

Marine Faunal Diversity of Pakistan

Inventory and Taxonomic Resources

Quddusi B. Kazmi



Zoological Society of Pakistan

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Reaching back to see the future

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**Zoological Society of Pakistan
2022**

President: Prof. Dr. Abdul Rauf Shakoori
Secretary General : Abdul Aziz Khan
Editor in Chief : Prof. Dr. Abdul Rauf Shakoori

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@ Quddusi B. Kazmi

ISBN:

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Published by the Zoological Society of Pakistan, Department of Zoology, University of the Punjab, Quaid-i-Azam Campus, Lahore, 54590, Pakistan.

**In memory of
Two great ladies-**

**My biological mother Mohtarma Rahat Begum- respecting and loving her for being a wonderful
mother and my supporter that she was**

AND

**My mentor -the great marine Zoologist -Professor Dr. Nasima M. Tirmizi for knowledge, love
and care she bestowed to me**

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Editor's Note



Oceans provide livelihood to 3 billion people, nearly 50% of the entire global population. They also produce at least 50% of the planet's oxygen, house most of the earth's biodiversity and are the main source of protein for more than a billion people around the world. Marine fauna are highly diverse and range in size from microscopic zooplankton to the blue whale.

Pakistan has a 1,050km long coastline, shared by the two provinces - Sindh and Balochistan, stretching from the Runn of Kutch in the east to Jiwani in the west, with as many as 100 million species. It is established that marine biodiversity far exceeds that on land. The marine environment has a very high biodiversity because 32 out of 33 described animal phyla are represented here. In order to fully exploit the marine sources for the benefit of mankind, it is imperative to take stock of the variety of marine resources. This onerous task was undertaken by the Marine Reference Collection and Resource Centre of University of Karachi, a research center established by a renowned visionary carcinologist Prof. Dr. Nasima Tirmizi of Department of Zoology, University of Karachi and later on headed by Dr. Quddusi B. Kazmi.

Zoological Society of Pakistan requested Dr. Q.B. Kazmi to prepare, for posterity, an inventory of the marine fauna of Pakistan. This was a huge, time consuming task, which was completed by Dr. Kazmi in less than two years. Her familiarity with the fauna, access to the original sources of information and documented record and expertise in taxonomic documentation has been phenomenal. No one else could have produced such a valuable document in such a short time. Marine Faunal Diversity of Pakistan: Inventory and Taxonomic Resources compiled by Dr. Kazmi has 23 chapters dealing with the major phyla represented in the Arabian Sea. The content of each chapter are supported by citation of references, listed at the end of each chapter. The index of scientific names given at the end of the book provides easy access to the relevant information about specific animal.

Marine faunal resources of Pakistan are however under severe threat of pollution, habitat destruction, overexploitation and global climate change. Despite being part of the London Convention on the Prevention of Marine Pollution by dumping of waste and other matter, Pakistan throws all sorts of waste into the sea. Some timely remedial measures will have to be undertaken to avoid any catastrophe.

Dr. Abdul Rauf Shakoori

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Professor Dr. Quddusi B. Kazmi began her career as Research Assistant completing her Bachelor of Science at the Zoology Department, Karachi University. After working for 41 years, she retired from the same institution as the Director, the Marine Reference Collection and Resource Centre and as Professor of Zoology, University of Karachi.

After gaining some valuable technical experience as Research Assistant, side by side she pursued her masters in Marine Zoology working on a thesis on the taxonomy of marine prawns of Pakistan with the renowned scientist late Prof. Dr. N.M. Tirmizi; the work was later published by the FAO. She was admitted to MPhil candidacy in a field of anatomy, opting the mantis shrimp as sample, that was later published as a handbook, and was recommended as reference book. During her doctoral dissertation on the marine crabs of Pakistan, she worked at the Natural History Museum, London where she learned the curatorial techniques and studied the old collection of Crustacea collected from Karachi housed at the NH Museum since 1898. The work in the doctoral thesis was also published and recommended as Reference Book.

Dr. Kazmi has received 2 gold medals and Life Time Achievement Award from the scientific organizations, a Best Paper Award, a Star Woman of the Year Award, travel grant to work at the NH Museum and two consecutive Productivity Awards of the Ministry of Science and Technology, Pakistan.

She has produced M.Sc., MAS, MPhil and Ph.D students, by supervising their theses, one of them is a Higher Education Commission Indigenous Scholarship holder, and one for the Kuwait University on the hermit crabs of Kuwait. She was among the approved PhD supervisors list of Higher Education Commission of Pakistan. She attended and presented her research findings at international and national conferences; on one occasion she was the only presenter from Pakistan. She has organized several conferences and seminars. She was also involved as Resource Person in the assessment and compilation of Pakistan Freshwater biodiversity Assessments Report 2004-2005 to detect increasing risk of extinction, as Consultant for Analysis of Benthic Fauna of a project undertaken by the environmental consultancy firm Hagler Bailly Pakistan (PVT) in 2008-2009.

Dr. Kazmi has written 16 books, 4 monographs, including one published by the HEC, and more than single and coauthored 250 research articles published in local and international journals; co- edited 3 proceedings of conferences, Urdu and English Newsletter of her Centre and edited a biannual Journal "The Pakistan Journal of Marine Sciences" and written around 70 popular articles.

Her areas of concentration are Marine Biodiversity and its conservation. Dedicated to the cause of marine conservation she was not going to confine herself to a retired life after the completion of her university services. Once that phase of her career came to an end, she decided to continue working to ensure a world where people can live in harmony with nature and continued her research work on her own. The present book of Dr. Kazmi on Marine faunal biodiversity of Pakistan will add to our knowledge of Pakistani marine fauna and will tell us about the health of ocean of the country. This compilation of Pakistani marine fauna spans from early nineteenth century to 2022 using databases of historical and contemporary location records of species indicating that a great number of species has ceased to exist in our local waters, though they still exist elsewhere leading to local extinction.

As the Director /Curator of the Marine Reference collection and Resource Center, University of Karachi her job was on running research projects, conducting research and writing scientific reports and research papers, overall as in-charge of the center to run administrative, academic and research affairs. During a visit to Singapore National University, on a joint study programmed, she signed a MoU with the University of Singapore for exchange of scientists/students.

She was the source of numerous invited lectures, newspapers articles, and TV talks.

The author will be more than happy for people to use photos of this inventory book in presentations, educational materials, and websites, but please acknowledge her if you do. (qbkazmi@yahoo.com; quddusikazmi2014@gmail.com)

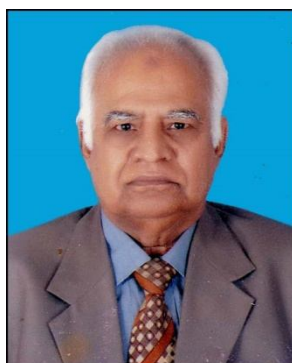
Contributors



Dr. Muhammad Moazzam Khan

Ex- Director General, Marine Fisheries Department, Government of Pakistan

Muhammad Moazzam Khan is one of the leading fisheries scientists of the country. Mr. Moazzam has been associated with fisheries research and administration since 1973. Since 1998 till his retirement in 2011 he worked as Director General, Marine Fisheries Department. During his tenure, as Director General, Marine Fisheries Department acclaimed national and international recognition. The Department enabled to achieve status of a harmonized country by European Commission as well as by US Department of state for complying TED regulations during his tenure. He also served as Chief Executive Officer of Fisheries Development Board in 2009-2010 and also served as Director, Animal Quarantine Department during 2009. Mr. Moazzam Khan has published more than 370 publications including 7 books, scientific papers in national and international Journals. Presently he is working as Technical Advisor (Marine Fisheries) in WWF-Pakistan. He is leading a team of scientists and fisheries managers working on by-catch of commercial fishing operations especially sharks, rays and cetaceans.



Professor Dr. Muhammad Afzal Kazmi

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Professor Dr. M. Afzal Kazmi did his masters in 1967 from the Aligarh Muslim University, with specialization in Ichthyology and Fisheries, got his doctorate on marine caridean shrimps of Pakistan. He joined the Department of Zoology, University of Karachi, and later went to North Carolina, USA for an international training in Marine Sciences at the Duke University.

Professor Kazmi has produced of 40 students by supervising for their masters, MPhils and PhD, he published more than 60 research articles in national and international journals of repute and one monograph funded by the Higher Education Commission, Pakistan. He has organized and attended several conferences and symposia.

He has been elected and appointed on several academic positions of the University of Karachi- chairman, Department of Zoology; Member, Board of Advance Studies and Research; University Senate; University Syndicate; President, Teachers Society for 3 consecutive tenures; Coordinator, Director, department of Health and Physical Education; General Secretary, Pakistan Fisheries Society; president, the Zoological Society of Pakistan.



Razia Naushaba

Senior Taxonomist, Marine Reference Collection and Resource Centre,
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Razia Naushaba worked as Senior Taxonomist at the Marine Reference Collection and Resource Centre, University of Karachi. Her main interest were the marine Mollusca of Pakistan. She helped the author in laying the ground work, commencing the elemental inventory of marine fauna of Pakistan.

She published more than ten research papers on marine fauna of Pakistan.

She got a short training course for Scanning Electron Microscope in Netherlands by Philips Electronics.

Preface

There is an increasing awareness that humans have some kind of ethical responsibility for the welfare or at least continued existence of our known living companions in the universe. There is a profound human instinct which causes people to feel kind to the natural world, and besides this there is an urge for the life hidden in the water on the planet. The lack of a documented database on total taxa diversity requires greater attention for the biodiversity of this environment.

