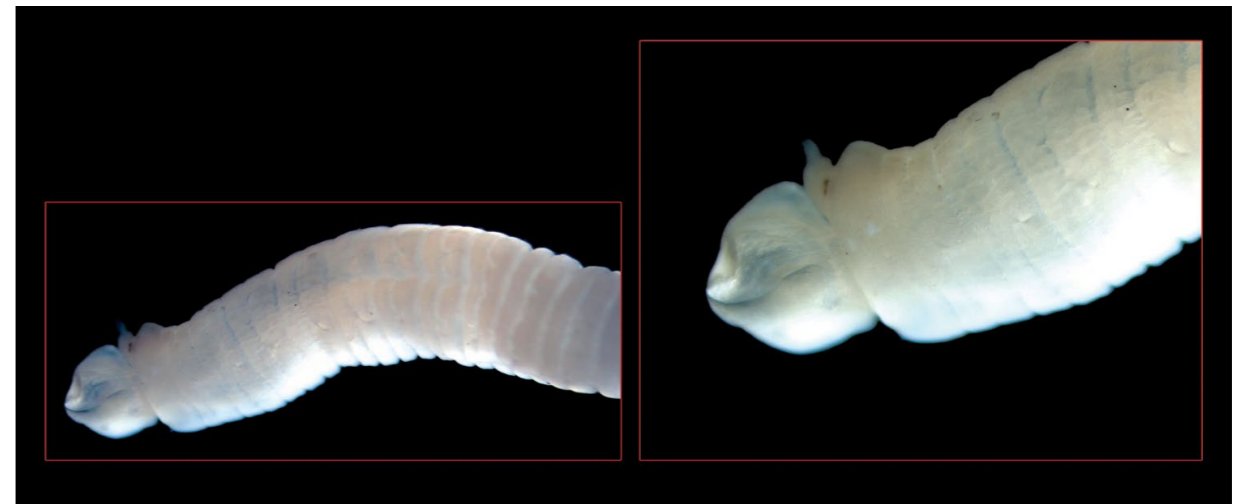


*Dasybranchus caducus* (Grube, 1846)



*Dasybranchus* sp.

Plate 83. *Dasybranchus* species in Qatar marine sediments.

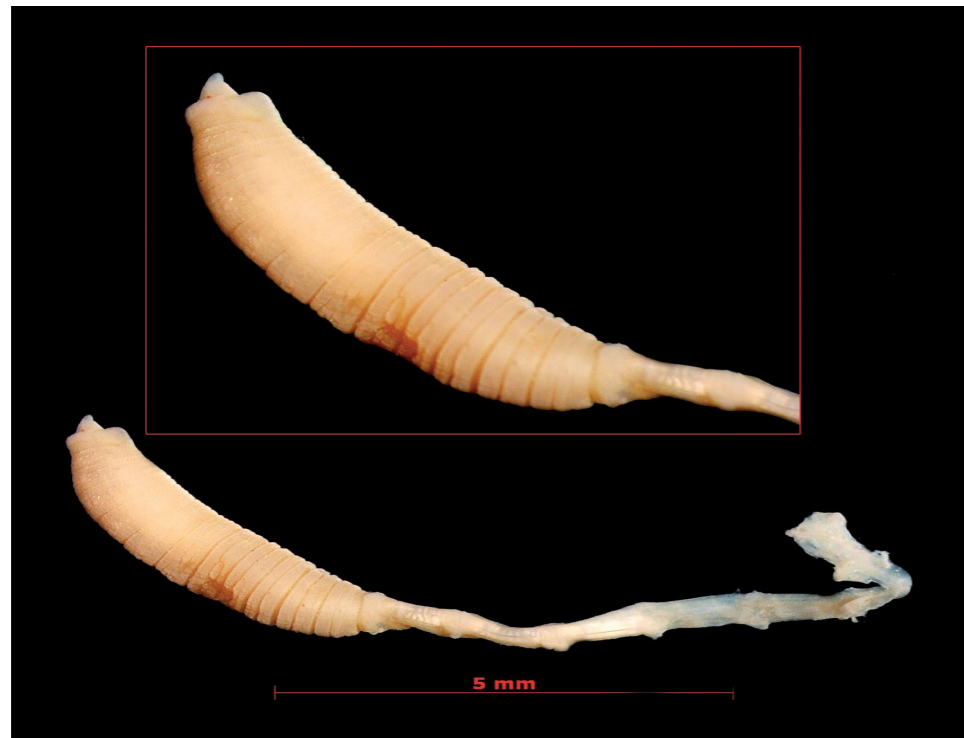


*Notomastus latericeus* Sars, 1851

Plate 84A. *Notomastus* species in Qatar marine sediments.



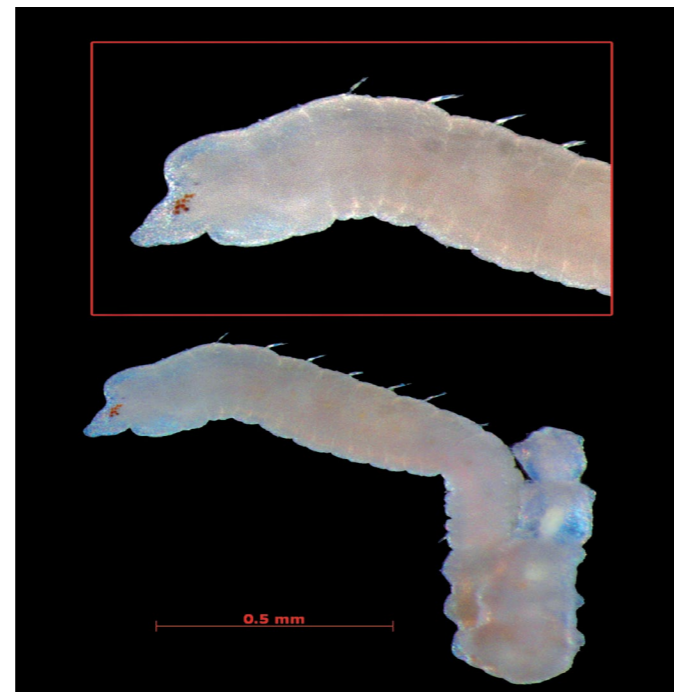
*Notomastus cf. agassizii* McIntosh, 1885



*Notomastus* sp. 1



*Notomastus* sp. 2



*Notomastus* sp. 3

Plate 84B. *Notomastus* species in Qatar marine sediments.

# **FAMILY: Cossuridae (Maitre d' Worm)**

The diagnostic family character of cossurids is a unique single elongate cylindrical filament originating from the mid-dorsal of an anterior segment. Prostomium without appendages but a single filamentous dorsal palp is present on an anterior segment ; these are usually retained after all but the roughest sample treatment. Setae are simple but have fine serrations. Cossurids are slender, deposit-feeding worms. Most species are very similar. The mid-dorsal filament, long called a tentacle. Adult size: To 20 mm length by 0.7 mm wide [Figure 38]. Two species belonging to the genus *Cossura*: *Cossura longocirrata* Webser & Benedict, 1887 and *Cossura* sp. were obtained [Plate 85].

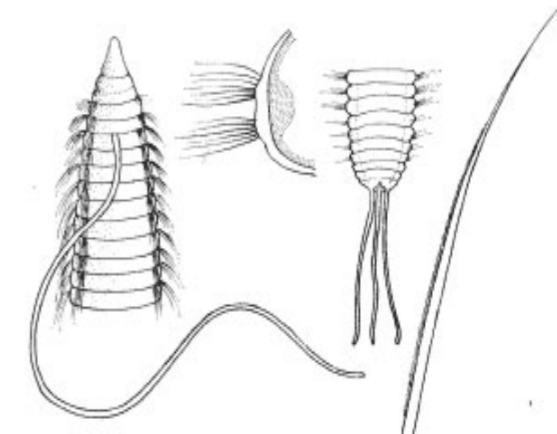
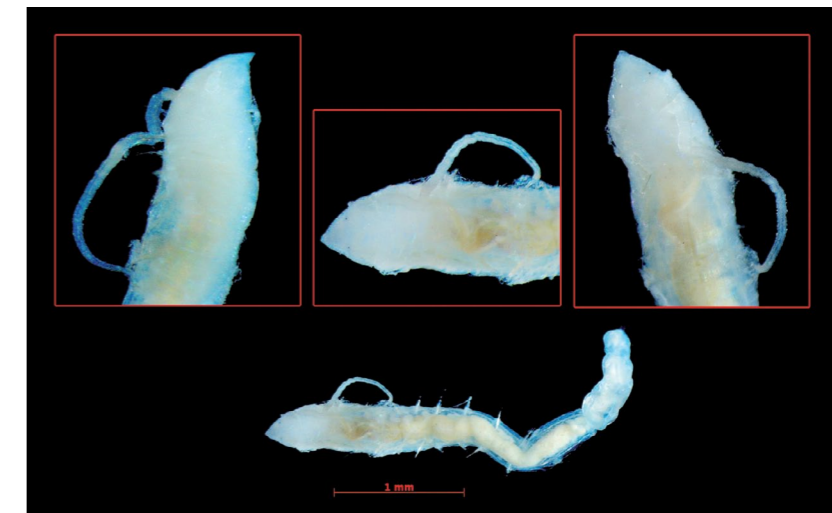


Figure 38. Diagnostic features of the family Cossuridae.

Source: <http://www.personal.cityu.edu.hk/>



*Cossura longocirrata* Webser & Benedict, 1887



*Cossura* sp.

Plate 85. *Cossura* species in Qatar marine sediments.

**FAMILY: Paraonidae** (Slender burrowing worms)

Slender burrowing worms with characteristic pairs of short belt-like to leaf-like gills present from about chaetiger four through a limited number of anterior segments. A short median-dorsal antenna on the prostomium is diagnostic but not present in all genera. Usually small slender worms with numerous segments. The prostomium is conical and a median dorsal antenna is often present. Dorsal digitate branchae are present on a number of median segments. All setae are simple and may include spines and a variety of modified forms (winged, forked). Adult size: To 40 mm length by 1 mm width, but usually much smaller. Paraonids are tiny thread-like worms. They are non-selective deposit feeders and burrow just below the surface of sandy mud. Their gut is full of sand grains and the detritus [Figure 39]. Seven species *Aricidea catherinae* Laubier, 1967, *Aricidea* cf. *suecica* Eliason, 1920, *Aricidea mutabilis* Cerruti, 1909, *Aricidea minuta* Southward, 1956, *Aricidea sanmartini* Aguado & Lopez, 2003, *Aricidea* sp. and *Paradoneis* sp. were obtained [Plate 86 A, B & C].

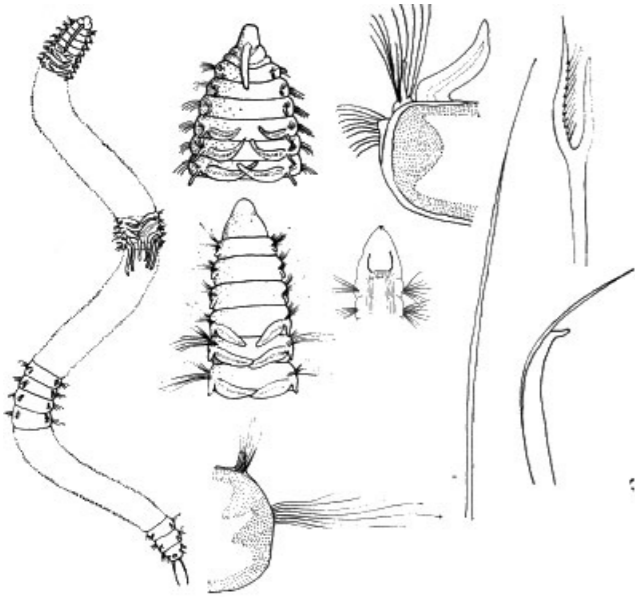
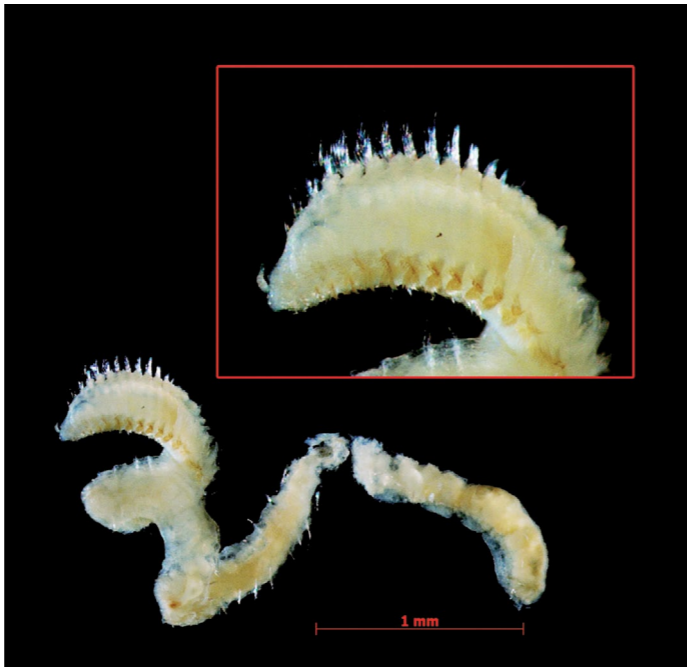
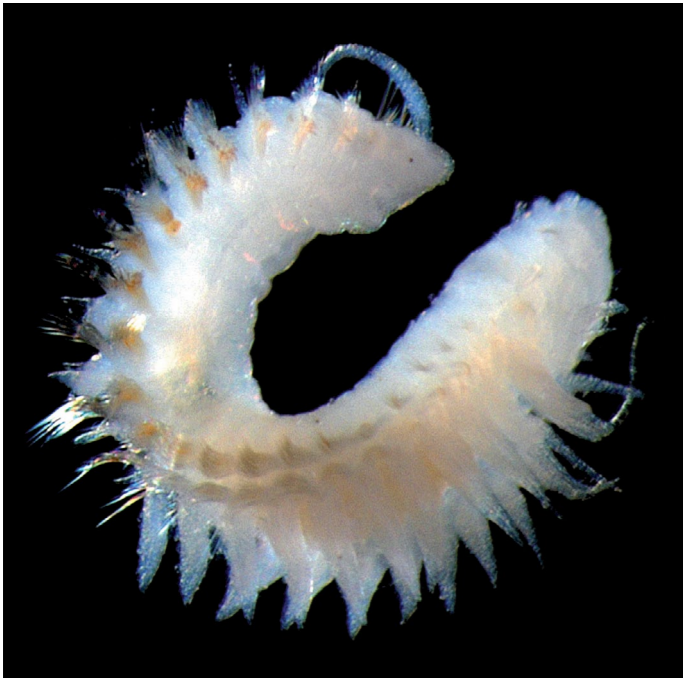


Figure 39. Diagnostic features of the family Paraonidae .  
Source: <http://www.nhm.ac.uk/>



*Aricidea catherinae* Laubier, 1967



*Aricidea* cf. *suecica* Eliason, 1920



*Aricidea mutabilis* Cerruti, 1909



*Aricidea minuta* Southward, 1956



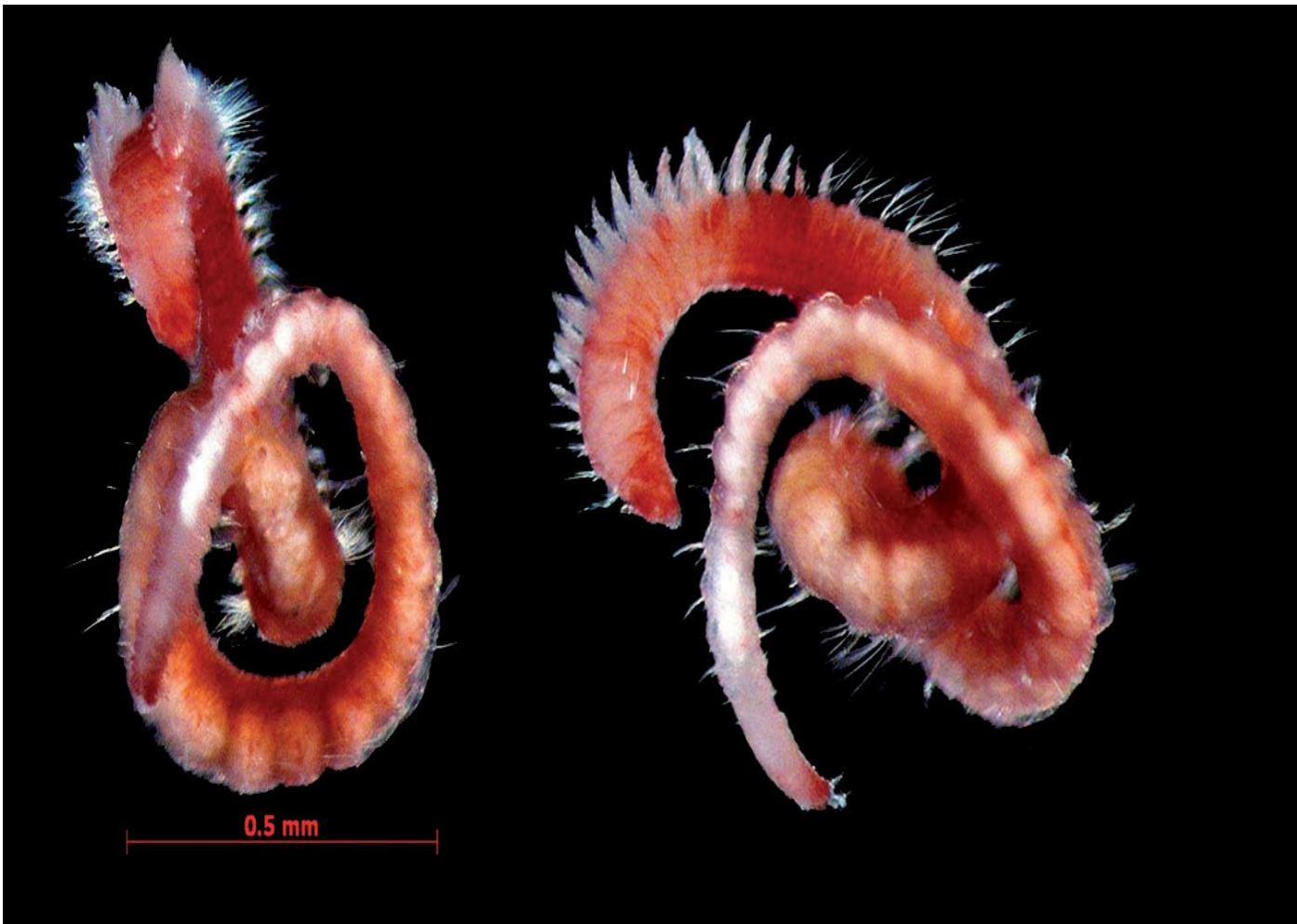
*Aricidea sanmartini* Aguado & Lopez, 2003

Plate 86A. *Aricidea* species in Qatar marine sediments.