In order for a country to comply fully with article 7 of the “Convention on Biological Diversity “it is first necessary to prepare an inventory of organisms present within their territories, its importance stressed by the experts in less developed country like ours. Here I would like to mention and appreciate the efforts of Dr. Z.B. Mirza who wrote an illustrated handbook of animal biodiversity (including coastal animals) of Pakistan in 1998. Such other attempts were made by late Prof. Dr.S.M. Hussain (2001) as brief report on biodiversity in the coastal areas of Pakistan, the the Diirector of Center of Excellence in Marine Biology, Pakistan, incorporated latest information on marine fauna; a good step, a booklet in Urdu for school going students on sea animals was published by late Waqar Ahmed Zuberi and finally the Marine Reference Collection and Resource Centre, University of Karachi, Pakistan contributed by printing a series of books on marine fauna of Pakistan. Now the same institution ,realizing a comprehensive national list of marine fauna missing, compiled this inventory of Pakistani marine animals, in view of the necessity to spread the awareness of the need to treat our marine animals as capital assets. The main aim of this study is to establish an inventory of the characteristic Pakistani intertidal, shallow sub tidal and deep water fauna ,with additional informations on the references of the first reports from Pakistani marine and brackish waters.

Such type of inventories, as the present one where a lot of recorded species are only present in historical papers, showed that number of species has replaced old species over time and possibly habitat changes, invasive species or indiscriminate exploitation has caused the local extinction of many native species. We can only benefit from marine resources if they are known to us and we can conserve and protect only those natural resources that we are aware of. To determine what is being lost, we must have some idea of what is available at any point of time. Maintaining a ledger that lists faunal inventory is a basic responsibility that taxonomists owe to their shareholders.

It is mentioned in literature that a vast difference occurs between the number of species known now and those waiting to be discovered. Some obvious areas where gaps exist are continental shelves and deep seas, including seamounts. Even along our 1000km coastline, there are vast stretches that have never been sampled.

Research and writing to make up the framework for an orderly representation and editing took me more than a decade starting in 2004. In spite of this long period it was not possible to describe the species, only an inventory could be compiled. But still the compilation should be useful as a base for the systematic marine zoologists of Pakistan-as a repository of information designed to harness and disseminate collective intelligence on the marine faunal biodiversity of Pakistan.

Unluckily in the last stage of the writing i.e. the revising and proof reading time I had cataract surgery of both of the eyes ,had some complications, not yet fully recovered and that may have caused omission of the mistakes in the proof, such as inconsistency of style and overlooking the other weaknesses etc. I am aware that the mistakes in a book are embarrassing-

Readers and reviewers may please forgive

اس یقین نے مجھے وہی ہے جرات گفتار
کہ میرا حرف سخن ناتمام بھی ہے

(My courage to speak comes from the certainty that what I have said thus far is incomplete.)

Ali Ahmad Minai

Reaching back to see the future
Quddusi B. Kazmi

Acknowledgments

To Allah for His countless blessings

The author is thankful to her late mother Rahat Begum and her younger daughter Rabia for their underlying assistance, tolerance and for durance during the preparation of the text. The author of this inventory of the marine animals of Pakistan expresses her indebtedness to the many workers who in the span of more than two hundred years since 1798 contributed to the list of species which the Pakistani marine and brackish fauna now embodies. Sincere thanks are due to the following authorities for providing us with valuable information The retrieval of almost all the research material was possible for that published abroad through internet and libraries especially the library of the Zoology Department of the University of Punjab and personal libraries of Professor Dr. Nasira Khatoon, Department of Zoology, and late Professor Dr.Shahina Fayaz, Director, National Nematological Research Centre, University of Karachi.

Thanks are due to all the scientists who helped her in many ways, especially late Prof. Dr. L.B. Holthuis, the Netherlands , Dr. Peter Ng, National University of Singapore, Dr. N. Yap, National University of Singapore and Drs. Terry Gosliner of California Academy of Sciences and Nathalie Yonow of Swansea University for helping with nudibranchs. The author wishes to express her thanks to Dr. Kevin Scheers from Belgium and Mauricio Garcia from Venezuela for identifying the *Eretes* species from a picture uploaded by her on Researchgate.

Catalogue of Data in World Data Center A- Oceanography (1965) provided many papers not available to the author. The author owes her special thanks to Mr. Imdadullah of PCSIR for helping in various ways, to Mr. Rameez Hamid of the Project, Pakistan Journal of Botany, University of Karachi for easing in finalizing the text and images of the manuscript, Mr. Nadeem Khan of M. M/ Photostat and Computers, University of Karachi was very helpful at a stage.

The author offers her sincere thanks to Ms. Wafra M. Zaheen and Dr. Farhana S. Ghory for extending technical support when needed, to her colleagues, especially Dr. Feroze A. Siddiqui, distinguished pupils and other staff members of the Marine Reference Collection and Resource Centre, University of Karachi, especially Mr.Shakir Ali and Mr.Zahid as composers and Mr.Abrar Ali as illustrator.

The author acknowledgments are due to late Mr. Maqsood Zafar and Mr. Amir Bux, both field assistants (MRC) for their profound dedication and enthusiasm in the field work and finding many species.

Some pictures are downloaded and shared, will be printed in unaltered/altered form for educational purpose, and the sources are acknowledged. The author is grateful to

those photographers who kindly agreed to allow us to use their images in this inventory. We are also grateful to those people who make their work available for use through the Creative Commons scheme. I respect the copyright of owners of the images used here. I am thankful that I can use those images as non-commercial illustration to enhance the knowledge in this inventory. Without those images the species data would have been less useful. Every effort has been made to acknowledge correctly and frequently contact the source and/or copyright holder for each picture and the authors I wish to apologize for any unintentional errors or omissions. At many places no known copyright restrictions were applied. Some pictures were blurred or poor having errant marks, etc. that were either part of the original artifact, or were introduced by the scanning process. But I believe many works are scientifically so important, that despite the imperfections I have included them here.

WWF-Pakistan is acknowledged for providing initial funds supporting to develop inventories of marine fauna under its project#5003690 in 2006.

Mr. Kamran Sheikh ia aknoweldege for allowing me to use underwater snaps of marine animals taken by him.

Summary

Marine and coastal ecosystems of Pakistan provide supporting services in the form of a wide range of habitats with wide range of faunal diversity, but till to date nobody tried to consolidate all these available information on marine fauna into a system in Pakistan. Thus, the time has now come when Pakistan should have a consolidated account of marine fauna. Accordingly, an attempt was made to prepare such account on the basis of published information and authors' new work. The present inventory summarizes the current status of taxonomic knowledge of the marine and coastal faunal biodiversity of Pakistan. Data from all of the publications on the taxonomy of Pakistani marine and brackish-water fauna were gathered and assimilated. The diversity of fauna suggests that the number of species known could be higher in Pakistan. In this inventory, the current status of the species diversity of 22 phyla, namely in alphabetical order: Acanthocephala, Annelida, Arthropoda, Brachiopoda, Bryozoa, Cephalorhyncha, Chaetognatha, Chordata, Cnidaria, Ctenophora, Echinodermata, Entoprocta, Gastrotricha, Gnathostomulida, Kinorhyncha, Hemichordata, Mollusca, Nematoda, Nemertea, Platyhelminthes, Porifera and Rotifera along the coasts of Pakistan is reviewed including newly reported for the first time and one new to science from the coast of Pakistan. The taxonomy of many marine groups, particularly invertebrates, and especially poriferans, ctenophores, cnidarians and tunicates, still remains a challenge to specialists, and as a result due to lack of specialists here, these taxa continue to be inadequately known from Pakistan. However, considerable knowledge on the taxonomy of other groups such as cestodes, trematodes, nematodes, crustaceans, molluscs, echinoderms, fish, reptiles and mammals is satisfactorily available in Pakistan. It is suggested that the data provided in this inventory book warrants continued taxonomic research in the least-studied or unknown groups in light of existing threats to marine biodiversity. The information disseminated in the book may be helpful to managerial measures for conservation and sustainable utilization of our precious biodiversity. Data provided are for informational purposes only. Although carefully collected, accuracy cannot be guaranteed as there may be ambiguous identifications and sometimes misidentifications made in literature.

Keywords: Pakistan; coastal faunal diversity; taxonomic resources

Introduction

Faunal checklists are important taxonomic scientific documents requiring the compilation of extensive datasets. They offer the most recent and proper scientific names of the taxonomic group of interest (Goh and Chou, 1996, Bruno, *et al.*, 2005), taxonomic revisions (Wells, 2007), and reports of new taxa. These checklists may also serve as starting points for other scientific disciplines (Majka and Sikes, 2009). First, many checklists aim to contribute to knowledge about biodiversity (Ryu *et al.*, 2012, Taheri *et al.*, 2012) which has become an important global issue. Datasets of checklists are also used to obtain a deeper understanding of ecological issues, speciation and conservation biology. Species lists may also be used as baseline data in the disciplines of environmental monitoring and environmental policy, in terms of understanding contemporary changes in local faunal compositions (Møller, *et al.*, 2010).

The marine biodiversity data base in our country is not organized as compared to terrestrial or freshwater biodiversity. In general the Pakistani marine fauna is poorly known. Nevertheless there has been good number of attempts to investigate and document the diversity of some groups. This report is an attempt to compile all the marine animals reported so far from the Pakistan coast and some new records/species. Thus this checklist is a collation of taxa as reported in the literature and from first hand sampling and identification.

1a) Criteria for inclusion of species:

Where an older record is not supported by more recent observation, there may be doubts as to the identification, or the specialists do not verify authenticity of the identification by giving them as wrong identification. In such cases the record is doubtfully included in the present list. Some groups have not been determined to specific level; they are included for the sake of including the taxon comprehensiveness as “undeterminable”. Given that the taxonomy of the marine fauna in this region is still ongoing, some species are

included with the qualifier “cf”/“aff” preceding the specific name; undescribed and/ or possibly undescribed are provisionally included with an “sp” qualifier. Some species included in the inventory are on the basis of photographic record. Species reported by scientists on Iran, Chahbahar coastline which is a nearest geographical regime to Pakistan and has same coastal habitat are sometimes included. There is strong possibility of occurrence of these species in Pakistan. The California Academy of Sciences gives occurrence records of many Invertebrates as CAS-INVERT collected from Pakistan, these records include few which are identified only up to family level and two of them are not reported from here after these records, they are: Neotanaidae Lang, 1956 from rocks with dense vegetation at low tide; Edwardsiidae Andres, 1881 from 0 to 80 ft sandy bottom. The present list has been in preparation for many years (since 2004) and some of the species have been cited in in-house departmental reports, these lists, which are not generally recognized as formal publications. These publications have not been excluded.

As a PhD student few brachyuran specimens were examined by the author during her visit to the Natural History Museum, United Kingdom (NHMUK) for identifications and records. The species are included here. The material dates back to 1850 and originate from shallow waters from various parts of the then coast of British India.

Species with doubtful identity are not ignored, but included.

1b) Organization of the list:

Unfortunately, there was no reference material available in Pakistan for some groups and no authority to confirm identification. I therefore resorted to the use of information on specialized websites. Throughout the source is indicated in the text. Focus was on providing clear detailed images to help in the identification. Where no information is available, identification was limited to the generic level and the species are described under their generic name as sp. I have refrained from attaching a name to such species where their anatomy should be studied.

The sequence of the invertebrate phyla and even their contents is subject to wide differences of opinion among zoologists, the

sequence adopted here for the invertebrate is that followed in textbooks of invertebrates. The Protozoa which is considered now as a subphylum of the Kingdom Protista and not the Kingdom Animalia is not included. A faunalist clearly is no place for the more controversial aspects of systematics, consequently only the latest classification is adopted within each group which seems to be more acceptable and well-tried classification. The classification essentially follows that is proposed by the World Marine Register of Marine Species (WoRMS), this database provides the most authoritative list of names of all marine species globally, ever published. Where WoRMS was not helpful the International Taxonomic Information System (ITIS) is then followed, also for the authorities and years for most of the taxa, I mainly follow the same sites. In general WoRMS classification is adopted.

For marine phyla an alternate classification is also available given below. (Source: Boundless Biology. Boundless, 26 May. 2016).

Kingdom Animalia Linnaeus, 1758 =
Metazoa

Subkingdom Eumetazoa Buetschli, 1910

The Superphylum Lophotrochozoa Halanych *et al.*, 1995

The Superphylum Lophotrochozoa includes the Phyla Bryozoa, Entoprocta, Phoronida, Nemertea, Mollusca, Sipuncula, Brachiopoda and Annelida from Pakistan Superphylum Platyzoa Cavalier-Smith, 1998

The Superphylum Platyzoa includes phyla Platyhelminthes, Rotifera and Acanthocephala The Superphylum Ecdysozoa Aguinaldo *et al.*, 1997

The Superphylum Ecdysozoa includes the Phyla Nematoda and Cephalorhyncha, Tardigrada and Arthropoda .

The Superphylum Deuterostomia Grobden, 1908

The Superphylum Deuterostomia contains Phyla Echinodermata, Hemichordata and Chordata.

Subfamilies have been used where applied. Generic names have undergone much change in the last 100 years. In order to ensure continuity of record, any species here included which has undergone a name-change in the years mostly carries a reference to change or

reviser. Sometimes two scientists here independently have given on organism different names, normally one of these takes preferences by common consent. These alternate names or synonyms are excluded except where they are necessary to equate the original reporting and the present work. Scientific names are written in italics. The author who first used the species name has her or his name written after it. If her or his species has subsequently been transferred to another genus the author's name is placed in bracket. The original and sometimes subsequent records if with different names from the original name are given. It has been tried to keep the data within as current as possible. The authorities of few taxa are not available.

Some species of fishes are either dubiously or misidentified in Pakistan. In addition, nomenclature of some species is now modified in international database and Fishbase. This inventory was aimed to provide a lucid taxonomic status and an image of each species in line with international database to ease zoologists in identification.

For the included literature, I have tried to ensure the taxonomic ones have all been listed either as primary objects of the research or as ancillary objects of broader studies. Papers on other biological aspects are listed only when the species they treat include new records, also included are pre partition records by the Indian and British workers (Pakistan was under British rule till 1947as British India and colonial spelling of Karachi was Kurrachee).

The species known to be recorded from the Arabian Sea coasts of Pakistan in the maps given by different reports like FAO, SeaLifeBase and FishBase are also included. Thus this checklist summarizes information on the Pakistani marine fauna contained in the world literature since 1798 to the end of 2022(some from 2023). In cases where only generic names were provided, I have chosen to omit these records unless the genus was a new record. Species only reported in an abstract of a conference with no formal description are also included.

I have sought to supply a small opening paragraph of each chapter before each group whose features, in many cases will not always be consistent from group to group.

Each Pakistani record is followed in the next line by information on size, colour, and habitat, when available and for each parasitic species; information is provided on the host(s). Every effort has been made to accredit a basis of record to the first contributor of the species to the faunal list from Pakistan whose name is given in a parenthesis in the next line where “this study or present study” replaces the contributors name; it indicates that authors take the responsibility for the particular record. The species appear under the most accepted synonym, author and date. The early records are retained, not only to accredit the original source but some for purely historic interest, some to signalize the persistence of certain species over long periods in the area. The list contains all marine, brackish and estuarine taxa, but it does not include exclusively freshwater or terrestrial species. I have attempted to bring names in line with the current literature on taxonomy in additional source.

Each chapter in this book covers a different phylum or major taxonomic group. The format for each chapter is the same- A short introduction followed by classification, the list itself and finally references mentioned in the list. These vary somewhat in content and detail from one phylum to the next, but are primarily taxonomic. In some groups comments on status have been added. The levels of classification are given. Geographical area of coverage has not been included in this version of the species inventory. The fossil fauna is not included in the inventory.

Typefaces used in the checklist:

- Phylum
- Subphylum
- Super class
- Class
- Subclass
- Order
- Suborder
- Super family
- Family
- Tribe
- Genus
- Subgenus
- Species

For certain groups we did not have sufficient expertise to compile a useable list but records are included as experts make such information available.

1c) Area covered:

The full title of the present Pakistanis marine faunal biodiversity inventory book denotes a wide coverage, including from Pakistan shores and inshore waters, as well as all pelagic and planktonic species. Some off-shore and deep sea records are also included. The book enlists not only common animals which may be found on the Pakistani shore in the adjacent shallow seas, but also the hidden, discrete, parasite and microscopic animals.

1d) Landscape of coastal environment:

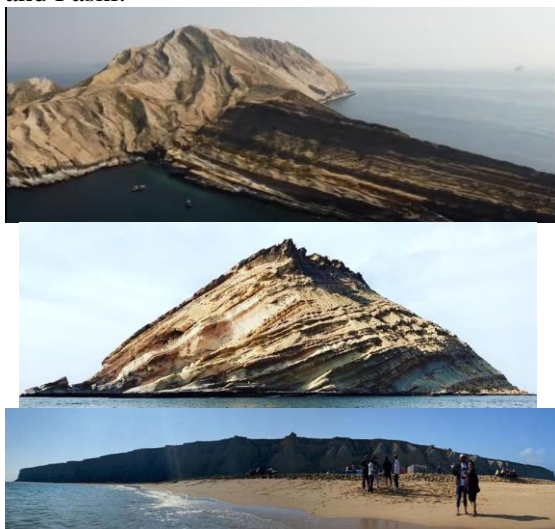
Pakistan is situated between latitude of 24° and 37° north and longitude of 62o and 75o east on the north eastern part of the Arabian Sea.



The 1000km long coastline lies within the subtropics bordering the Arabian Sea in the north. Economic Zone (EEZ) 200 nm covers an area of 196,600 km² and the territorial waters cover an area of 24,000 km². The coastal strip is arid; the dominant aquatic vegetation in the intertidal zone where fresh water outlets are present is mangrove plantation, while further out to sea algae and may be sea grasses (no information available on sea grass) prevail. The Pakistan margin is characterized by a strong midwater oxygen minimum zone (OMZ) that intercepts the seabed at bathyal depths (150 to 1300 m). An oxygen minimum zone lies off Karachi at water depth 700 m. In the Indian Ocean, seep communities have been found near Pakistan (von Rad *et al.*, 2000). Methane-seeps are found off Makran (Pakistan)

From ecological point of view the coastline is divided into two different areas with different profiles. (a) The Mekrān is bisected by the modern political boundary between Pakistan and Iran. The Pakistani Mekran or Makran coast (in some sources as Mecran and Mokrān) which is Baluchistan’s

southern strip and stretches for 754 km. Its continental shelf is narrow and has a steep and unstable slope type. The main rivers of this area are, the Hingol, Hub, Basul and Dasht. The Astola Island and Churna Island are the only significant offshore islands of Pakistan, found at approximately 25 km off the main land of Baluchistan located between Ormara and Pasni.



Churna and Astolla Islands

The plain of Baluchistan has a complex lagoon system in which Miani Lagoon has 300 km² lengths, Kalamat Lagoon has 250 km² lengths and Jiwani Lagoon has 125 km² lengths. The coastline also includes rocky headlands, bays, mud volcanoes and wide alluvial plains, (b) the Sindh coast area is 320 km long extends to the Indian border in the southeast dominated by subsidence and high sediments accumulation rate. It has broad continental shelf (70-121 km) and has a stable slope. A few small islands (Baba, Bhit, and Shamspir) are located near Karachi. There are seventeen major creeks and hundreds of small creeks on Sindh southeast coast. The Indus River discharges in the Arabian Sea at two points, Turshian and Khobar. The shelf/slope of Sindh is characterized by the Indus Canyon. On the coast of Karachi the Lyari River and Malir Rivers add fresh but polluted water to Manora Channel throughout the year, these channels and their backwaters function as a positive estuary. Our EEZ support diverse ecosystems: mangrove and swamps, deltas and estuaries, corals, gas vents, up sloping zones, channels, bays, creeks, lagoons, continental shelves and vast rocky and sandy beaches.