Plate 86B. *Aricidea* species in Qatar marine sediments.



*Aricidea* sp.



*Paradoneis* sp.

Plate 86C. *Aricidea* and *Paradoneis* species in Qatar marine sediments.

**FAMILY : Maldanidae (Bamboo worms)**

Most segments longer than wide giving «Bamboo worm» appearance. The prostomium may be in the form of a flat plate with a central crest and well marked nuchal slits. Mouth is ventral with a papillose proboscis. Poorly developed biramous parapodia. Pygidium a plate, conical, funnel shaped or petaloid. Pygidium a plate, conical, funnel shaped or petaloid [ Figure 40]. Eleven species *Euclymene lumbricoides* (Quatrefages, 1865), *Euclymene robusta* (Arwidsson, 1906), *Euclymene* sp.1, *Euclymene* sp.2, *Clymenella* sp., *Maldane* cf. *sarsi* Malmgren, 1865, *Maldane* sp.1, *Maldane* sp.2, *Maldane* sp.3, *Maldane* sp.4 and *Praxillella gracilis* (M. Sars, 1861). were found [Plate 87A & B] and [Plate 88A & B].

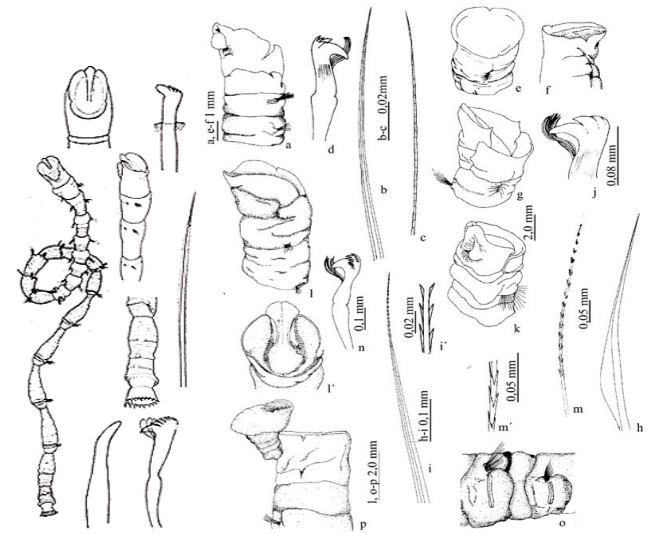


Figure 40. Diagnostic features of the family Maldanidae.

Source: <http://www.nhm.ac.uk/>



*Euclymene lumbricoides* (Quatrefages, 1865)

Plate 87A. *Euclymene* and *Maldane* species in Qatar marine sediments.



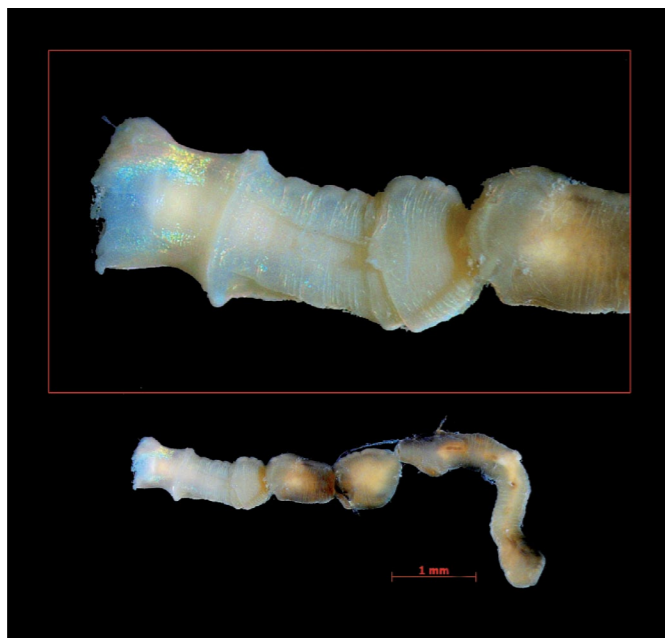
*Euclymene robusta* (Arwidsson, 1906)



*Euclymene* sp.1

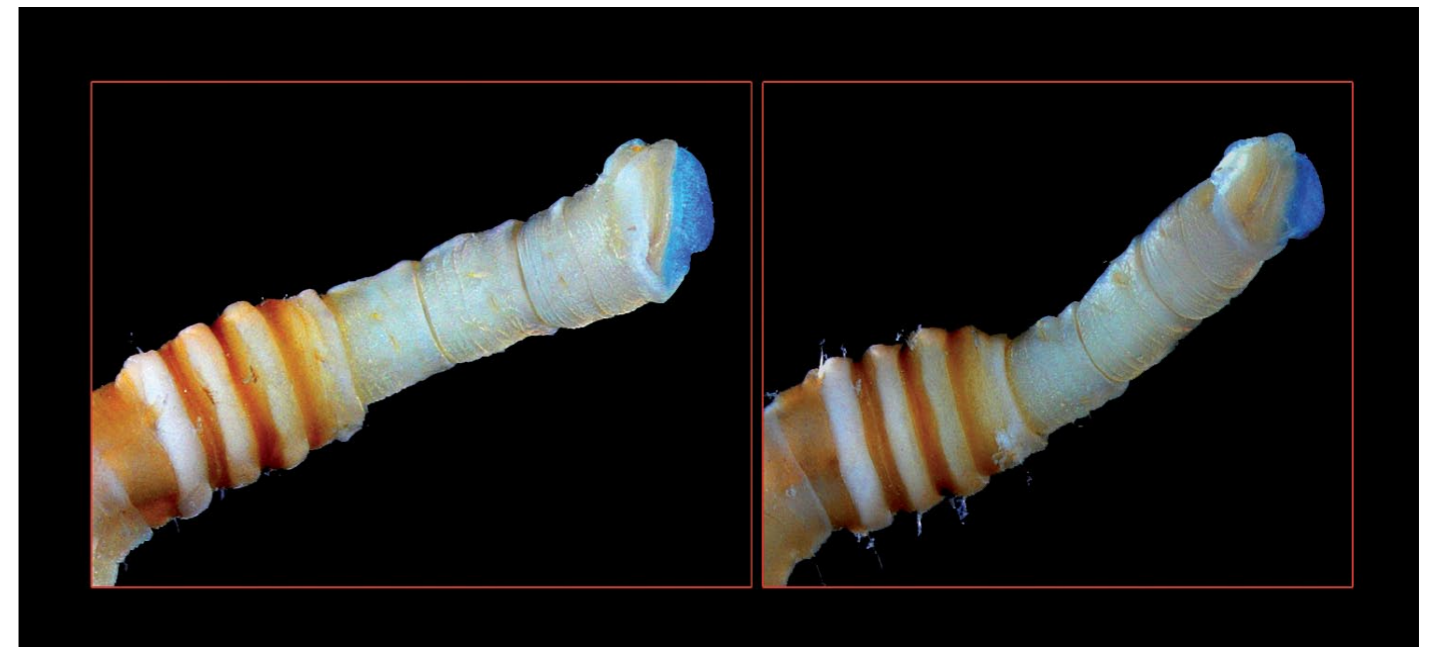


*Euclymene* sp.2



*Clymenella* sp.

Plate 87B. *Euclymene* and *Clymenella* in Qatar marine sediments.



*Maldane* cf. *sarsi* Malmgren, 1865

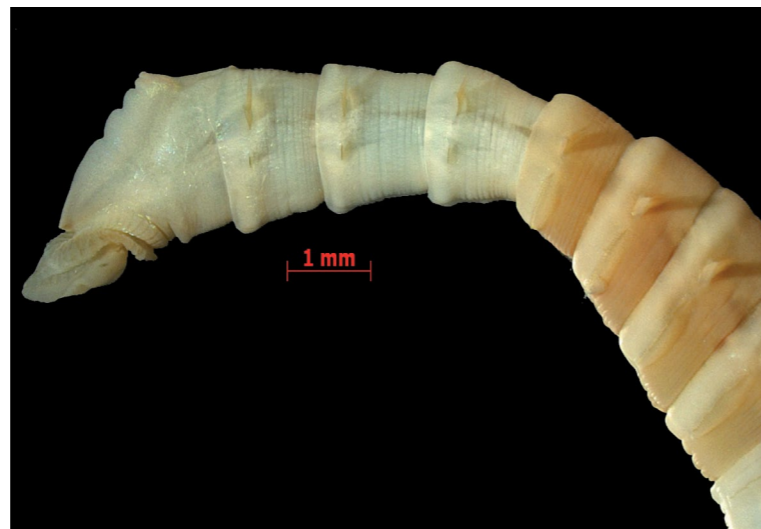


*Maldane* sp.1

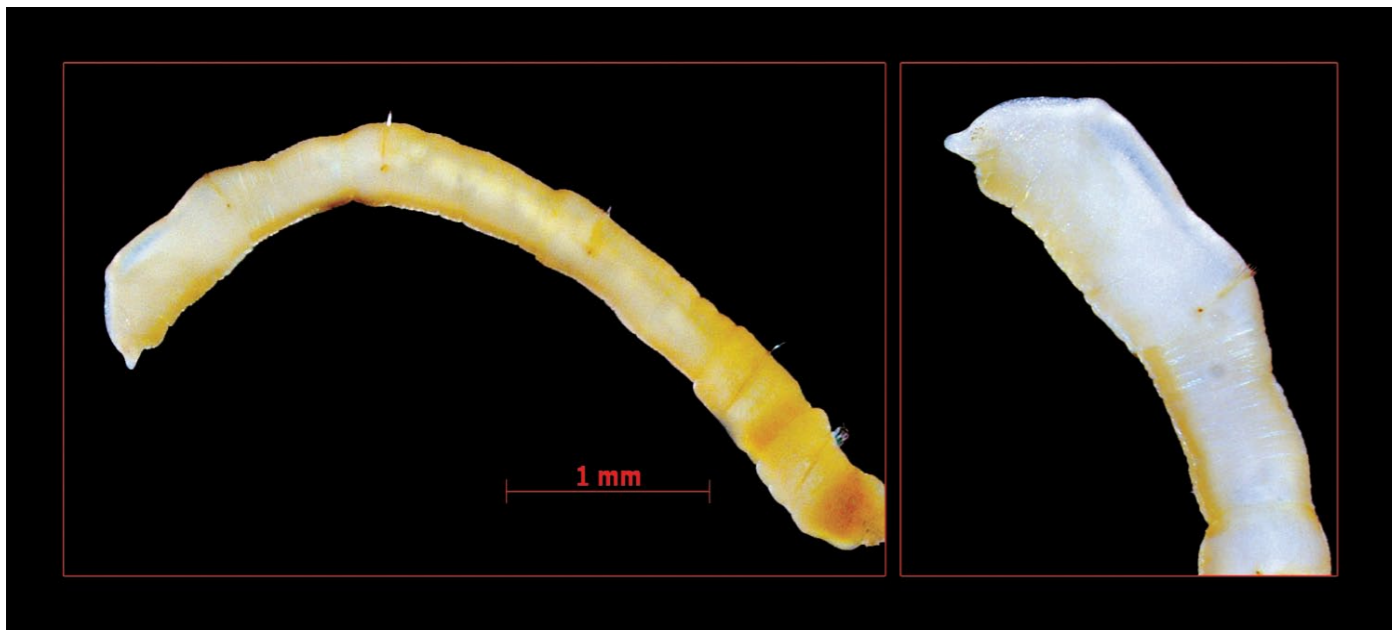
Plate 88A. *Maldane* species in Qatar marine sediments.



*Maldane* sp.2



*Maldane* sp.3



*Maldane* sp.4



*Praxillella gracilis* (M. Sars, 1861)

Plate 88B. *Maldane* and *Praxillella gracilis* in Qatar marine sediments.

## FAMILY: Flabelligeridae

These worms have a papillated body of relatively few segments although their surfaces may be partially obscured by mucus bound sediment. The Prostomium carries eight or more branchial filaments and a pair of grooved palps but tends to be retracted and difficult to observe. Setae of anterior segments may be elongated to form a cephalic cage. Parapodia reduced to no more than 2 bundles of setae in most species. Notopodial setae are simple and often cross barred. Neurosetae either similar to noto- or modified simple or compound hooks [Figure 41]. Seven species was found *Pherusa gymnopapillata* Hartmann-Schröder, 1965 and *Pherusa* sp.1, *Pherusa* sp.2 and *Pherusa plumosa* (Linnaeus, 1767), *Brada villosa* (Rathke, 1843), *Brada* sp.1 and *Brada* sp.2 [Plate 89A & B].

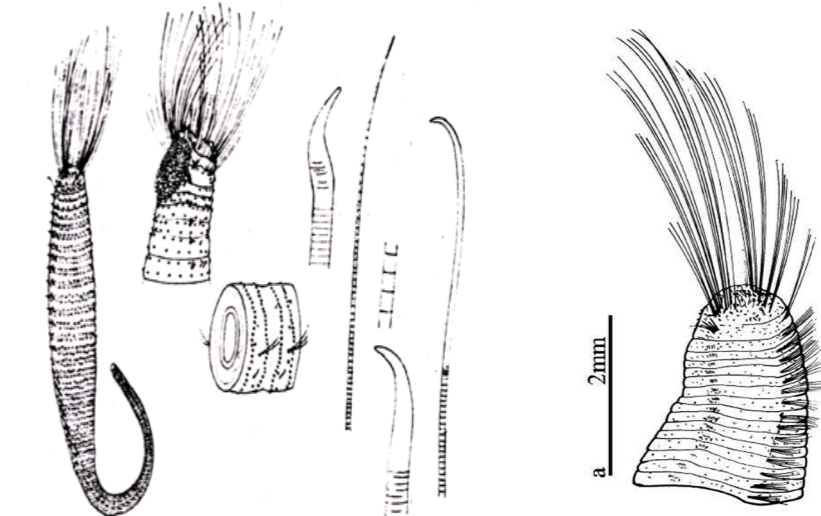


Figure 41. Key characters in the Flabelligeridae.