Tides are of mixed semidiurnal types with two highs and two lows every day. The tidal range is about 3.5m with slightly higher range on the coast of Sindh. Salinity in the inshore waters of Karachi areas ranges from 35.5 to 36.‰. The Southwest (SW) Monsoon from June through September and the Northeast Monsoon (NE) from December through March with the spring transition (pre-monsoon) occurs in April and May and the fall transition (post-monsoon) occurs in October and November, respectively. South westerly flow has a direct effect on the Arabian Sea, Oman Sea, the Arabian Sea, coast of Iran, southern Pakistan, and India (Caulfield, 1990)

Global Climate Risk Index 2016 report listed Pakistan number five in the list of top 10 countries most affected by climatic change. Sea intrusion creating an inhospitable environment for aquatic creatures Ongoing global ocean warming and a recent increase in the frequency and duration of marine heatwaves have demonstrably impacted marine ecosystems. While range shifts are among the predicted responses, it is expected that many species shown in this book are no more here.

1e) Types of Shores:

All along our coastline different types of shores are present. Following the universally recognized types they are categorized into 3 major types depending on the coastal geography which results in a variety of substrates. Most of these substrate can however be related to one of four types: rocky, shingle, sandy or muddy. It has been observed that at any one point the geological formations have profoundly modifying effect upon the types of organisms to be found. Although one is apt to consider different shore types separately, in practice they often grade into one another. The animals are found in their pelagic and benthic realms.

Rocky Shores:

Rocky shores are the most variable type, their character depending on the prevailing rocks. The profile of the rocky shore is usually

related to the strata formation. If this is sloping there will usually be a variety of crevices and pools. If it is flat one will encounter rocky platforms and ledges. Rocky shores usually provide a great diversity of animals and plants because the number of ecological niches available is so great.

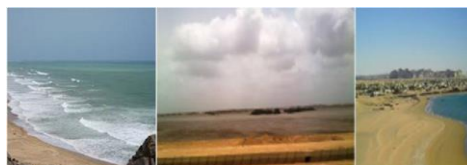


By comparison with rocky shores all other types of beach may at first sight appear barren and deserted. In practice this is true of shingle beaches where the pebbles are constantly being rolled about by the action of waves, so that most forms of life find it impossible to exist; also the spaces between the pebbles are too large to retain water by capillarity when the tide ebbs, so that virtually nothing can survive under or between the pebbles. Examples of Pakistani rocky shores are Manora Island, Paradise Point, Cape Monze and Bulleji.

Sandy Shores:

Sandy shores are made up of vast numbers of fine grains - usually quartz. The profile of a sandy shore depends to a great extent on the degree of exposure to wave action. Because the particles are so small water is usually retained by capillary action in the minute interstitial spaces between the grains. This water effectively lubricates the grains and also allows the animals to survive in the sand after the tide has fallen. Although the surface of the sand is affected by the fall of the tide, bringing about water loss, temperature and salinity changes, these effects do not appear to penetrate very deeply so that organisms several centimeters down can exist quite well. Providing the sandy shore is stable and not being moved by wave action, it provides a good environment for marine organisms. The diversity of species may not be as great as that

on a rocky shore, but the density at which the individuals are disposed on a sandy shore is often very high. Examples of Pakistani sandy shores are Gaddani, Sonmiani, Sand Spit, Hawk's Bay.



Muddy Shores:

Muddy shores are made of the finest particles of sand. For the mud to accumulate the shore must be virtually flat. In addition to the silt (which is of mineral origin) there will also be a variety of organic debris accumulated here. A layer of hydrogen sulphide is found beneath the surface which causes a typical smell. The fine particles may cause difficulty for some animals since it can block delicate structures; some species benefit from the organic material included while others do not. Hence the number of species represented may be restricted to certain specialized ones, although their populations can be considerable. Estuaries with shores of fine sand and mud can be exceedingly productive. Examples of Pakistani muddy shores are Baba, Bhit and Shamspir Islands, backwaters, deltaic regions, and mangrove mudflats between the creeks.



Very often the geographical locality or the habitat for instance- upper shore or in mud will assist in helping with the identification. In some cases the exact depth at which organism occurs are known, in other cases only a general impression is available, for instance shallow water.

Salt pannes:

Are water retaining depressions located in Karachi. generally tend to retain water during the summer months between high tides,. Upon successive cycles of inundation and evaporation the panne develops an increased salinity greater than that of the larger body of water. This increased salinity dictates the type of flora and fauna able to grow within the pannes. Salt pannes and pools are unique microhabitats dominated by various species that vary considerably in composition due to a variety of factors such as substrate type, depth and diameter, location within the intertidal zone, these factors affect the types of species which can survive within the various types of salt pannes and pools. The local salt marshes are present in the Manora Channel near Sands” Spit at Karachi, regularly inundated with sea water, can be divided into three zones i.e. seaward, intermediate and landward. Like all coastal marshes, salt pannes are threatened by sea-level rise; therefore, it must be assessed how they are affected by rising sea.



Salt pannes, Karachi

1f) Taxonomic resources:

No bibliographic citation for the authority of the taxa is given. The sources or the references to work of the original contributor (First ever Pakistani record) and reference to change in nomenclature and those reflecting changes in taxonomy are provided and annexed in the “References” at the end of each chapter. Some of the old papers could not be consulted being not available but are included in the bibliographic references.

1g) Illustrations:

Not all the species are illustrated. The illustrations are line drawing, black and white or coloured photographs. Throughout this volume, photographs and illustrations have been placed after the taxon to which they refer.

The illustrations do not themselves indicate size. Colour in marine organisms can be surprisingly variable. Some change their colour rapidly when removed from the sea even after a short period of time or it is related to the season or developmental stage. Therefore the coloured photographs are not always helpful in identification. Several of the illustrations are borrowed from other sources mentioned. No known copyright restrictions are determined by some Pakistani sources. Some images could have imperfections as they are either historical or reportage.

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Chapter 2

INVENTORY

Phylum Porifera

Phylum Porifera is the basal most clade of animals. They are multicellular organisms that have bodies full of pores and channels allowing water to circulate through them. All of them are sessile aquatic animals. Although there are freshwater species, the great majority are marine species, ranging from tidal zones to depths exceeding 8,800 m (5.5 mi), with approximately 5,000–10,000 known species traditionally distributed in three classes: calcareous sponges (Calcarea), glass sponges (Hexactinellida) and demosponges (Demospongiae). Little work has been done on this group from Pakistan.

Subkingdom Parazoa Grant and Todd, 1838

Phylum Porifera Grant, 1836

Class Calcarea Bowerbank, 1864

Order Clathrinida Hartman, 1958

Family Clathrinidae Minchin, 1900

Genus *Ascartis* Hackel, 1873

Ascartis gardineri (Dendy, 1913)

Sessile; depth range 0 - 20 m.

(Kumar, 1924 as *Leucosolenia gardineri*, Dendy, 1913, as *Leucosolenia gardineri* var. *vergensis*).



Family Leucettidae de Laubenfels, 1936

Genus *Leucetta* Haeckel, 1872

Leucetta sp.

Subtidal

(Maghsoudlou *et al.*, 2014)

Class Desmospongiae Sollas, 1885

Order Verongiida Bergquist, 1978

Family Ianthellidae Hyatt, 1875

Genus *Ianthella* Gray, 1869

Ianthella flabelliformis (Pallas, 1766)

Coral reef

(Ali, 2006)

Family Aplysinidae Carter, 1875

Genus *Verongula* Verrill, 1907

Verongula sp

(Ali, 2006)



(Picture courtesy: Ali, 2006)

Order Chondrillida Redmond, Morrow, Thacker, Diaz, Boury-Esnault, Cardenas, Hajdu, Lobo-Hajdu, Picton, Pomponi, Kayal and Collins, 2013

Family Chondrillidae Gray, 1872

Genus *Cinachyrella* Wilson, 1925

Cinachyrella australiensis (Carter, 1873)

Benthic

(Kumar, 1924 as *Cinachyra iris*)

Order Dictyoceratida Minchin, 1900

Family Thorectidae Bergquist, 1978

Genus *Luffariella* Thiele, 1899

Luffariella avariabilis (Poléjaeff, 1884)

Coral reef

(Khan *et al.*, 2012)



Family Thorectidae Bergquist, 1978

Genus *Phyllospongia* Ehlers, 1870

Phyllospongia foliascens (Pallas, 1766)

35 cm,

At 9 m depth

(Ali, 2006 as *Phyllospongia lamellosa* (Esper)



(Photo after www.casc.it/photogallerynew.asp)

Family Dysideidae Gray, 1867
Genus *Dysidea* Johnston, 1842
Dysidea cinerea Keller, 1889
Subtidal
(Maghsoudlou *et al.*, 2014)
Order Tethyida Morrow and Cárdenas, 2015

Family Tethyidae Gray, 1848
Genus *Tethya* Lamarck, 1814
Tethya near *aurantium* (Pallas, 1766)
In loose spherical colonies under rocks, in depth on stony and sandy bottom
(Present study)



Tethya ingalli (Bowerbank, 1859)
Size 5 cm dia.
Sessile, free buds, adapted for an extended planktonic life
(Kumar, 1924 as *Donatia ingalli*)



Free planktonic bud

Order Polymastiida Morrow and Cárdenas, 2015

Family Polymastidae Gray, 1867
Genus *Polymastia* Bowerbank, 1864

Polymastia pachymastia de Laubenfels, 1932

Intertidal
(Mangi, 1994, unpublished, questionable)



(In aquarium)

Order Suberitida Chombard and Boury-Esnault, 1999

Family Suberitidae Schmidt, 1870

Undetermined taxon.

Moulding to the contour of dromid crab (Tirmizi and Kazmi, 1988)



Genus *Suberites* Nardo, 1833

Suberites sp

Found in deep water greater than 20m.
(Kumar, 1924)

Family Halichondriidae Gray, 1867
Genus *Pseudospongosorites* McCormack and Kelly, 2002

Pseudospongosorites sp.

In shallow waters near shore
(Kumar, 1924)

Genus *Hymeniacion*

Bowerbank, 1858

Hymeniacion heliophila (Wilson, 1911)

Intertidal oyster reef

(Aslam *et al.*, 2020)

Order Axinellida Lévi, 1953

Family Axinellidae Carter, 1875

Genus *Axinella* Schmidt, 1862

Axinella sp.

In strong water currents
(Kumar, 1924)

Axinella donnain (Bowerbank, 1873)

Subtidal

(Moazzam and Moazzam, 2020)

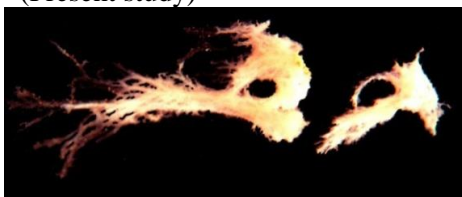


(After Moazzam and Moazzam, 2020)

Undeterminable taxon

Intertidal

(Present study)



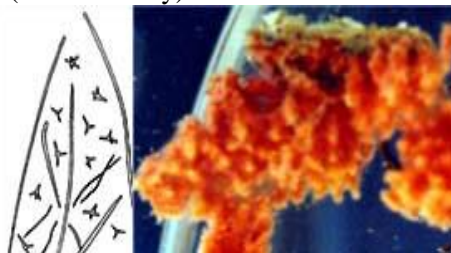
Meshes of ectosomal skeleton

Subclass Heteroscleromorpha Cárdenas,
Pérez and Boury-Esnault, 2012

Family Dictyonellidae van Soest, Diaz
and Pomponi, 1990.

Intertidal

(Present study)



Spicules-dichotriaenes, subtylostyles,
sigmas micoxes and specimen

Genus *Reniochalina* Lendenfeld, 1888

Reniochalina stalagmitis Lendenfeld,
1888 15cm.

At 12m depth Inhabits caves, crevices,
and slope areas

(Ali, 2006 questionable)

Genus *Liosina* Thiele, 1899

Liosina paradoxa Thiele, 1899

Mangroves, on pneumatophores
(Jabeen *et al.*, 2018)



(After Jabeen *et al.*, 2018)

Order Tetractinellida Marshall, 1876

Family Thrombidae Sollas, 1885

Genus *Thrombus* Sollas, 1886

Thrombus challenger Sollas, 1886

Growth on majid crab

(Mangi, 1994 unpublished).

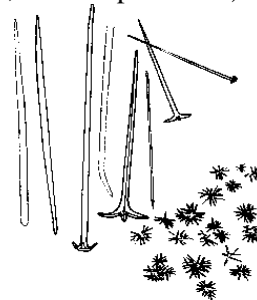
Family Ancorinidae Schmidt, 1870

Genus *Stelletta* Schmidt, 1862

?*Stelletta durissima* Bergquist, 1965

On mangrove root, 1 m depth.

(Mangi, 1994 unpublished)



Spicules- spirasters mucronate, tylostyles

Family Tetillidae Sollas, 1886

Genus *Acanthotetilla* Burton, 1959

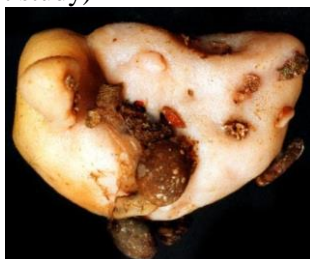
Acanthotetilla sp.

(Mangi, 1994, unpublished)



Spicules

Family Geodiidae Gray, 1848
 Genus *Geodia* Lamarck, 1815
Geodia. near *mesotriaena* Lendenfeld,
 1910. 12 cm.
 Encrusting to amorphous massive, under
 rocks, on sea weeds
 (Present study)



Order Biemnida Morrow, Redmond,
 Picton, Thacker, Collins, Maggs,
 Sigwart, Allcock, 2013

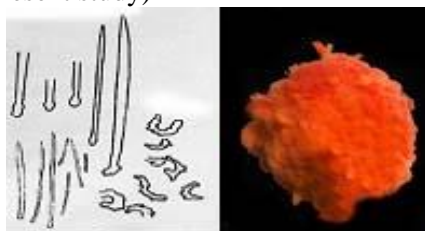
Family Biemnidae Hentschel, 1923
 Genus *Sigmaxinella* Dendy, 1897
Sigmaxinella sp. blue in colour
 Massive, intertidal
 (Mangi, 1994 unpublished)



Spicules

Order Clionaida Morrow and Cárdenas,
 2015

Family Clionaidae d'Orbigny, 1851
 Genus? *Clionopsis* Rützler, 2002
Clionopsis sp. Yellowish brown
 Parasitically boring holes in calcareous
 material such as mollusc shells and
 corals
 (Present study)



Spicules and specimen

Order Poecilosclerida Topsent, 1928

Family Latrunculiidae Topsent, 1922
 Genus *Latrunculia* du Bocage, 1869
Latrunculia sp. green and brown.
 Benthic, sessile
 (Mangi, 1994 unpublished)

Family Mycalidae Lundbeck, 1905
 Genus *Mycale* Gray, 1867
Mycale sp.
 Encrusting, coating subtidal mangrove
 roots, inshore water
 (Present study)

Family Hymedesmiidae Topsent, 1928
 Genus *Acanthancora* Topsent, 1927
Acanthancora sp. Cobalt blue
 On rocks
 (Present study)



Family Tedaniidae Ridley and Dendy,
 1886

Genus *Tedania* (*Tedania*) Gray, 1867
Tedania (*Tedania*) *anhelans* (Vio in
 Olivi, 1792) Reddish brown
 Subtidal, down to 40 m.
 (Kumar, 1924 as *Tedonia digitata*)
 Order Haplosclerida Topsent, 1928

Family Chalinidae Gray, 1867
 Genus *Haliclona* Grant, 1836
Haliclona (*Gellius*) *fibulata* (Schmidt,
 1862) rose or pale yellow-coloured
 In infralittoral, to ca. 60 m. encrusting on
 stones, conglomerates of shells,
 calcareous algae and, sponges
 (Kumar, 1924 as *Gellius fibulatus*)
Haliclona *hornelli* (Dendy, 1916)
 Mangroves, backwaters
 (Jabeen, 2018)
Haliclona sp.
 Sub tidal
 (Present study)



Genus *Chalinula* Schmidt, 1868
Chalinula confusa (Dendy, 1922)
 In the shallow subtidal and intertidal zones.
 (Kumar, 1924 as *Chalina confusa*)

Family Callyspongiidae de Laubenfels, 1936
 Genus *Callyspongia* Duchassaing and Michelotti, 1864
Callyspongia sp. yellowish brown
 Inshore

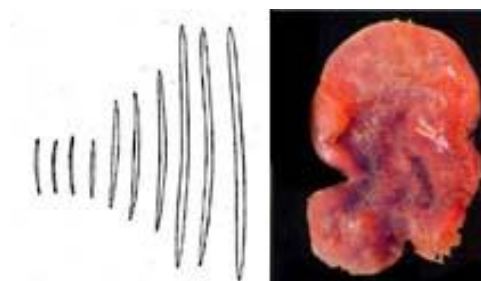


Skeleton
 (Mangi, 1994 unpublished).

Callyspongia (Cladochalina) fibrosa,
 (Ridley and Dendy, 1886)
 Sessile, at depth upto 20 m., mangroves
 (Jabeen, 2018 ,unpublished thesis)

Family Niphatidae van Soest, 1980
 Genus *Niphates* Duchassaing and Michelotti, 1864
Niphates olemda (de Laubenfels, 1954)
 pink, 20-40 cm, at 7 m depth
 (Ali, 2006 as *Cribrochalina olemda* questionable)
 Genus *Amphimedon* Duchassaing and Michelotti, 1864
Amphimedon delicatula (Dendy, 1889)
 Shallow depth
 (Kumar, 1924 as *Pachyalina delicatula*)
 Genus *Chalinula* Schmidt, 1868.
Chalinula confusa (Dendy, 1922)

In the shallow subtidal and intertidal zones.
 (Kumar, 1924 as *Chalina confusa*)
 Order Poecilosclerida Topsent, 1928.
 Undeterminable taxon



Spicules-megascleres, and microscleres



Specimens and Spicules- Microdiactines,
 Microcalthrop and Microcalthropes
 trilophés
 (Present study)

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Phylum Cnidaria

The Cnidaria is a phylum containing over 10,000 species of animals found exclusively in aquatic (freshwater and marine) environments, Many cnidarian species produce colonies that are single organisms composed of medusa-like or polyp-like zooids, or both. They are predominantly marine. Their distinguishing feature is cnidocytes, the specialized cells that they use mainly for capturing prey.

The Cnidarians are classified into four main groups: the almost wholly sessile Anthozoa (sea anemones, corals, sea pens); swimming Scyphozoa (jellyfish); Cubozoa (box jellies) and Hydrozoa, a diverse group that includes all the freshwater cnidarians as well as many marine forms, and has both sessile members. Staurozoa (stalked jelly fish) have recently been recognized as a class in their own right rather than a sub-group of Scyphozoa, and there is debate about whether Myxozoa and Polypodiozoa are cnidarians or closer to bilaterians (more complex animals).