Source: <http://www.nhm.ac.uk/>, [http://www.cona.cl/.../html/6\\_Rozaczylo/Rozbaczyllo.htm](http://www.cona.cl/.../html/6_Rozaczylo/Rozbaczyllo.htm)



*Pherusa gymnopapillata* Hartmann-Schröder, 1965



*Pherusa* sp.1

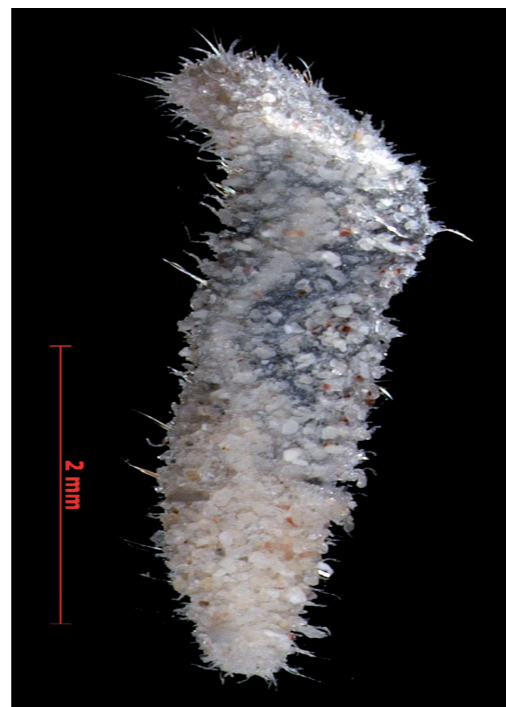


*Pherusa* sp.2

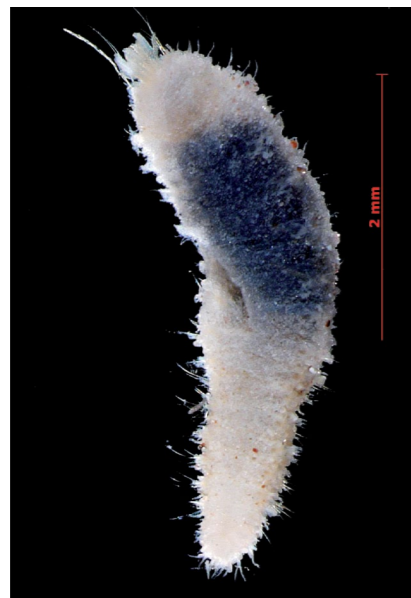
Plate 89A. *Pherusa* species in Qatar marine sediments.



*Pherusa plumosa* (Linnaeus, 1767)



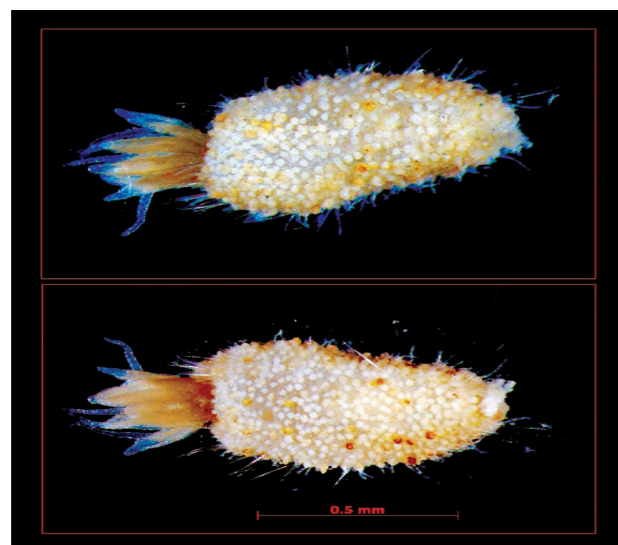
*Brada villosa* (Rathke, 1843)



*Brada* sp.1



*Brada* sp.2



*Brada* sp.3

Plate 89B. *Pherusa* and *Brada* species in Qatar marine sediments.

# **FAMILY: Pectinariidae (Trumpet worms)**

Live in a brittle conical sandy tube which is open at both ends. The body is divided into 3 sections. The head has a thick operculum and a row of heavy flattened setae. The mouth is surrounded by grooved buccal tentacles. Other setae include short capillaries and pectinate uncini [Figure 42]. Only three species were found *Petta pusilla* Malmgren, 1866, *Pectinaria* cf. *granulata* (Linnaeus, 1767) and *Pectinaria papillosa* Caullery, 1944 [Plate 90 and 91].

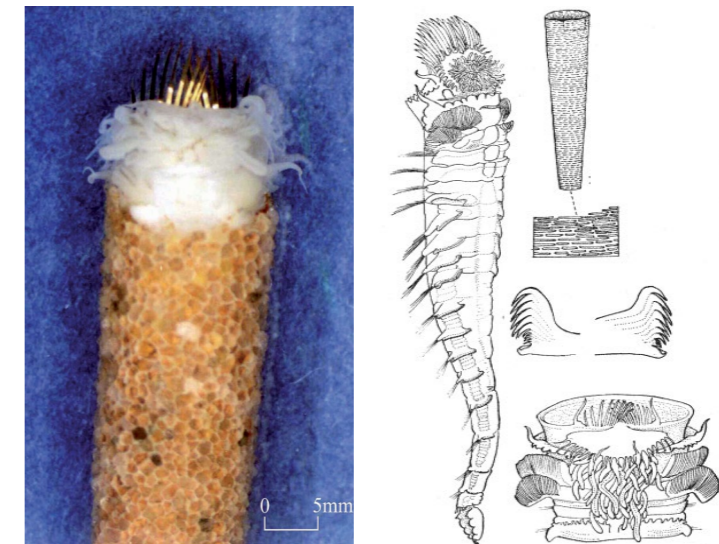
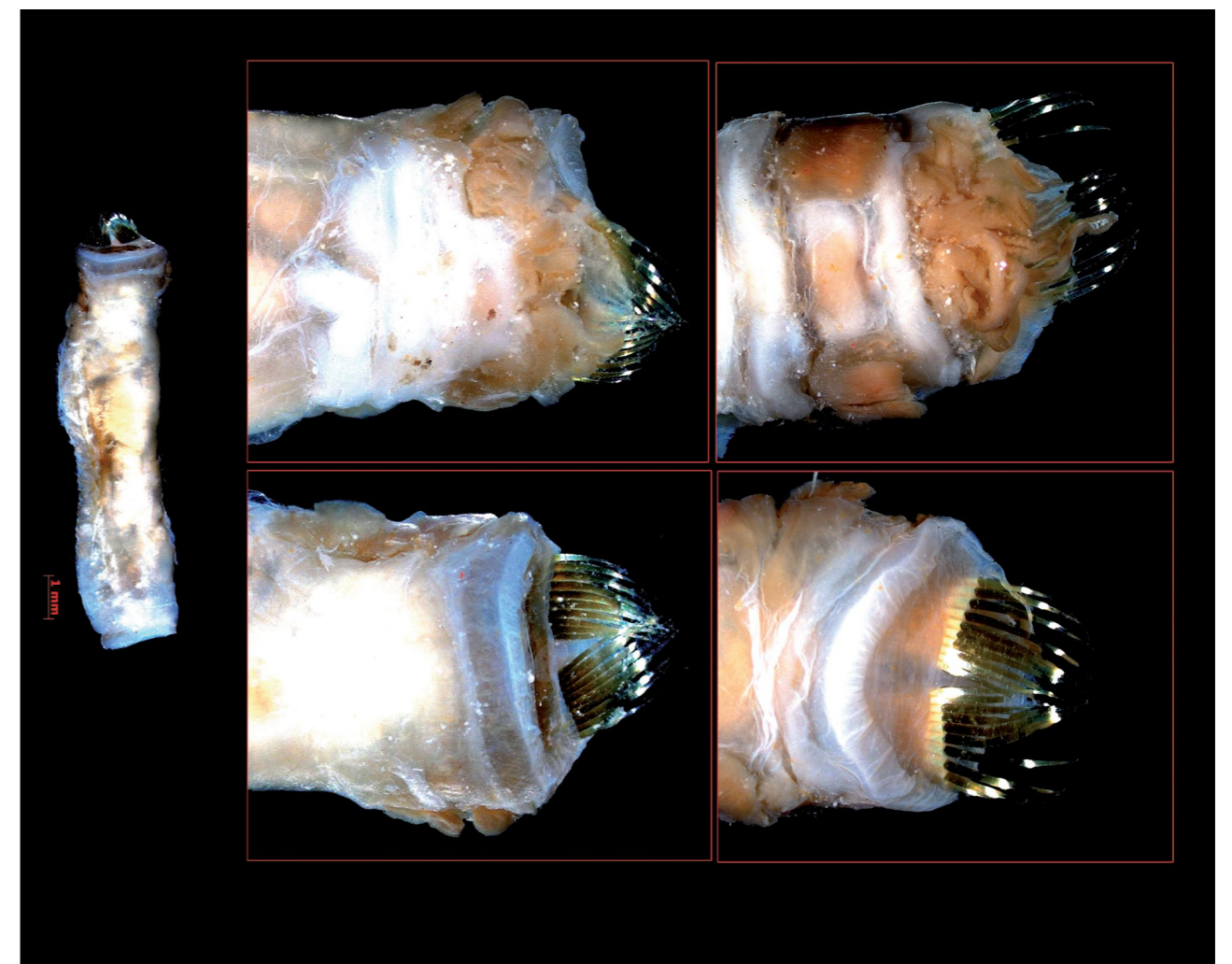


Figure 42. Key characters in the Pectinariidae.

Source: <http://www.personal.cityu.edu.hk>



*Petta pusilla* Malmgren, 1866

Plate 90. *Petta pusilla* species in Qatar marine sediments.



*Pectinaria* cf. *granulata* (Linnaeus, 1767)



*Pectinaria papillosa* Caullery, 1944

Plate 91. *Pectinaria* species in Qatar marine sediments.

#### FAMILY: Sternaspidae

The sternaspids are short worms with a dark yellow or reddish chitinized shield and an inflated body. They are common in sandy and muddy substrates at all depths usually around 100-200 m depth. They are small and unworm-like with rounded shape and dull color. They are rarely found in large numbers and are burrowers of sand and mud. They are motile surface deposit feeders. They burrow head first into the substratum to feed on the organic matter. While inverted, the chitinized shield covers the burrow entrance [Figure 43]. Only one species was found *Sternaspis scutata* Ranzani, 1817 [Plate 92].

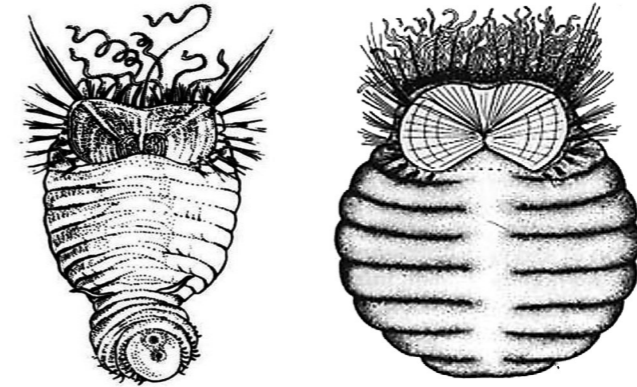


Figure 43. Key characters in the Sternaspidae.

Source: <http://www.rmbr.nus.edu.sg>

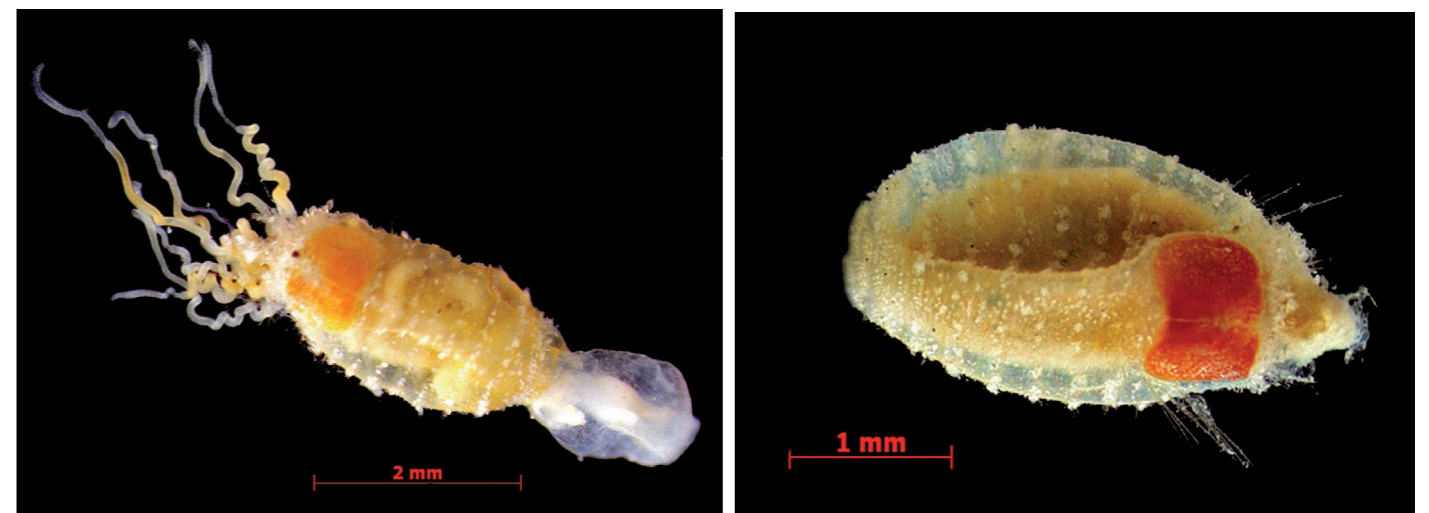
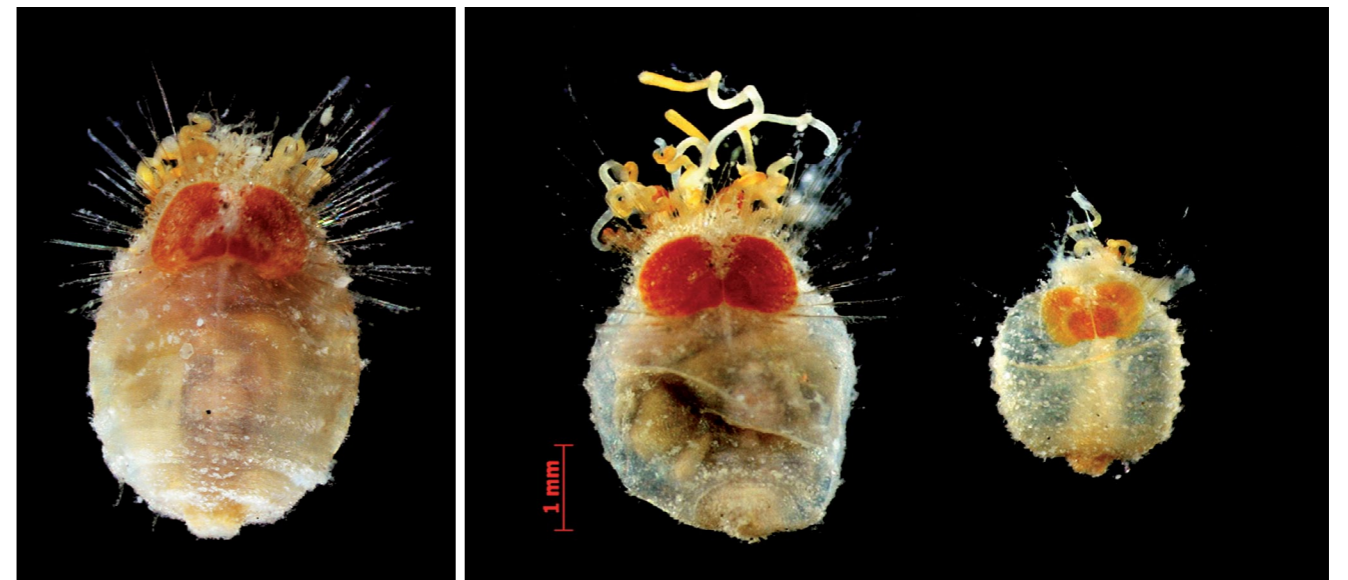


Plate 92. *Sternaspis scutata* Ranzani, 1817 in Qatar marine sediments.

# TUBE WORMS

## FAMILY: Oweniidae (sand worms)

The Oweniid commonly known as "sand worms" found in a tough sandy tube. Body elongate with most segments longer than they are wide. The parapodia are poorly developed. Prostomium and peristomium are fused and in many species are equipped with a frilly food-gathering membrane. The notosetae are capillary but the neurosetae are minute bi- or tridentate hooks which occur in dense bands. They are indirect deposit-feeders. All oweniids are tubicolous. Oweniids are occasionally found inhabiting abandoned gastropod shells [Figure44]. Only one species was found: *Owenia fusiformis* Delle Chiaje, 1841 [Plate 93].