Subkingdom Eumetazoa Buetschli, 1910
 Phylum Cnidaria Verrill, 1865
 Class Anthozoa Ehrenberg, 1834
 Subclass Octocorallia Haeckel, 1866
 Order Alcyonacea Lamouroux, 1812

Family Anthothelidae Broch, 1916
 Genus ? *Erythropodium* Kölliker, 1865
Erythropodium sp
 On a piece of bivalve from intertidal zone
 (Present study)



Suborder Scleraxonia Studer, 1887

Family Melithaeidae Studer, 1887
 Genus *Clathraria* Gray, 1859

? *Clathraria* sp.
 Rocky reefs
 (Ali *et al.*, 2014)



Family Subergorgiidae Gray, 1859
 Genus *Annella* Gray, 1858

Annella sp.
 On slopes and deeper parts of the reef
 (Ali *et al.*, 2014)

Annella reticulata (Ellis and Solander, 1786)
 On slopes and deeper parts of the reef
 (Present study)



Sub Order Stolonifera Thomson and Simpson, 1909

Family Tubiporidae Ehrenberg, 1828
 Genus *Tubipora* Linnaeus, 1758
Tubipora musica Linnaeus, 1758
 Found in shallow coastal waters
 (DeVantier *et al.*, 2008, Present study)



Suborder Holaxonia Studer, 1887

Family Gorgoniidae Lamouroux, 1812
 Genus *Subergorgia* Gray, 1857
Subergorgia sp.
 Shallow water
 (Present study)

Family Acanthogorgiidae Gray, 1859

Genus *Muricella* Verrill, 1868

Muricella sp.

Reef slope

(Kazmi and Nausaba, 2000)



Polyps, sclerites (separated), branch

Family Plexauridae Gray, 1859

Genus *Echinogorgia* K lliker, 1865

Echinogorgia ramosa (Thomson and Henderson, 1905)

Found on rocks, stones and shells or standing freely on bottom below 20 m.

(Hamid, 1924 as *Astromuricea ramosa* (Thomson and Henderson)

Echinogorgia sp.

On reef ledges

(Ali *et al.*, 2014)

Genus *Bebryce* Philippi, 1841

? ***Bebryce*** sp.

0-200 m.

(Ali *et al.*, 2014)

Genus *Menella* Gray, 1870

Menella sp.

Reef slope.

(Ali *et al.*, 2014)



Genus *Paraplexaura* K kenthal, 1909

Paraplexaura sp.

At about 20 m sand and gravel bottom

(Ali *et al.*, 2014)

Genus *Echinomuricea* Verrill, 1869

Echinomuricea indica Thomson and Simpson, 1909

Shallow reef beach with rocky substrate

(Narejo *et al* 2021)

Suborder Calcaxonia Grasshoff, 1999

Family Isididae Lamouroux, 1812

Genus *Melithaea* Milne Edwards, 1857

Melithaea delicata (Hickson, 1940)

Deep sea

(Rahim, 2013 as *Acabaria delicatula*)



(Photo courtesy Rahim, 2013)

Order Pennatulacea Verrill, 1865

Family Chunellidae K kenthal, 1902

Genus *Amphiacme* K kenthal, 1903

Amphiacme abyssorum (K kenthal, 1902)

Deep slope

(Williams, 2011)

Family Pennatulidae Ehrenberg, 1828

Genus *Pennatula* Linnaeus, 1758

Pennatula aff. ***grandis*** Ehrenberg, 1834

At 1200 m., in oxygen deficient zone

(Murty *et al.*, 2008 / Jeffereys *et al.*, 2009)

Family Renillidae Gray, 1860

Genus *Renilla* Lamark, 1816

Renilla reniformis (Pallas, 1766)

Frequently found washed ashore, also can often be found living intertidally completely buried in the sand.

(Syed and Haque, 1973)



(Picture via Google)

Suborder Sessiliflorae K kenthal, 1915

Family Veretillidae Herklots, 1858

Genus *Cavernularia* Milne Edwards and Haime, 1850

Cavernularia obesa Valenciennes, 1831
Found in soft sand and muddy bottom areas
(Syed and Haque, 1973)



Cavernularia malabarica Fowler, 1894
At depth on rocky bottom 27–30 m
(Steiner, 1975)

Family Virgulariidae Verill, 1868

Genus *Virgularia* Lamarck, 1816

Virgularia sp.

Sandy mud
(Steiner, 1975)



Genus *Scytium* Herklots, 1858

Scytalium tentaculatum Kölliker, 1880
Shelf area, plays host to crabs, shrimps and gobies.
(Haque, 1977)

Family Hpteridae Williams, 1995

Genus *Hpteris* Kölliker, 1880

Hpteris sp.

Oxygen deficient zone

(Murty *et al.*, 2009)

Order Helioporacea Bock, 1938

Family Helioporidae Moseley, 1876

Genus *Heliopora* de Blainville, 1830

Heliopora coerulea (Pallas, 1766)

On shallow reef (generally less than 2 m),
exposed reef locations, reef flats and
intertidal zones

(DE Vantier *et al.*, 2008)

Subclass Hexacorallia Haeckel, 1896

Order Zoantharia Gray, 1832

Family Zoanthidae Rafinesque, 1815

Genus *Zoanthus* Lamarck, 1801

Zoanthus sansibaricus (Carlgren, 1900)

polyps fluorescent green, column of the
polyps light brown in colour,

From the upper intertidal rocks

(Gul, 2013)



(After Gul, 2013)

Zoanthus vietnamensis (Pax and Müller, 1957)

Rocky intertidal platforms. Deep sea

(Nasir *et al.*, 2022)



(After Nasir *et al.*, 2022)

Zoanthus sp.

Rocky intertidal

(Present study)



Suborder Macrocnemina Haddon and Shackleton, 1891

Family Epizoanthidae (Delage and Hérouard, 1901)

Genus *Epizoanthus* (Gray, 1867) 4.

Epizoanthus scotinus (Wood, 1957)

Rocky intertidal platforms

(Nasir *et al.*, 2018)



(After Nasir *et al.*, 2022)

Order Ceriantharia Perrier, 1893

Family Cerianthidae Milne-Edwards and Haime, 1852

Genus *Cerianthus* delle Chiaje, 1830

Cerianthus membranaceus (Spallanzani, 1784) 350 mm.

In mud

(Syed and Haque, 1973; Haque, 1977 doubtful identification fide Gul *et al.*, 2015)

Order Antipatharia Milne-Edwards and Haime, 1857

Family Antipathidae Ehrenberg, 1834

Genus *Antipathes* Pallas, 1766

Antipathes sp.

(Ali *et al.*, 2014)

Genus *Cupressopathes* Opresko, 2001

Cupressopathes pumila (Brook, 1889)

At 167m depth

(Brook, 1889)

Genus *Cirripathes* Blainville, 1830

Cirripathes spiralis (Linnaeus, 1758)

Prefers deeper areas with current. Occurs at depths greater than 185 m

(CITES 2012 Appendices I, II and III valid from 3 April 2012. UNEP. JNCC Report No. 379, 2005)

Family Protoptilidae Kölliker, 1872

Genus *Distichoptilum* Verrill, 1882

Distichoptilum sp.

Found on continental shelf. Oxygen deficient zone

(Syed and Haque, 1973; Murty *et al.*, 2009)

Family Stylopathidae Opresko, 2006

Genus *Tylopathes* Brook, 1889

Tylopathes elegans Brook, 1889

Deep benthic

(Brook, 1899)



Suborder Brachycnemina Haddon and Shackleton, 1891

Family Sphenopidae (Hertwig, 1882)

Genus *Palythoa* Lamouroux, 1816

Palythoa tuberculosa (Esper, 1791)

Rocky intertidal platforms

(Nasir *et al.*, 2018)

Palythoa mutuki (Haddon and Shackleton, 1891)
Found on overhangs. depth range 0 - 28 m

Family Echinoptilidae Hubrecht, 1885
Genus *Echinoptilum* Hubrecht, 1885
Echinoptilum sp.

At 1200 m
(Jeffereys *et al.*, 2009)

Echinoptilum sp.
Oxygen deficient zone
(Murty *et al.*, 2009)

Echinoptilum sp
Fishing zone
(Present study)



Order Actinaria Hertwig, 1882
Suborder Nyantheae Carlgren, 1899
Infraorder Thenaria Carlgren, 1899
Superfamily Metridioidea Carlgren, 1893

Family Metridiidae Carlgren, 1893
Genus *Metridium* de Blainville, 1824
Metridium dianthus (Ellis, 1768)

Intertidal
(Rajput, 2011 as *Metridium senile*
(Linnaeus, an incorrect identification)

Family Aiptasiidae Carlgren, 1924
Genus *Paraipptasia* England, 1992
Paraipptasia sp.

Intertidal rocks
(Present study)



On a rock
Infraorder Athenaria Carlgren, 1899

Family Hactiidae Carlgren, 1949
Genus *Phytocoetes* Annandale, 1915
Phytocoetes gangeticus Annandale, 1915
Intertidal mud flats

(Haque, 1977)
Pelocoetes exul (Annandale, 1907)/
Stomphia (Gosse, 1859)
(Present study)



Family Actinoscyphiidae Stephenson, 1920
Genus *Actinoscyphia* Stephenson, 1920
Actinoscyphia sp.
1200-1400 m., oxygen minimum zone
(Singh, 1924; Jeffereys *et al.*, 2009)

Family Hormathiidae Carlgren, 1932
Genus *Paraphellia* Haddon, 1889
Paraphellia expansa (Haddon, 1886)
Lives buried in sand or gravel, sometimes attached to shells or stones. Exclusively sublittoral
(Singh, 1924, questionable as restricted to the eastern North Atlantic)
Genus *Actinauge* Verrill, 1883
Actinauge sp.

Oxygen minimum zone
(Jefferys *et al.*, 2009)
Genus *Hormathianthus* Carlgren, 1943
Hormathianthus tuberculatus Carlgren, 1943
Brownish. Scapus with numerous scattered minute, brownish tubercles and dark bands lengthwise
Attached to gastropod shells
(Gul and Häussermann, 2017)



(After Gul and Häussermann, 2017)

Family Sagartiidae Gosse, 1858
Genus *Sagartia* Gosse, 1855
Sagartia sp.
Intertidal
(Present study)



(Left image courtesy Moazzam)

Genus *Actinothoe* Fischer, 1889
Actinothoe modesta (Verrill, 1866)
 Intertidal rocks
 (Syed and Haque, 1973 as *Sargastia modesta*)

Genus *Neoaipiasia* Parulekar, 1969 with unresolved taxonomic position sensu Grajales and Rodriguez (2015)
Neoaipiasia commensali Parulekar, 1969
 Yellowish-brown with minute irregular brown patches and six blackish bands lengthwise
 (Kazmi, 1996 as *Cancrisocia expansa* Stimpson; Gul and Häussermann, 2017)



(After Gul and Häussermann, 2017 On crab's back. Attached to gastropod (*Babylonia spirata*) shells)

Family Actiniidae Rafinesque, 1815
 Genus *Actinia* Linnaeus, 1767
Actinia equine (Linnaeus, 1758)
 On hard grounds
 (Fatima and Barkati, 1999)

Genus *Anemonia* Risso, 1826
Anemonia indica Parulekar, 1968
 In rock pools and in crevices, under rocks
 (Haque, 1977)

Genus *Aulactinia* Verrill, 1864
Aulactinia verrucosa (Pennant, 1777)
 Sub tidal
 (Ali, 2006 as *Bunodactis verrucosa*)

Genus *Anthopleura* Duchassaing de Fonbressin and Michelotti, 1860
Anthopleura waridi (Carlgren, 1900)
 Column pale yellow to ochre. Verrucae olive-green in uppermost part with crimson shade on apices to completely crimson verrucae on column. Each row of verrucae ends with one olive-green spherule on distal most margin carrying a whitish, prolonged acrorhagus in deep fossa. Oral disc dark brown; mesenterial insertions visible as more or less distinct whitish lines. Tentacles dark olive green to brown

Found in the sand-filled holes and crevices of intertidal rocks.
 (Gul and Häussermann, 2017)



(After Gul and Häussermann, 2017)

Anthopleura sp
 Intertidal rocks
 (Present study)



Genus *Paracondylactis* Carlgren, 1934
Paracondylactis sinensis Carlgren, 1934
 Beige coloured with slight grayish shade on tentacles and oral disc
 (Gul and Häussermann, 2017)



(After Gul and Häussermann, 2017)

***Paracondylactis* sp.**

Intertidal
(Present study)



Genus *Entacmaea* Ehrenberg, 1834.
Entacmaea quadricolor (Leuckart in Ruppell and Leuckart, 1828) Column brownish. Tentacles light-greenish. Shallow to deep waters
(Gul and Häussermann, 2017)



Family Haloclavidae Verrill, 1899
Genus *Metapeachia* Carlgren, 1943
Metapeachia tropica (Panikkar, 1938)
Burrows into soft intertidal sediments
(Haque, 1977)



Genus *Synpeachia* Yap, Fautin, Ramos, and Tan, 2014

Synpeachia temasek Yap, Fautin, Ramos, and Tan, 2014.

Reddish-brown column. Burrows into soft intertidal sediment

(Yap *et al.*, 2014 inferred “*S. temasek* may range west at least as far as Pakistan”).



Family Aliciidae Duerden, 1895
Genus? *Lebrunia* Duchassaing de Fonbressin and Michelotti, 1860

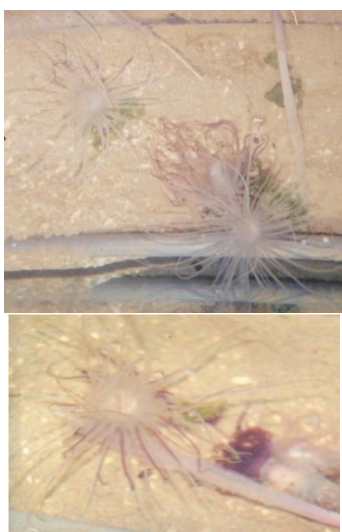
***Lebrunia* sp.**

Intertidal
(Present study)

Undetermined alciids

Attached on rocks
(Present study)



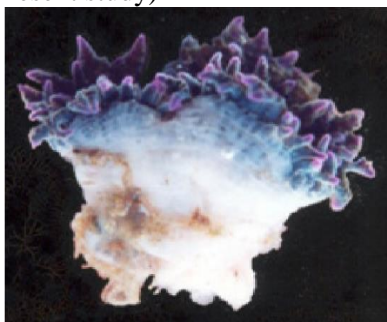


Family Diadumenidae Stephenson, 1920
Genus *Diadumene* Stephenson, 1920
Diadumene lineata (Verrill, 1869)
Intertidal
(Kazmi, 2016)



Suborder Enthemonae Rodríguez and Daly in Rodríguez *et al.*, 2014.

Family Phymanthidae Andres, 1883
Genus *Phymanthus* Milne Edwards and Haime, 1851
Phymanthus sp.
Among coral rubble, usually with the body column wedged in crevices
(Present study)



Order Scleractinia Bourne, 1900

Family Cladocoridae Milne Edwards and Haime, 1857
Genus *Cladocora* Ehrenberg, 1834
Cladocora cf. ***caespitosa*** (Linnaeus, 1767)
Colonial
(Siddiqi *et al.*, 2011)

Family Astrocoeniidae Koby, 1890
Genus *Stylocoeniella* Yabe and Sugiyama, 1935
Stylocoeniella guentheri (Bassett-Smith, 1890)
Colonies in high latitude rocky foreshores
(IUCN Red List)

Family Rhizangiidae d'Orbigny, 1851
Genus *Astrangia* Milne Edwards and Haime, 1848
Astrangia costata Verill, 1866
Mud/sand flat, intertidal, low tide mud/sand
(CAS: INVERT 99526.0 Steiner, 1975)

Family Montastraeidae Yabe and Sugiyama, 1941
Genus *Orbicella* Dana, 1846
Orbicella annularis (Ellis and Solander, 1786)
At depths between 0 and 80 meters
(DE Vantier *et al.*, 2008 as *Montastraea annularis*)
Genus *Astrea* Lamarck, 1801
Astrea annuligera Milne Edwards and Haime, 1849
On the back and fore slope of the reef and in lagoons, found to 20 m.
(DE Vantier *et al.*, 2008 as *Montastrea annuligera*)

Family Siderastreaeidae Vaughan and Wells, 1943
Genus *Pseudosiderastrea* Yabe and Sugiyama, 1935
Pseudosiderastrea tayamai Yabe and Sugiyama, 1935
Reef slopes in shallow but sheltered water.
(DE Vantier *et al.*, 2008)
Siderastrea savignyana Milne Edwards and Haime, 1849
Reef-associated; depth range 0 - 10 m
(IUCN Red List)

Family Merulinidae Verrill, 1865
 Genus *Platygyra* Ehrenberg, 1834
Platygyra lamellina (Ehrenberg, 1834)
 Shallow water on fore-reef slopes
 (DE Vantier *et al.*, 2008)
Platygyra daedalea (Ellis and Solander, 1786).
 Common over a wide range of habitats, especially back reef margins
 (Siddiqi *et al.*, 2011)
 Genus *Leptoria* Milne Edwards and Haime, 1848
Leptoria phrygia (Ellis and Solander, 1786)
 In lagoons and on clear water reef slopes
 (DE Vantier *et al.*, 2008).
 Genus *Erythrastrea* Pichon, Scheer and Pillai, 1983
Erythrastrea flabellata Pichon, Scheer and Pillai, 1983.
 In shallow reef on reef slopes protected from wave action, in lagoons at least at 25 m.
 (Veron, 2000)
 Genus *Hydnophora* Fischer von Waldheim, 1807.
Hydnophora exesa (Pallas, 1766)
 Lagoons and reef slopes found to 30 m.
 (DE Vantier *et al.*, 2008).
Hydnophora microconos (Lamarck, 1816)
 Shallow, exposed water
 (DE Vantier *et al.*, 2008)
 Genus *Goniastrea* Milne Edwards and Haime, 1848
Goniastrea* cf. *retiformis (Lamarck, 1816)
 Usually pale in colour, ranging from cream to orange, pink, green or dark brown.
 Common in eulittoral pools and can withstand considerable exposure at low tide.
 (Siddiqi *et al.*, 2011)
Goniastrea pectinata (Ehrenberg, 1834)
 Usually pale brown or pink but may be dark brown in deep or turbid water.
 Most shallow water
 (Ali *et al.*, 2014)
 Family Coscinaraeidae Benzoni, Arrigoni, Stefani, and Stolarski, 2012

Genus *Anomastraea* Marenzeller, 1901
Anomastraea irregularis von Marenzeller, 1901
 Mainly in shallow water and tidal pools
 (Veron, 2000)

Family Oculinidae Gray, 1847
 Genus *Cyathelia* Milne Edwards and Haime, 1849
Cyathelia axillaris (Ellis and Solander, 1786)
 At 45m.depth
 (Moazzam and Moazzam, 2016)



(After Moazzam and Moazzam, 2016)

Family Agariciidae Gray, 1848
 Genus *Gardineroseris* Scheer and Pillai, 1974
Gardineroseris lanulata (Dana, 1846)
 In a shallow reef slope
 (IUCN Red list)
 Genus *Pavona* Lamarck, 1801
Pavona explanulata (Lamarck, 1816)
 Occurs in a wide range of shallow habitats
 (Ali *et al.*, 2014)
Pavona venosa (Ehrenberg, 1834)
 Shallow reef
 (DE Vantier *et al.*, 2008)
Pavona diffluens (Lamarck, 1816)
 Found from 5-20 m.
 (Veron, 2000, DE Vantier *et al.*, 2008)
Pavona decussate (Dana, 1846)
 Shallow-water environments found from 3-11 m, rarely from 12-15 m
 (DE Vantier *et al.*, 2008)
Pavona cactus (Forskål, 1775)
 Found in lagoons and on upper reef slope
 (DE Vantier *et al.*, 2008)
Pavona frondifera (Lamarck, 1816)
 In shallow reef environments and found from 3-15m depth.
 (Mondal *et al.*, 2014)
Pavona varians (Verrill, 1864)
 Most reef environments
 (Ali *et al.*, 2014)
 Genus *Leptoseris* Milne Edwards and Haime, 1849

Leptoseris solida (Quelch, 1886)

Depth range 0 - 40 m

(IUCN Red List)

Family Dendrophylliidae Gray, 1847

Genus *Rhizopsammia* Verrill, 1869

Rhizopsammia verrilli van der Horst, 1922

At 103m

(Moazzam and Moazzam, 2016)



Genus *Dendrophyllia* Blainville, 1830

?*Dendrophyllia robusta* (Bourne, 1905)

Colonial, found on hard ground from 30 m.