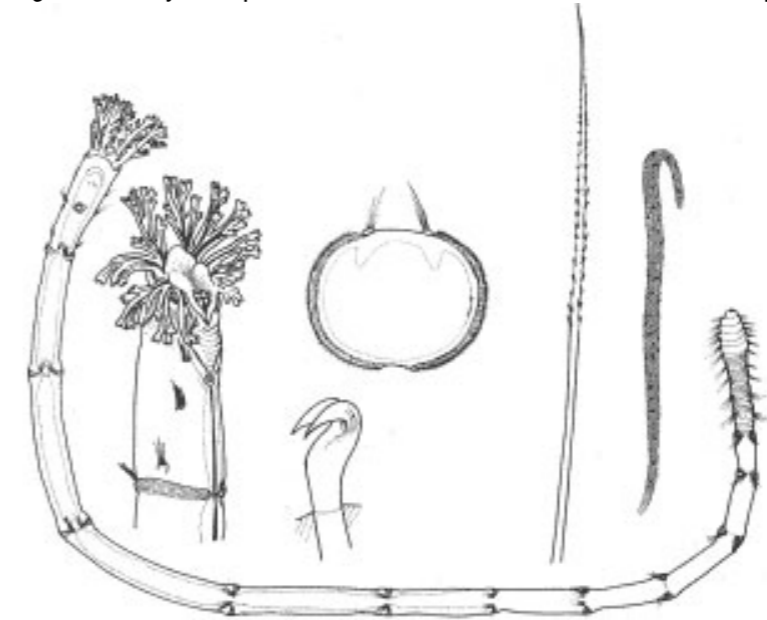


Figure 44. Diagnostic features of the family Oweniidae .

Source: <http://www.nhm.ac.uk/>

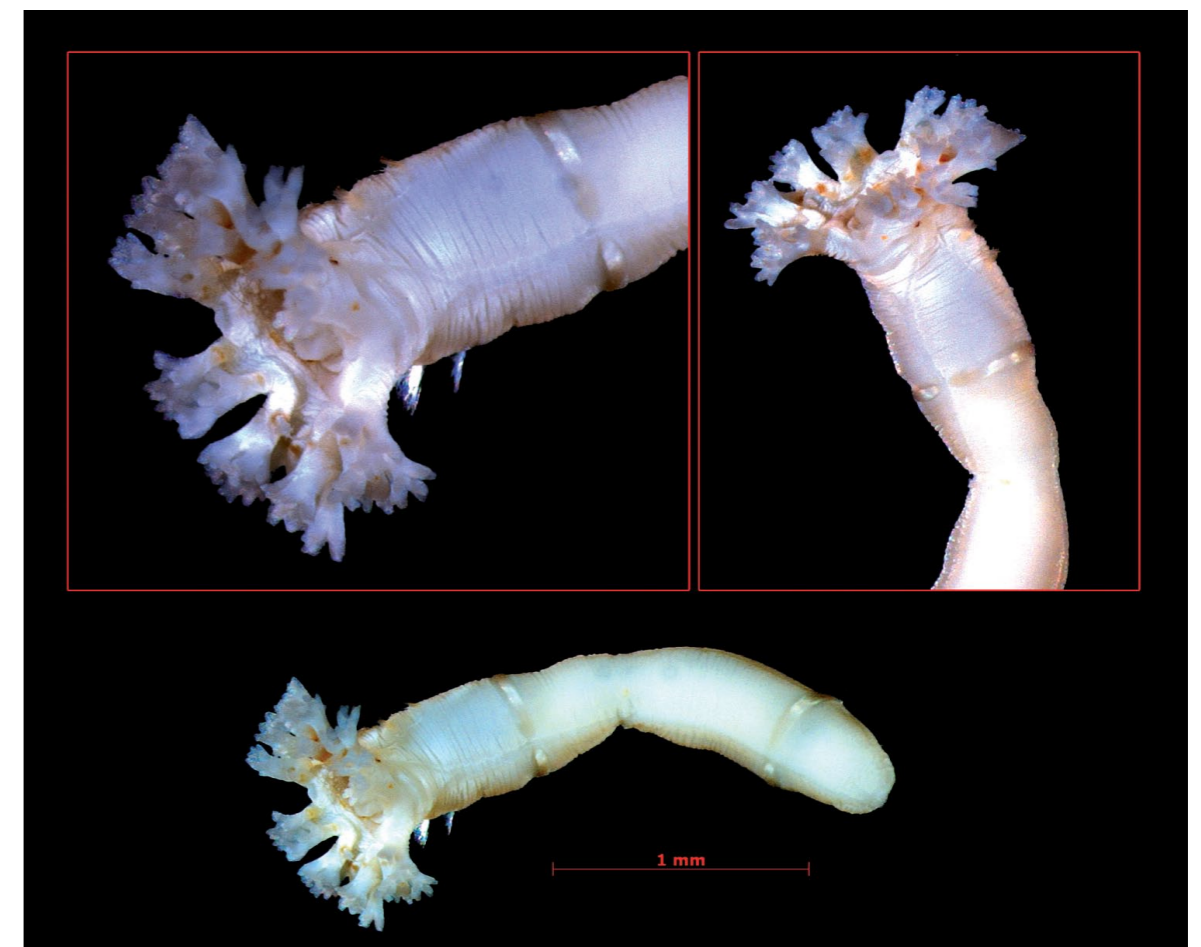


Plate 93. *Owenia fusiformis* Delle Chiaje, 1841 in Qatar marine sediments.

**FAMILY: Terebellidae**

Body clearly divided into 2 regions. Prostomium no more than a simple fold. The numerous buccal tentacles cannot be fully retracted into the mouth. Up to 3 pairs of branchae may be present on anterior segments which may be simple or branched. Thoracic parapodia are biramous with dorsal winged capillaries and ventral uncini. The abdominal parapodia are uniramous and have uncini only [Figure 45]. Ten species were found belonging to the genera *Eupolymnia* (1), *Loimia* (1) and *Pista* (4), *Pistella* (1), *Terebella* (2) and *Polycirrus* (1) [Plate 94, 95 (A&B), 96 and 97].

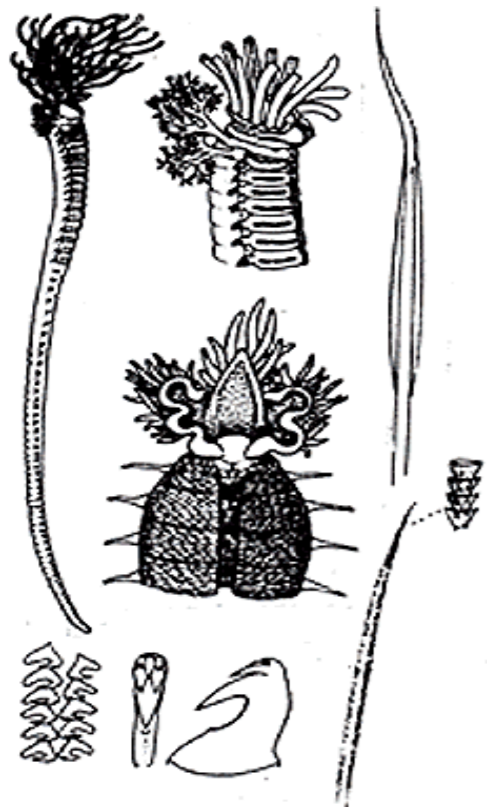
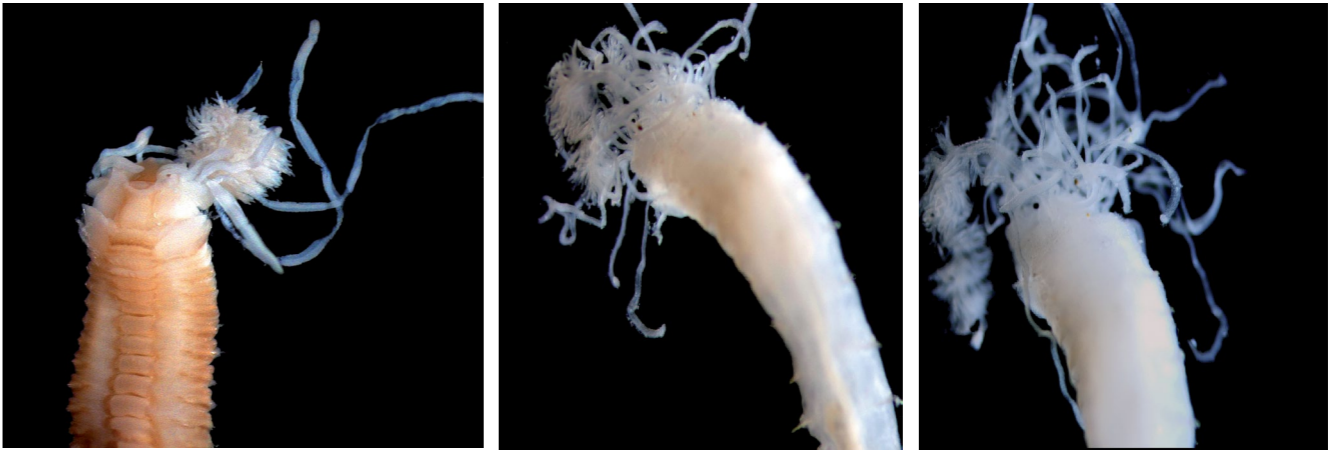


Figure 45. Diagnostic features of the family Terebellidae .  
Source: <http://www.nhm.ac.uk/>



*Eupolymnia* cf. *nesidensis* (Delle Chiaje, 1828)

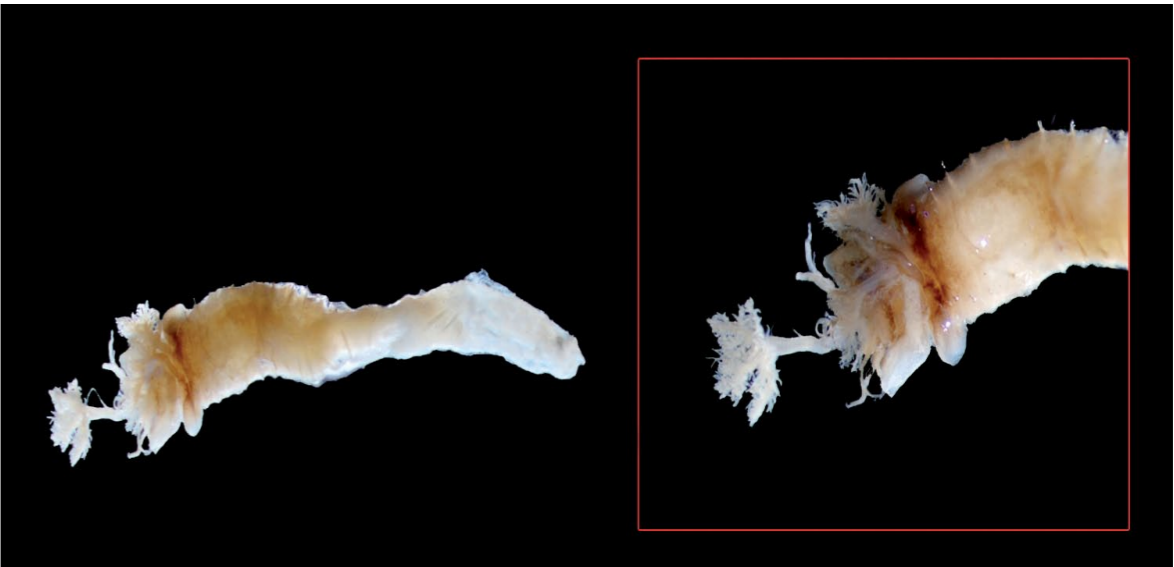


*Pista brevibranchiata* Moore, 1923



*Loimia medusa* (Savigny 1820)

Plate 94. *Loimia* and *Eupolymnia* specisein Qatar marine sediments.

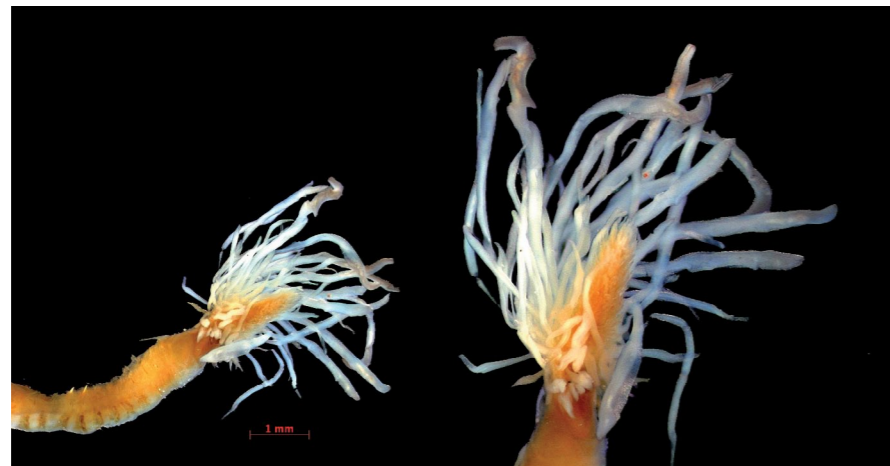


*Pista* cf. *cristata* (Muller, 1776)

Plate 95A. Species of the genera *pista* in Qatar marin esediments.



*Pista* sp.1



*Pista* sp.2

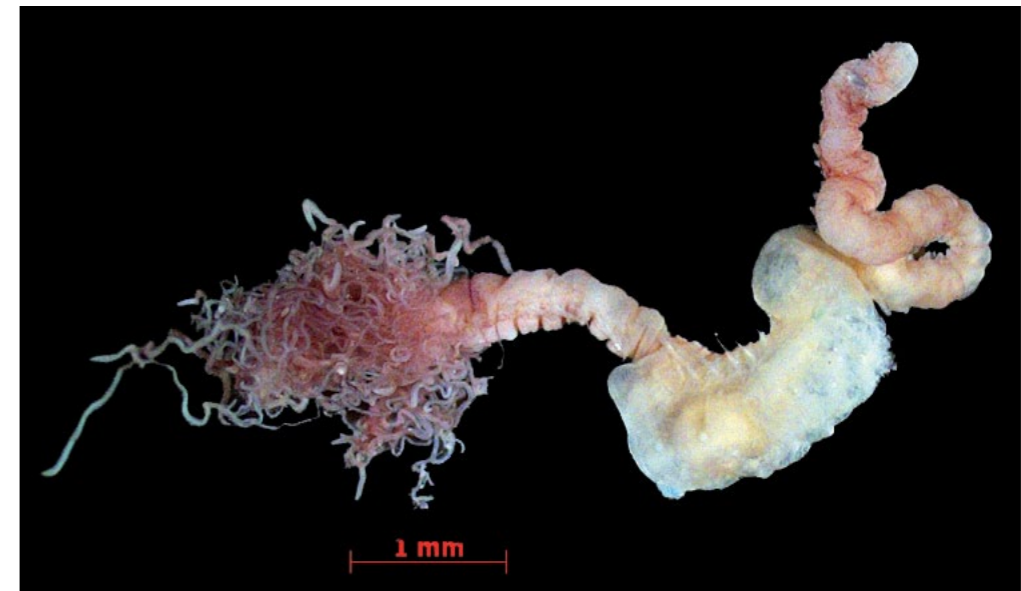


*Pistella* cf. *lornensis* (Pearson, 1969)

Plate 95B. Species of the genera *pista* and *Pistella* in Qatar marin esediments.



*Terebella* sp.



*Terebella* cf. *flabellum* Baird, 1865

Plate 96. Species of the genera *Terebella* in Qatar marin esediments.



Plate 97. *Polycirrus aurantiacus* Grube, 1860 in Qatar marin esediments.

FAMILY: Ampharetidae (Spaghetti mouth worm)

Terebellida group: no posterior notosetae, usually with 2-4 pairs of simple gills arranged transversely on setiger 1. Feeding tentacles retract into the mouth. Notosetae of setiger 1 may be enlarged and project forward laterally to the gills (palae) [Figure 46]. Nine species were obtained (*Amphicteis gunneri* (Sars, 1835), *Amphicteis floridus* Hartman, 1951 and *Amphicteis* sp., *Ampharete finmarchica* (M. Sars, 1866), *Amage auricula* Malmgren, 1866 [Plate 98, 99 (A&B)], *Hypania* sp., *Melinna* cf. *cristata* heterodonta Moore, 1923, *Melinna palmata* Grubein and *Melinna* sp. [Plate, 100 (A&B)]).

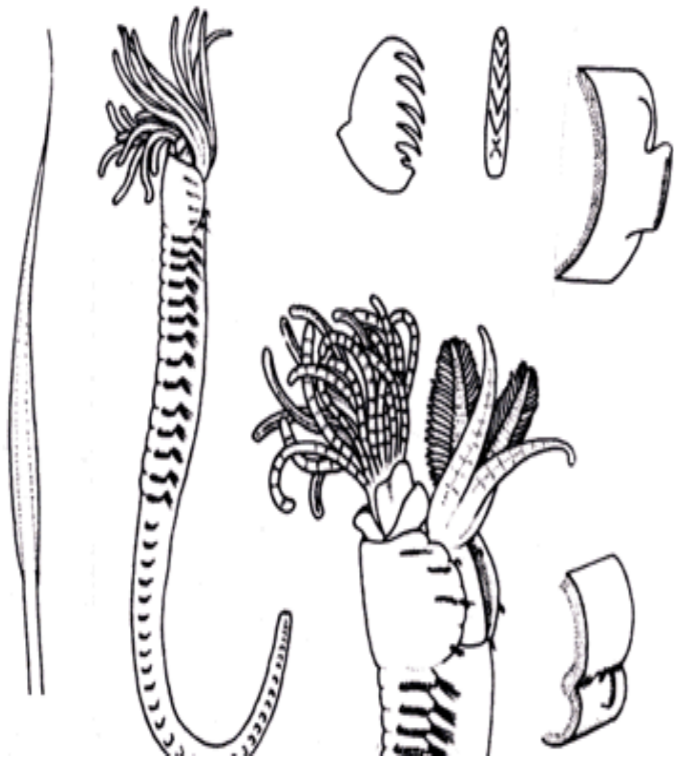


Figure 46. Key characters in the Ampharetidae.  
Source: <http://www.nhm.ac.uk/>



Plate 98. *Amphicteis gunneri* (Sars, 1835) specisein Qatar marine sediments.



*Amphicteis floridus* Hartman, 1951



*Amphicteis* sp.



*Ampharete finmarchica* (M. Sars, 1866)



*Amage auricula* Malmgren, 1866

Plate 99. *Amphicteis*, *Ampharete* and *Amage* species in Qatar marine sediments.



*Hypania* sp.

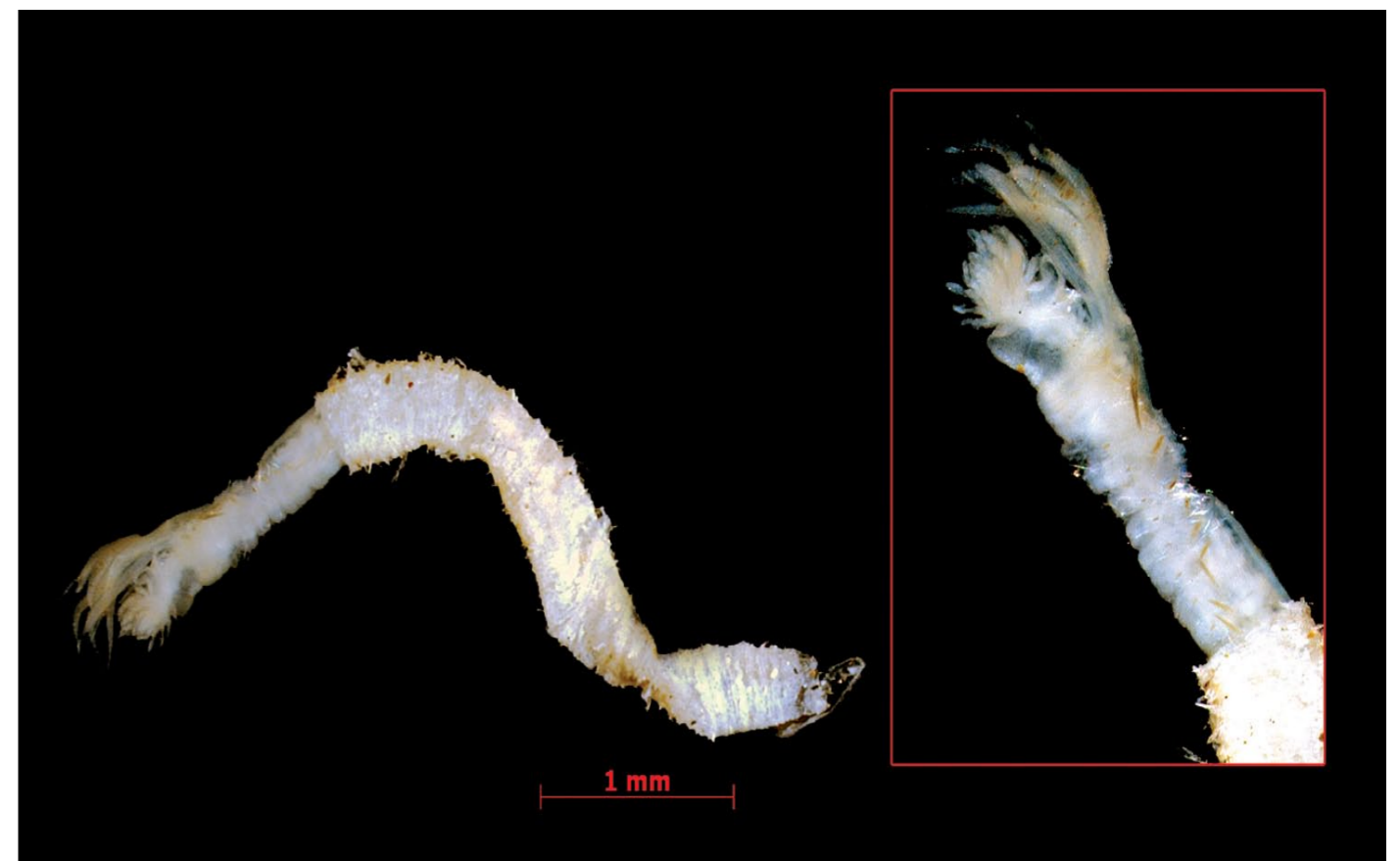


*Melinna* cf. *cristata* heterodonta Moore, 1923

Plate 100A. *Melinna* and *Hypania* species in Qatar marine sediments.



*Melinna palmata* Grube, 1870



*Melinna* sp.

Plate 100B. *Melinna* species in Qatar marine sediments.

**FAMILY: Trichobranchidae**

Generally similar to the family Terebellidae except that the thoracic uncini are replaced by long-handled uncini hooks [Figure 47]. Five species *Terebellides stroemi* (McIntosh, 1885), *Amaeana trilobata*, *Amaeana* sp.1, *Amaeana* sp.2 and *Trichobranchus* sp. were obtained [Plate 101 and 102].

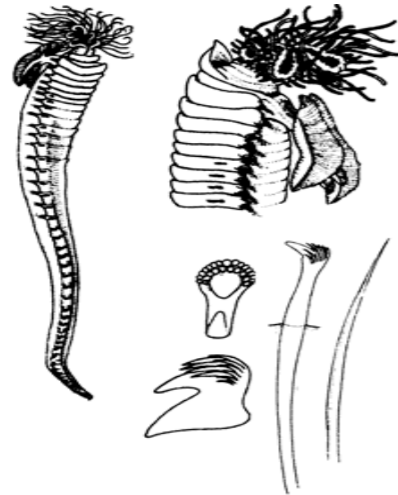
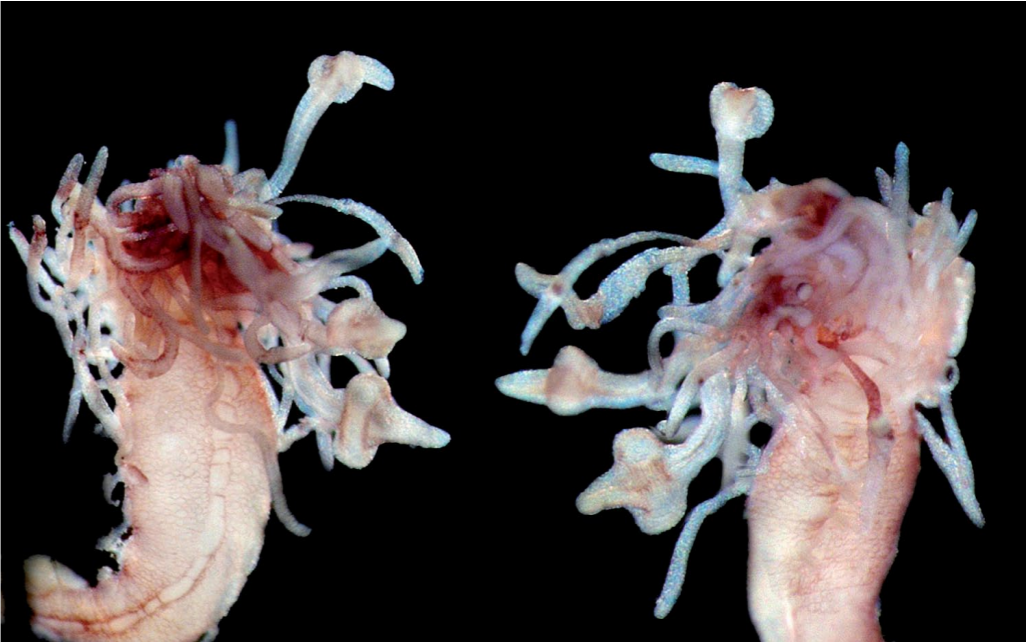
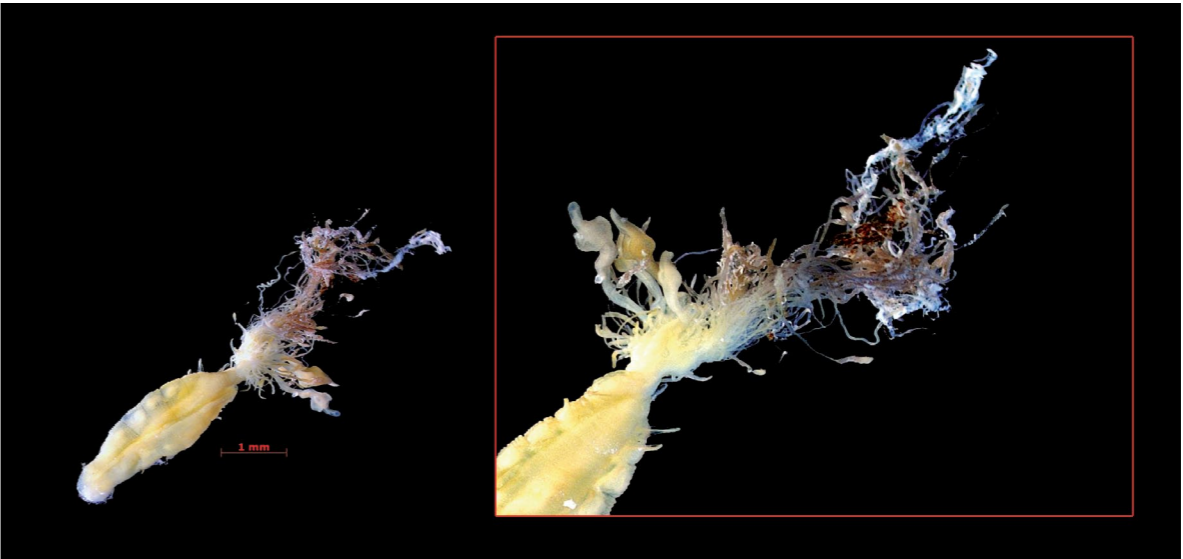


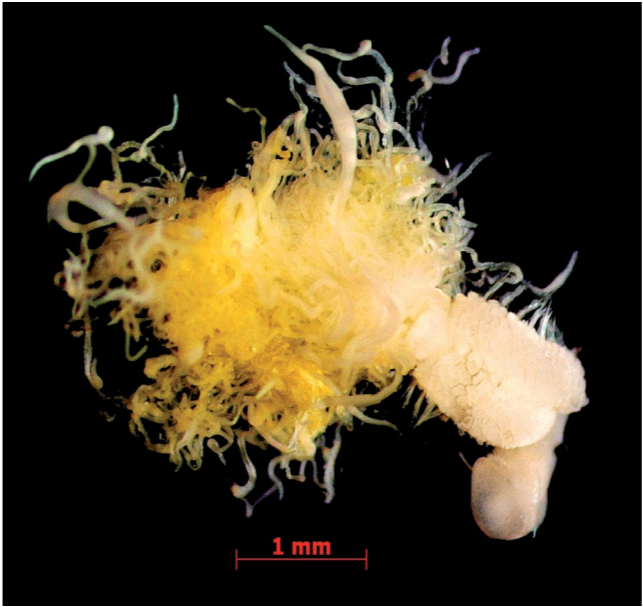
Figure 47. Diagnostic features of the family Trichobranchidae.  
Source: <http://www.nhm.ac.uk/>,



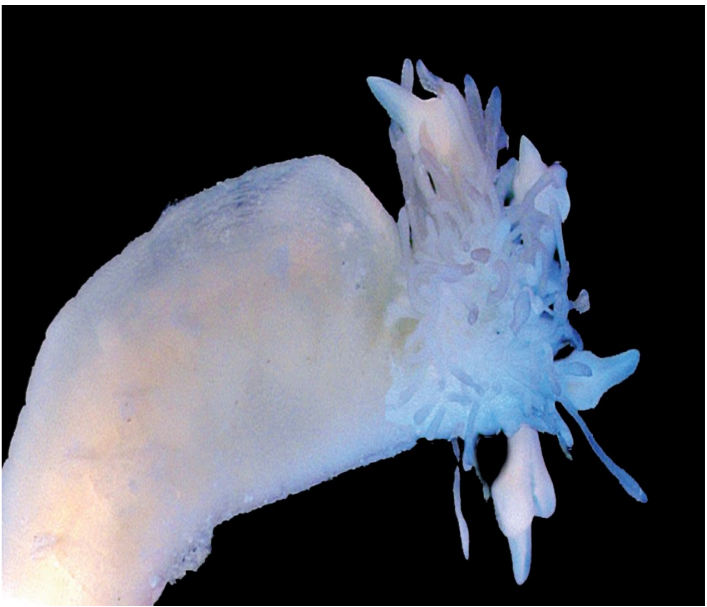
*Amaeana trilobata* (Sars, 1863)



*Amaeana* sp.1



*Amaeana* sp.2



*Trichobranchus* sp.



*Terebellides stroemi* (McIntosh, 1885)

Plate 101. *Terebellides* species in Qatar marine sediments.

Plate 102. *Amaeana* and *Trichobranchus* species in Qatar marine sediments.

**FAMILY: Sabellariidae**

Members of this family live in tubes made of sand and shell fragments cemented together and attached to rocks. Worms build heavy sandy tubes which are closed by an operculum of golden-coloured setae originating from the first 3 setigers. There are numerous buccal cirri and a pair of small grooved palps around the mouth. Body in 3 sections the last of which is an asetigerous tube. The thorax is rudimentary. The median region has capillary neurosetae and pectinate uncinae dorsally. [Figure 48]. One species was obtained *Sabellaria* sp. [Plate 103].

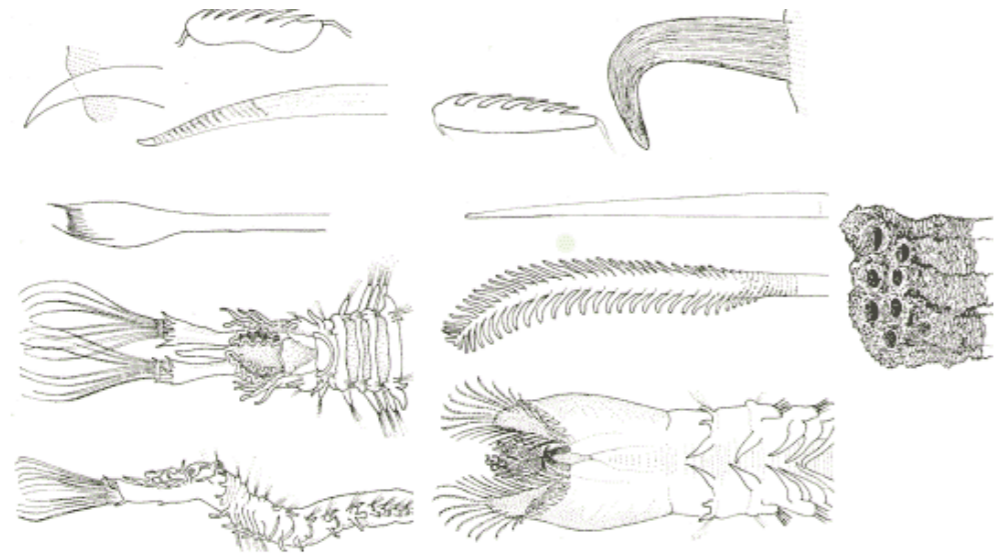


Figure 48. Variation in structure of Sabellariidae worms.  
Source :<http://www.nhm.ac.uk/>



*Sabellaria* sp.

Plate 103. *Sabellaria* in Qatar marine sediments.

**FAMILY: Sabellidae (Fan worms)**

Worms with smooth tapering cylindrical bodies living in tough non calcareous tubes. The prostomium and peristomium are fused and have developed into a tentacular crown (bi-pinnate radioles) that often obscures a pair of grooved palps. Note that the tentacular crown is easily lost during collection and preservation. There is no operculum. The peristome is often developed into a collar surrounding the base of the radioles. The body is clearly divided into thorax and abdomen. Chaetae are winged capillaries and uncini [Figure 49]. Thirteen species were obtained *Sabella* (1) [Plate 104], *Branchiomma* (1), *Dasychone* (1), cf. *Calcisabella* (1) [Plate 105], *Chone* (1), cf. *Paradialychone* (1), *Sabellastarte* (2) [Plate 106], *Jasmineira* (1) and *Euchone* (1) [Plate 107], *Amphiglena* (1), *Lygdamis* (1) [Plate 108] *Sabellaria* (1). and Sabellidae ? (1) [Plate 109].

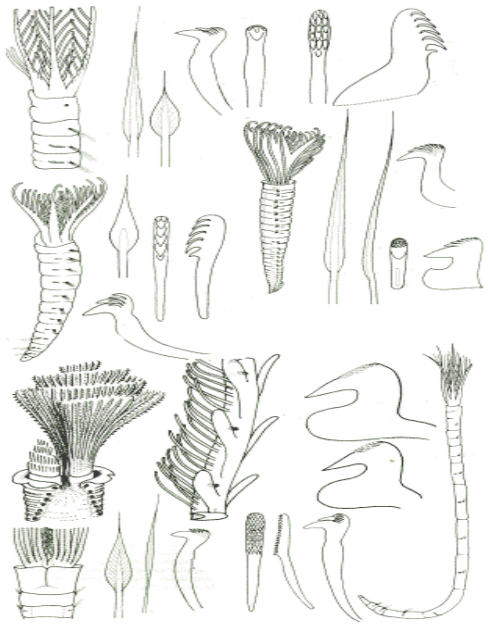
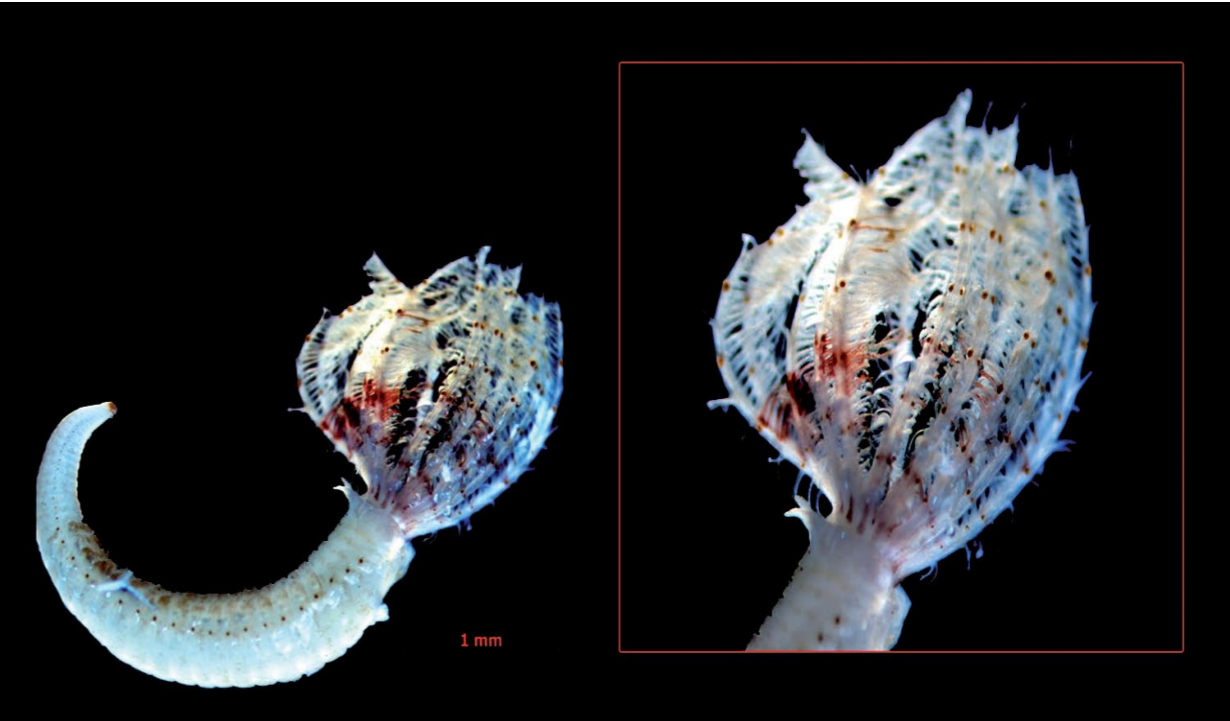


Figure 49. Variation in structure of Fan worms.  
Source :<http://www.nhm.ac.uk/>



*Sabella fusca* Grube, 1870

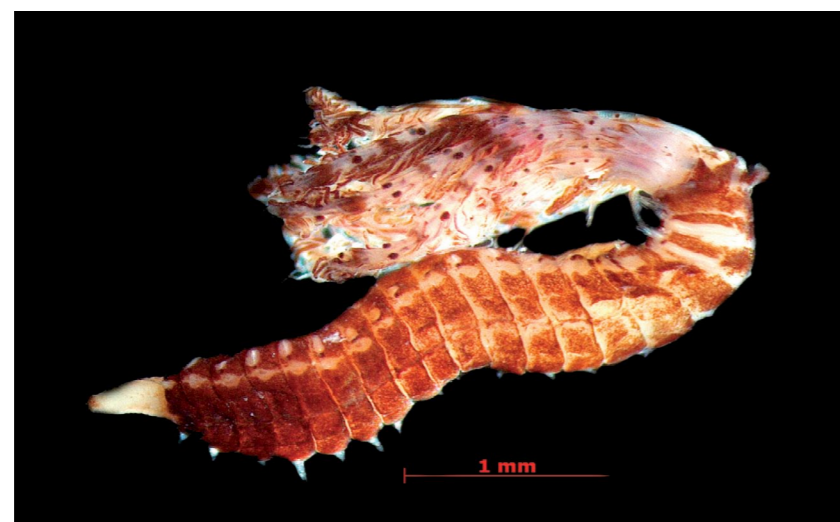
Plate 104. *Sabella fusca* Grube Fan worms in Qatar marine sediments.



*Branchiomma* cf. *violacea* (Schmarda, 1861)



*Dasychone* sp.



cf. *Calcisabella* sp.

Plate 105. *Branchionna*, *Dasychone* and *Calcisabella* species in Qatar marine sediments.



*Chone fauveli* McIntosh, 1916



cf. *Paradialychone* sp.

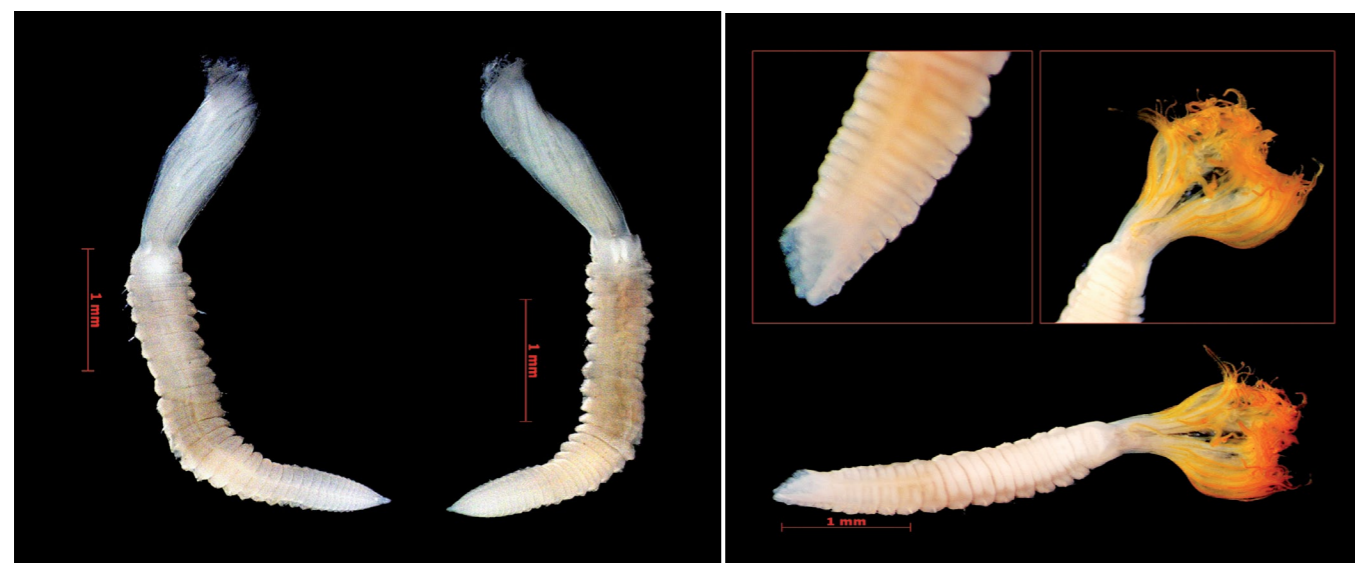


*Sabellistarte* sp.

Plate 106. *Chone* and *Sabellistarte* species in Qatar marine sediments.



*Jasmineira elegans* Saint-Joseph, 1894



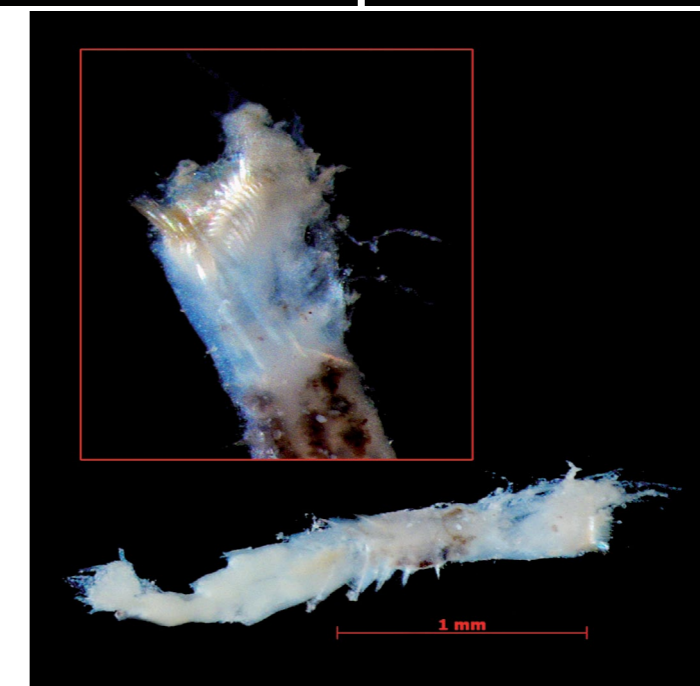
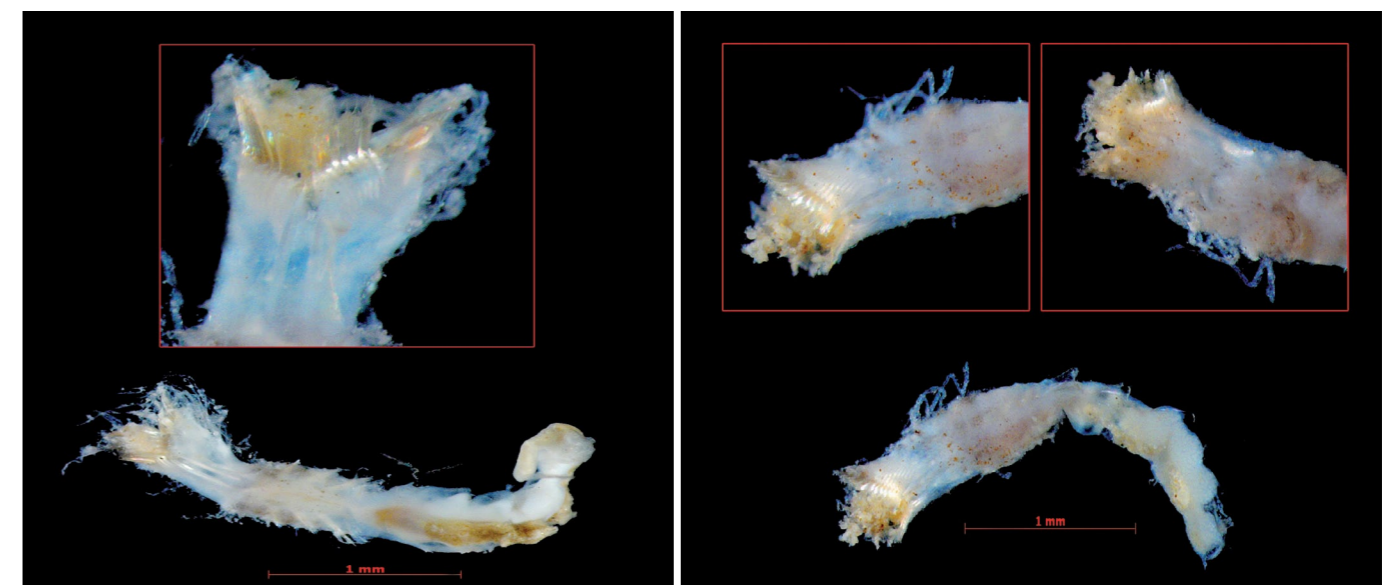
*Jasmineira elegans* Saint-Joseph, 1894

*Euchone* cf. *analis* (Kröyer, 1865)

Plate107. *Jasmineira* species in Qatar marine sediments.



*Amphiglena mediterranea* (Leydig, 1851)



*Lygdamis giardi* (McIntosh, 1885)

Plate108. *Lygdamis* and *Amphiglena* in Qatar marine sediments.



Sabellidae ?

Plate109. *Sabellaria* and Sabellidae in Qatar marine sediments.

**FAMILY: Serpulidae (Keel worms)**

**Keel worms** with a clearly divided body living in **calcareous tubes** which they close by means of an operculum developed from one of their radioles. The thorax has simple or winged capillary setae in the notopodium and uncini in the neuropodium. In the abdomen this distribution is reversed. Often colonial and reef-forming [Figure 50]. Fourteen- species were found : *Hydroides elegans* (Haswell, 1883), *Hydroides* cf. *cruciger* Mörch, 1863, *Hydroides* sp.1, *Hydroides* sp.2, *Ficopomatus enigmaticus* Lacmnh, *Janua brasiliensis* (Grube, 1872), *Janua* (*Fauveldora*) *kayi* Knight-Jones, 1972, *Serpula* cf. *concharum* Langerhans, 1880, *Serpula* cf. *narconensis* Baird, 1865, *Spirorbis* sp., *Spirobranchus dendropoma* Mörch, 1863, *Spirobranchus* sp.1, *Spirobranchus* sp.2 and *Vermiliopsis* sp.[Plate 110 and 111 A,B,C and D].

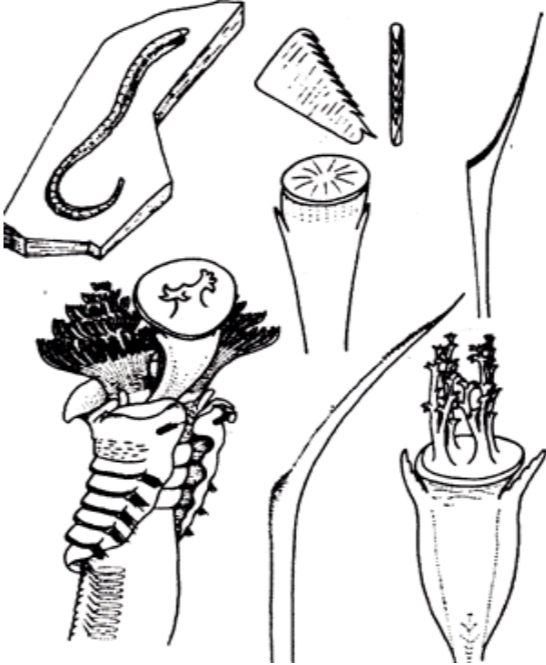


Figure 49. Variation in structure of fan worms.  
Source :<http://www.nhm.ac.uk>

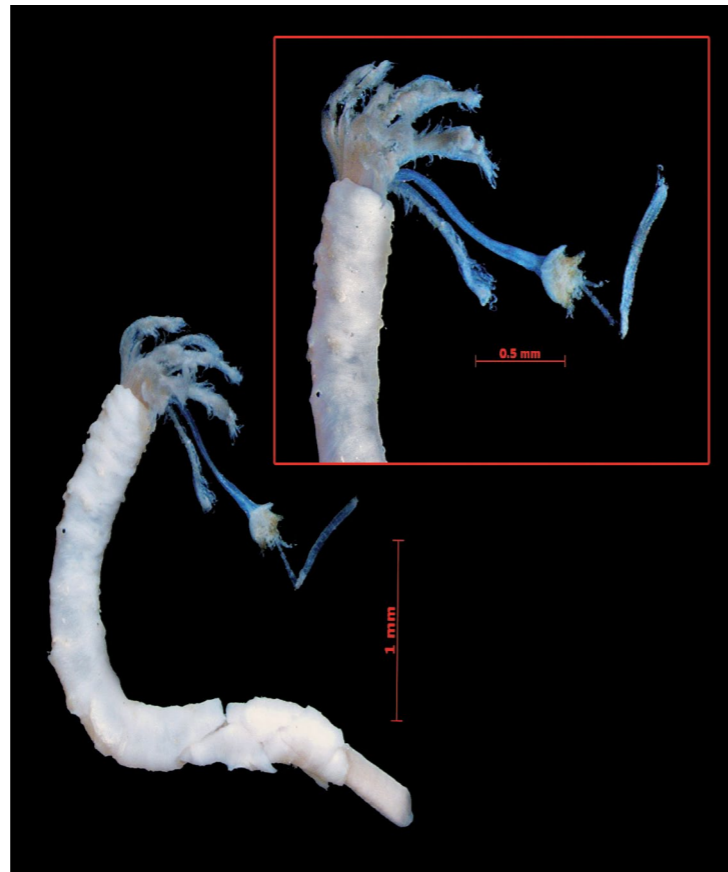


*Hydroides elegans* (Haswell, 1883)

Plate 110. *Hydroides elegans* species in Qatar marine sediments.



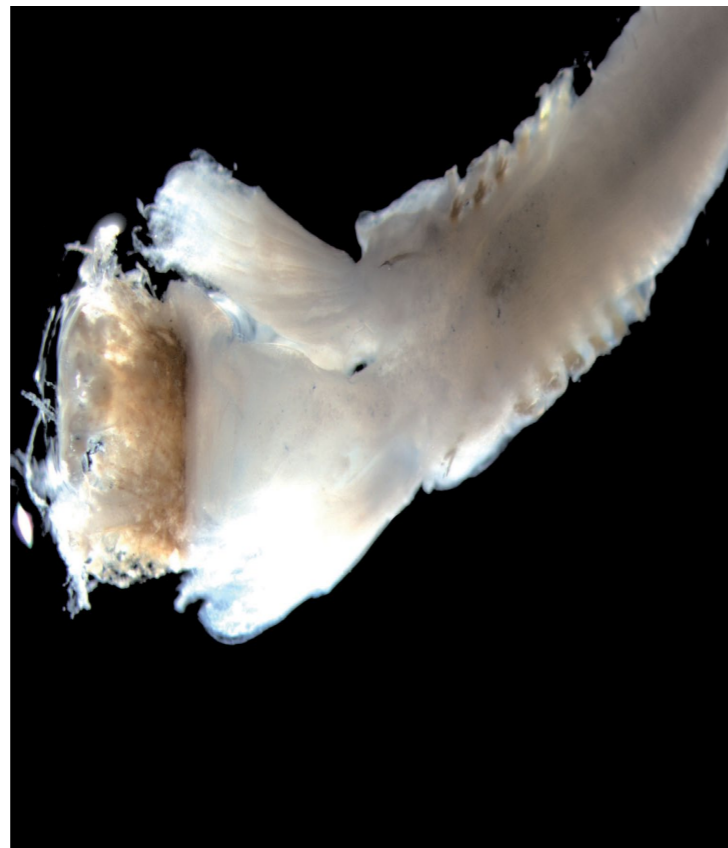
*Hydroides cf. cruciger* Mörch, 1863



*Hydroides* sp.1

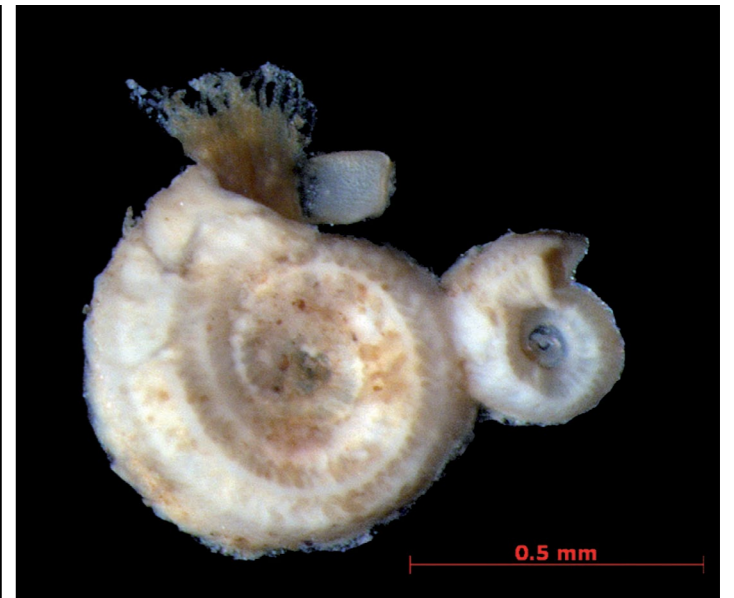


*Hydroides* sp.2

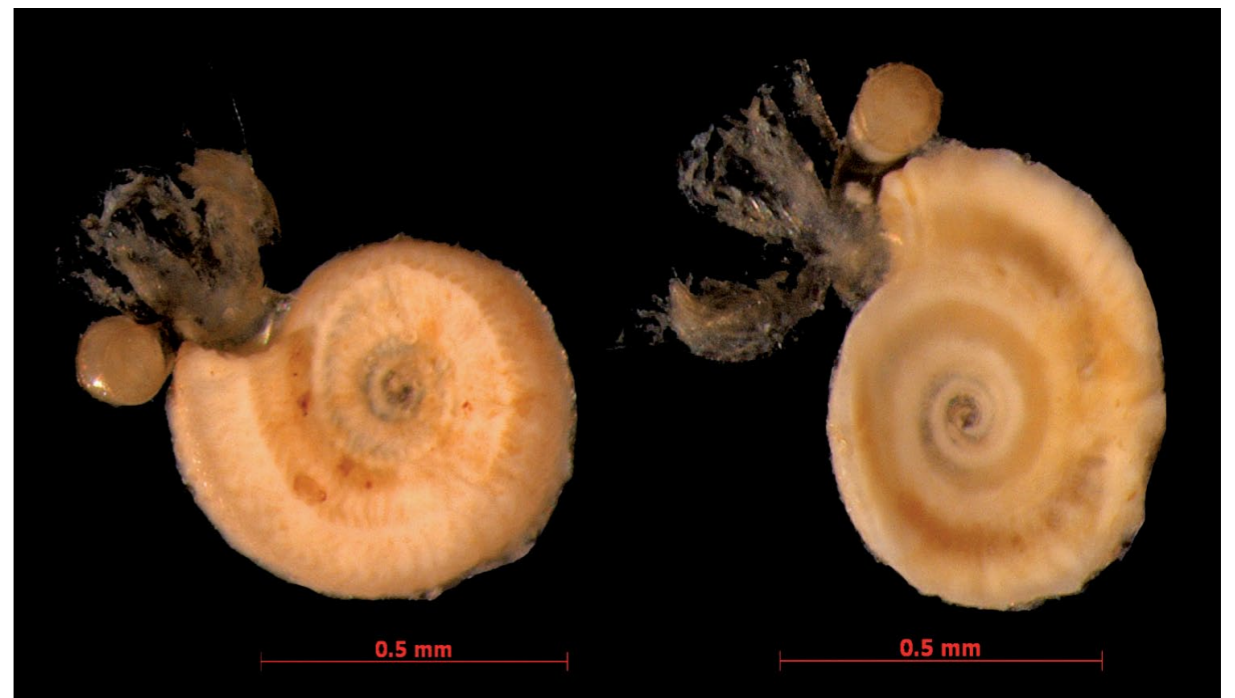
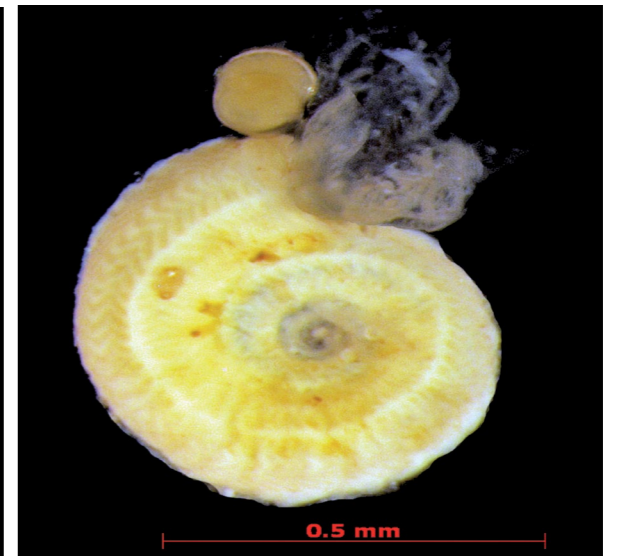
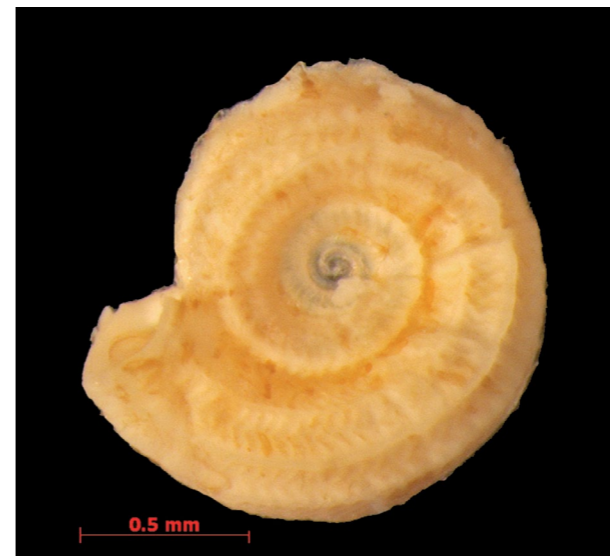


*Ficopomatus enigmaticus* (Fauvel, 1923)

Plate 111A. Keel worms of the family Serpulidae in Qatar marine sediments.

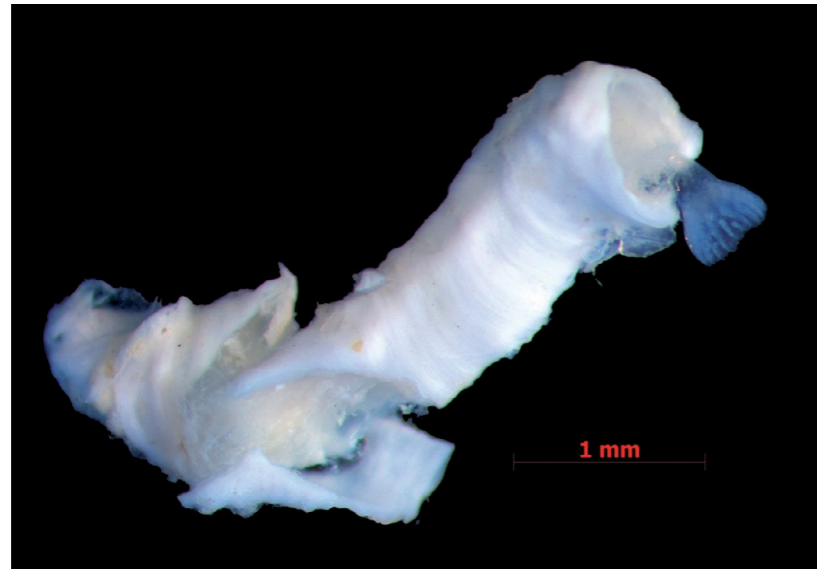


*Janua brasiliensis* (Grube, 1872)



*Janua (Fauveldora) kayi* Knight-Jones, 1972

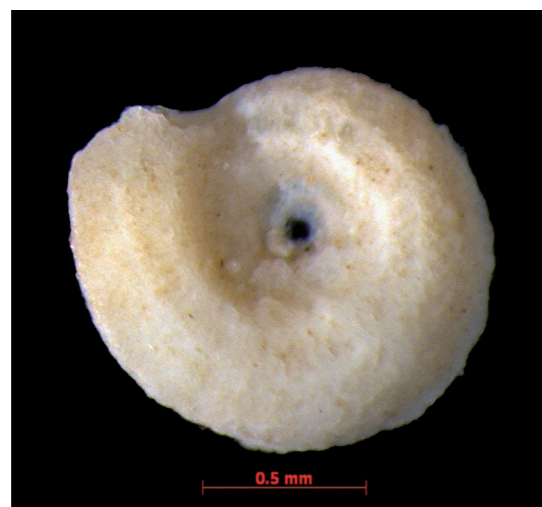
Plate 111B. Keel worms of the family Serpulidae in Qatar marine sediments.



*Serpula* cf. *concharum* Langerhans, 1880

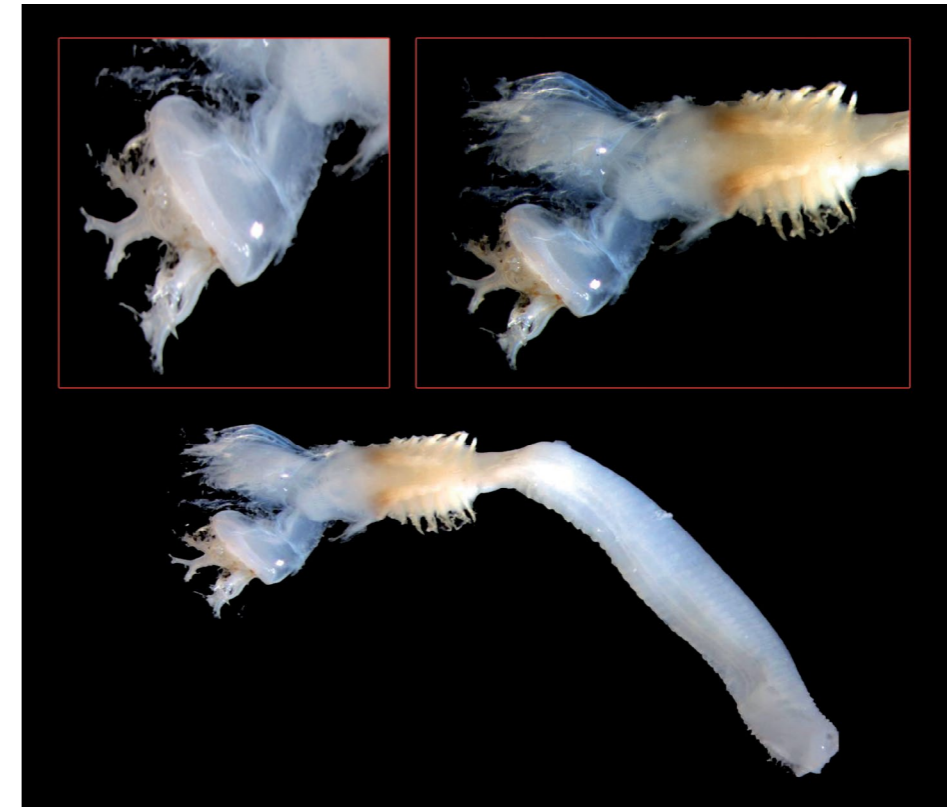


*Serpula* cf. *narconensis* Baird, 1865

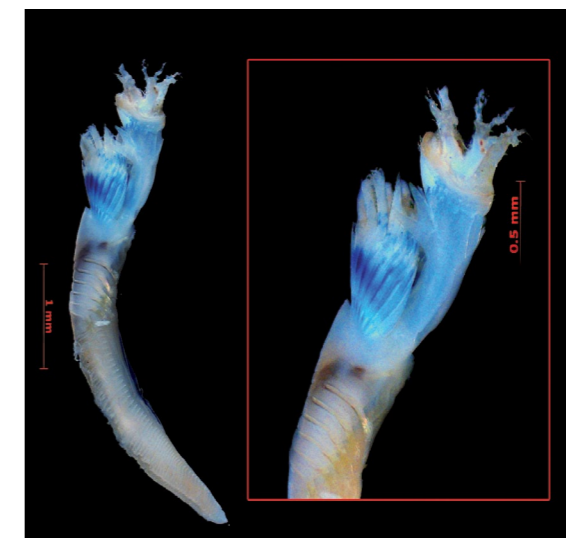


*Spirorbis* sp.

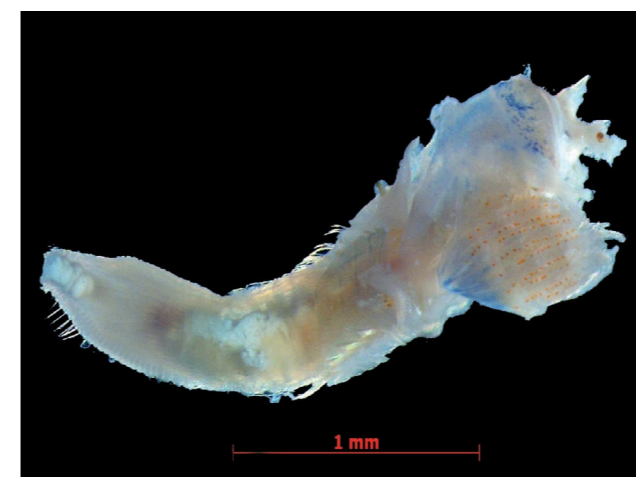
Plate111C. Keel worms of the family Serpulidae in Qatar marine sediments.



*Spirobranchus dendropoma* Mörch, 1863



*Spirobranchus* sp.1



*Spirobranchus* sp.2



*Vermiliopsis* sp.

Plate 111D. Keel worms of the family Serpulidae in Qatar marine sediments.

# APPENDIX

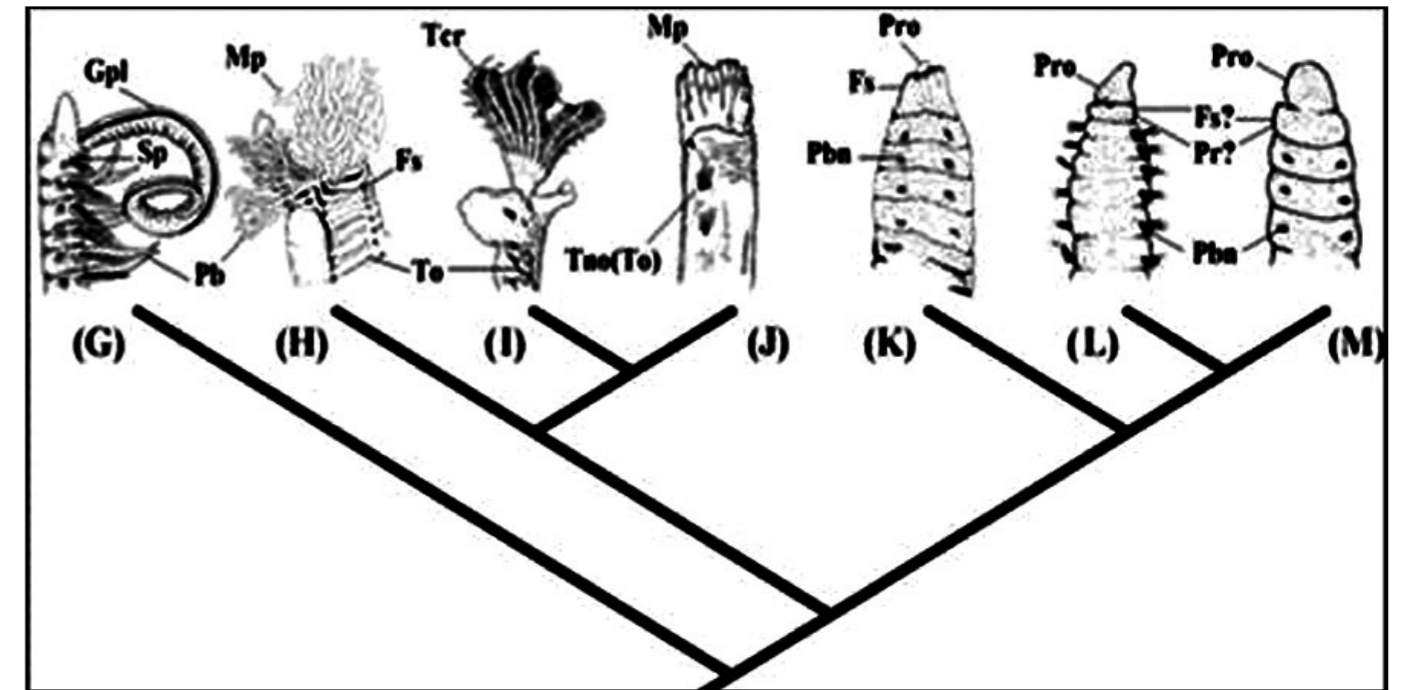


Figure (51). Further scenario for main modifications of many anterior morphological characters of the **Sedentary** metameric lineages (in lateral view). (G) Spionida represented by *Aonides oxycephala* (Sars 1862) (Spionidae) (modified from Imajima 1989); (H) Terebellida represented by *Nicolea amnis* Hutchings & Murray, 1984 (Terebellidae) (modified from Hutchings & Murray 1984); (I) Sabellida represented by *Dasynema chrysogyrys* (Grube 1876) (Sabellidae) (modified from Imajima & Hove 1984); (J) *Owenia* represented by *Owenia fusiformis* delle Chiaje, 1842 (Oweniidae) (modified from Imajima & Morita 1987); (K) Capitellidae represented by *Notomastus estuarius* Hutchings & Murray, 1984 (Hutchings & Murray 1984); (L) Questidae represented by *Questa caudicirra* Hartman, 1966 (modified from Fauchald 1977); (M) Clitellata represented by *Phallodrilus riparius* Giani & Martinez-Ansemil, 1981 (Tubificidae) (modified from Giani & Martinez-Ansemil 1981). Fs, first segment; Gpl, grooved palps; Mp, multiple palps; Pb, parapodial branchiae; Pbn, parapodial chaetal bundles; Pr, peristomial ring; Pro, prostomium; Sp, spionimorph parapodia; Tcr, tentacular crown; Tno, truncate notopodia; To, tori.

Source:<http://www.scielo.br/>

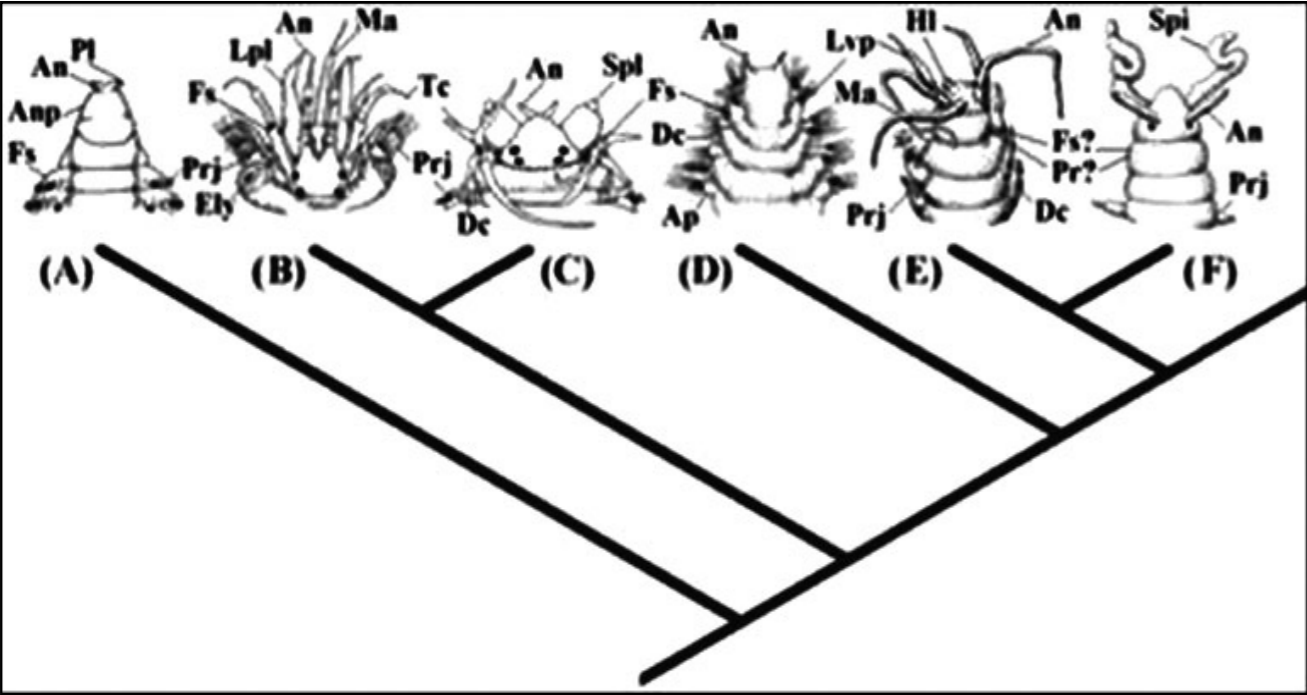
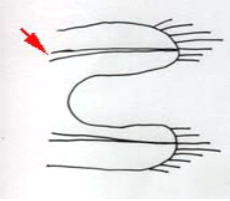
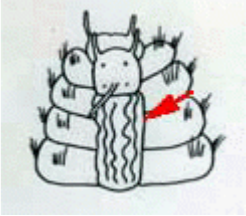

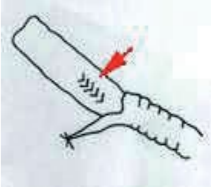

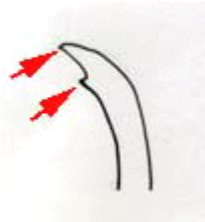

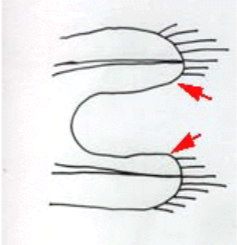
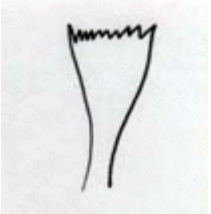
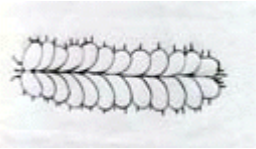


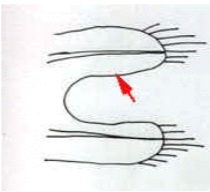

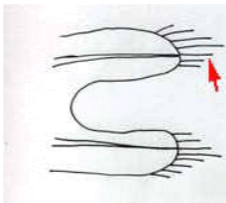

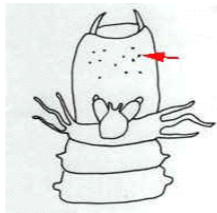


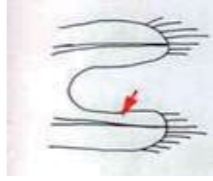
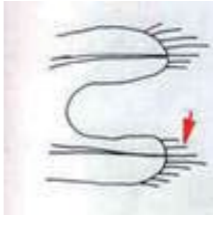
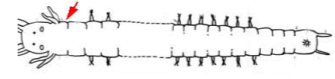


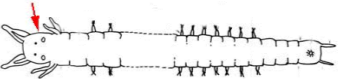
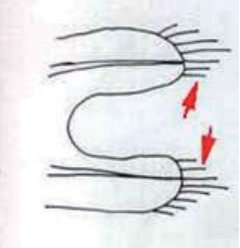
Figure (51). General scenario for the main modifications of many anterior morphological characters of the **Errant** metamerics lineages (in dorsal view). (A) Paralacydoniidae represented by *Paralacydonia paradoxa* Fauvel, 1913 (modified from Pettibone 1963); (B) Scale worms represented by *Lepidonotus caelorus* Kinberg, 1866 (Polynoidea) (modified from Imajima 1997); (C) Phyllodocyformia represented by *Nereis diversicolor* Müller, 1776 (Nereidae) (modified from Böggemann 1997); (D) Basal group of Eunicida represented by *Aglaophamus gippslandicus* Rainer & Hutchings, 1977 (Nephtyidae) (modified from Imajima & Takeda 1985); (E) Eunicidae represented by *Hyalinoecia tubicola* Müller, 1766 (Onuphidae) (modified from George & Hartmann-Schröder 1985); (F) Dorvilleidae represented by *Protodorvillea kefersteini* McIntosh, 1869 (modified from George & Hartmann-Schröder 1985). An, lateral antennae; Anp, annulated prostomium; Ap, amphinomid-like parapodia; Dc, dorsal cirri; Ely, elyrophore; Fs, first segment; Hi, hypertrophied peristomial lips; Lpl, long sensory palps; Lvp, latero-ventral palps; Ma, median antennae; Pl, palps; Pr, peristomial ring; Prj, projecting neuropodia; Spi, spionimorph palps; Spl, stout articulated palps; Tc, tentacular cirri.

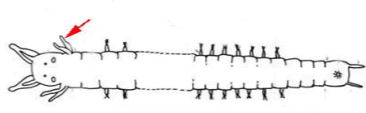
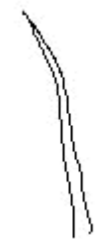
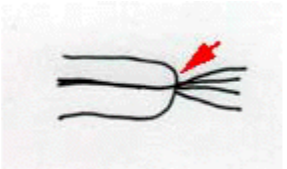
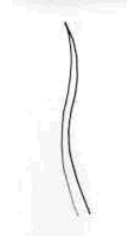
Source:<http://www.scielo.br/>

Illustrated glossary of terms

<b>Aciculum</b>		<b>Caruncle</b>	
<b>Antenna</b>		<b>Chevron</b>	
<b>Biarticulate</b>		<b>Clitellum</b>	The swollen glandular portion of skin of certain annelids.
<b>Bidentate</b>		<b>Compound seta</b>	
<b>Biramous</b>		<b>Denticulate</b>	
<b>Branchia</b> a gill, an extension of the body wall which has elements of the blood-vessels.		<b>Elytron (elytra)</b>	
<b>Capillary seta</b> a hair-like bristle but often used to cover slender tapering setae.		<b>Eversible (proboscis)</b> capable of being extended by turning the inner part outwards.	

<b>Falciger</b> 	<b>Multiarticulated</b> 
<b>Harpoon seta</b> a stout pointed seta with recurved barbs near the tip.	<b>Notopodium</b> 
<b>Hooded seta</b> 	<b>Notosetae</b> 
<b>Hook</b> stout-shafted, blunt, often distally curved and dentate seta; smaller hooks arranged in single or double rows are often referred to as uncini.	<b>Occipital antennae</b> antennae on the posterior part of the prostomium.
<b>Interrama cirrus</b> a cirriform projection between the notopodium and neuropodium.	<b>Palps</b> 
<b>Limbate (seta)</b> a seta with a flattened margin to the blade.	<b>Paragnath</b> 
<b>Lobe</b> major parapodial process, used mainly about flattern kinds, but also more generally about all kinds of major parapodial processes.	<b>Pectinate</b> comblike;with a series of projections arranged like the teeth of a comb.

<b>Neuropodium</b> 	<b>Presetal</b> posterior to the setae.
<b>Neurosetae</b> 	<b>Presetal</b> anterior to the setae
<b>Peristomium</b> first distinct post-prostomial region; strictly including only the region around the mouth, in practice including also segments fused to this structure, forming the posterior part of the recognizable head. 	<b>Proboscis</b> the anterior part of the alimentary canal derived from the stomadaeum which can be everted to project forwards. 
<b>Pinnate</b> 	<b>Prostomium</b> anteriormost, a pre-segmental part of the body anterior to the mouth, enclosing at least the anterior to the brain, often with antennae and eyes. 
<b>Polychaete</b> bristle worm, a class of mainly marine annelid worms, characterized by possession of parapodia bearing numerous chaetae	<b>Seta</b> secretion from parapodia forming armature. 

<b>Setiger</b> a segment with setae.	<b>Tentacular cirrus</b> a cirrus arising from the peristomium. 
<b>Simple seta</b> 	<b>Uniramous</b> mostly have reduced notopodium. 
<b>Spiniger</b> 	

Source: [http:// personal.cityu.edu.hk/~bhworm/errant/key.htm](http://personal.cityu.edu.hk/~bhworm/errant/key.htm)

References

Andrew Campbell. , (2005). Guide to seashores and shallow seas of Britain and Northern Europe. Published by Philip's, a division of Octopus Publishing Group Ltd.

L. G. Eldredge and C.M. Smith, (August 2001). A guidebook of introduced marine species in Hawaii.

Matthew D. Richmond, (1997). A field guide to the seashores of Eastern Africa and the Western Indian Ocean Islands. Published by Sida/ Department for Research Cooperation, SAREC, and University of Dar es Salaam.

David A. Jones, (1986). A field guide to the sea shores of Kuwait and the Arabian Gulf. Published in the U.K. by University of Kuwait.

Websites

- <http://en.wikipedia.org/wiki/Polychaete>
- <http://www.annelida.net>
- [www.infovek.sk/.../annelida/obrazky.html](http://www.infovek.sk/.../annelida/obrazky.html)
- <http://www.ucmp.berkeley.edu/annelida/polyintro.html>
- <http://www.nhm.ac.uk>
- <http://www.iopan.gda.pl/>
- <http://instruct1.cit.cornell.edu/courses/biog105/labs/inverts/annelida.html>
- <http://www.tolweb.org/Annelida>
- <http://www.scielo.cl/>
- [http:// personal.cityu.edu.hk](http://personal.cityu.edu.hk)
- [http://www.bishopmuseum.org/HBS/invertguide/species/phallusia\\_nigra.htm](http://www.bishopmuseum.org/HBS/invertguide/species/phallusia_nigra.htm)
- [http://www.cona.cl/.../html/6\\_Rozaczylo/Rozbaczyllo.htm](http://www.cona.cl/.../html/6_Rozaczylo/Rozbaczyllo.htm)
- <http://www.answers.com>
- <http://researchdata.museum.vic.gov>
- <http://www.rmbr.nus.edu.sg>
- <http://species-identification.org/>

Deposit No. at 264/2011  
ISBN. 99921-786-1-2