(Ali *et al.*, 2014)



Genus *Turbinaria* Oken, 1815

Turbinaria sp.

Found in mid intertidal

(Ali *et al.*, 2014).



Turbinaria reniformis Bernard, 1896

Fringing reefs in turbid water found from 2-15 m.

(DE Vantier *et al.*, 2008)

Genus *Duncanopsammia* Wells, 1936

Duncanopsammia peltata (Esper, 1790)

Shallow on sandy reef flats and deep sandy reef bases.

(DE Vantier *et al.*, 2008 as *Turbinaria peltata*)

Family Pocilloporidae Gray, 1842

Genus *Seriatopora* Lamarck, 1816

Seriatopora caliendrum Ehrenberg, 1834

On reef slopes between the surface and 25 m. deep

(DE Vantier *et al.*, 2008)

Genus *Stylophora* Schweigger, 1820

Stylophora pistillata (Esper, 1792) cream, pale yellow or green.

Exposed reef fronts and tidal areas

(IUCN Red List)

Stylophora subseriata (Ehrenberg, 1834)

Reef-associated; depth range 0 - 40 m

(IUCN Red List).

Family Leptastreidae Rowlett, 2020

Genus *Leptastrea* Milne Edwards and Haime, 1849

Leptastrea cf. *bottae* (Milne Edwards and Haime, 1849)

On reef flats

(Ali *et al.*, 2014)

Leptastrea pruinosa Crossland, 1952

On reef flats

(Ali *et al.*, 2014)

Leptastrea purpurea (Dana, 1846)

Reef-associated; depth range 0 - 86 m

(IUCN Red List)

Genus *Plesiastrea* Milne Edwards and Haime, 1848

Plesiastrea versipora (Lamarck, 1816)

Reef environments, in shaded places such as under overhangs.

(Ali *et al.*, 2014)

Family Plerogyridae Rowlett, 2020

Genus *Blastomussa* Wells, 1968

Blastomussa loyae Head, 1978 Brown and green.

Reef environments

(DE Vantier *et al.*, 2008 as

Parasimplastrea sheppardi)

Blastomussa merleti (Wells, 1961)

Steep slopes and crevices, at depths down to about 50 metres

(IUCN Red List)

Family Acroporidae Verrill, 1902

Genus *Alveopora* Blainville, 1830

Alveopora sp.

Shallow, rocky foreshores

(Ali *et al.*, 2014)

Genus *Acropora* Oken, 1815

Acropora sp.

15 m on rocks

(Ali *et al.*, 1995)

Acropora muricata (Linnaeus, 1758)

Usually cream, brown or blue, generally with pale branch ends. Reef slopes and Lagoons.

(Veron, 2000 as *Acropora formosa*)

Acropora pharaonis (Milne Edwards, 1860)

In shallow reef on sheltered slopes, found from 5-25 m.

(Corals WIO)

Acropora hyacinthus (Dana, 1846)

From 5-20m.

(DE Vantier *et al.*, 2008)

Acropora horrida (Dana, 1846)

On upper reef slopes and in lagoons

(DE Vantier *et al.*, 2008)

Acropora granulosa (Milne Edwards, 1860)

Shallow reefs, from depths of between 8 and 40 m.

(Veron, 2000)

Acropora clathrata (Brook, 1891)

Found in fringing reefs, sheltered reefs and back reef habitats, between the depths of 5–40m

(SeaLifeBase)

Acropora valida (Dana, 1846) Usually cream to yellowish-brown, sometimes with pinkish tips to the branches and whitish corallites.

Common on upper reef slopes

(IUCN Red List.)

Genus *Montipora* Blainville, 183

Montipora mollis Bernard, 1897.

Sub tidal mud flats and in other inshore habitats

(Ali *et al.*, 2014)

Montipora venosa (Ehrenberg, 1834)

To at least 30 m.

(DE Vantier *et al.*, 2008)

Montipora stitosa (Ehrenberg, 1834)

From reef flats to mid reef slopes

(DE Vantier *et al.*, 2008)

Montipora foliosa (Pallas, 1766)

On protected upper reef slopes

(DE Vantier *et al.*, 2008)

Montipora verrucosa (Lamarck, 1816)

From 1-30 m.

(DE Vantier *et al.*, 2008)

Montipora stellata Bernard, 1897 Bright green polyps and purple branches

Depth range 0 - 20 m

(IUCN Red List)

Montipora monasteriata (Forskål, 1775)

pale brown or pink with pink or white margins.

Abundance: common on reef slopes

(IUCN Red List)

Genus *Favites* Link, 1807

Favites complanata (Ehrenberg, 1834)

Major coral reef habitats

(Ali *et al.*, 2014)

Favites pentagona (Esper, 1795)

Major coral reef habitats

(Ali *et al.*, 2014)



(Photo Courtaay Kamran Sheikh)

Favites spinosa (Klunzinger, 1879).

Major coral reef habitats

(Ali *et al.*, 2014)



(Picture from Veron, 2000)

Favites flexuosa (Dana, 1846)

On sub tidal rock and rocky reefs, in the outer reef channel, on the back and fore slope, and in lagoons

(de Vantier *et al.*, 2008)

Favites chinensis (Verrill, 1866)

On sub tidal rock and rocky reefs

(de Vantier *et al.*, 2008)

Favites micropentagonus Veron, 2002

On upper reef slopes found in lagoons to 20 m.

(de Vantier *et al.*, 2008)

Favites halicora (Ehrenberg, 1834)

Found on sub tidal rock and rocky reefs, in the outer reef channel, on the back and fore slope, and in lagoons

(De Vantier *et al.*, 2008)

Favites cf. acuticollis (Ortmann, 1889)

Occurs in shallow reef environments. In lagoons and on the back and fore slope of the reef

(Siddiqi *et al.*, 12011)

Genus *Oulophyllia* Milne Edwards and Haime, 1848

Oulophyllia wellsi (Ma, 1959)

Found on reefs at depths down to about 30 metres (100 ft), mostly occurring on subtidal rocks and in lagoons

(IUCN Red List)

Genus *Echinopora* Lamarck, 1816

Echinopora gemmacea (Lamarck, 1816)

In 2-5 m. depth at upper reef slope (Randall, 1995; DE Vantier *et al.*, 2008)



Genus *Dipsastraea* Blainville, 1830

Dipsastraea pallida (Dana, 1846)

In various rocky reef habitats and is often the dominant species on the fringes of back reefs. It occurs at depths down to 50 m (160 ft) or more.

(IUCN Red List, Sea Life Base)

Dipsastraea speciosa (Dana, 1846) Pale grey, green or brown, usually with calices of contrasting colour

More than 20 km from shore

(IUCN Red List)

Dipsastraea favus (Forskål, 1775)

On reef back margins.

(IUCN Red List)

Dipsastraea lizardensis (Veron, Pichon and Wijsman-Best, 1977)

Reef-associated; depth range 0 - 40 m

(Siddiqi *et al.*, 2011 as *Favia lizardensis*)

Dipsastraea truncata (Veron, 2000)

Found in most shallow reef environments. Subtidal rock, rocky reefs. Also in outer reef channel, back and foreslopes as well as lagoons

(Siddiqi *et al.*, 2011 as *Favia truncates*)

Genus *Cyphastrea* Milne Edwards and Haime, 1848

Cyphastrea serailia (Forskål, 1775)

varying in colour from grey to brown or reddish-brown

Occurs on intertidal rock pools, subtidal reefs and boulder substrata

(IUCN Red List)

Cyphastrea microphthalma (Lamarck,

1816) Pigmented brown, cream or green colour due to the presence of

zooxanthellae

Reef-associated; depth range 6 - 25 m

(Corals of the world map)

Family Lobophylliidae Dai and Horng, 2009

Genus *Homophyllia* Brüggemann, 1877

Homophyllia bowerbanki (Milne Edwards and Haime, 1857)

Colonies may exceed 1.5 m. in diameter, shallow reef environments

(Ali *et al.*, 2014 as *Acanthastrea hillae* Wells, 1955)

Genus *Sclerophyllia* Klunzinger, 1879.

Sclerophyllia maxima (Sheppard and Salm, 1988)

Shallow reef environments

(Ali *et al.*, 2014 as *Acanthastrea maxima*)

Genus *Lobophyllia* de Blainville, 1830

Lobophyllia hemprichi (Ehrenberg, 1834)

In upper reaches of reef slopes

(Ali, 2006)

Lobophyllia radians (Milne Edwards and Haime, 1849)

On the upper reef slope

(IUCN Red List)

Lobophyllia hataii Yabe, Sugiyama and Eguchi, 1936

Usually brown or green. Valley floors and walls are usually of contrasting colours.

Upper reef slopes protected from wave action.

(Ali *et al.*, 2014)

LOBOPHYLLIA AGARICIA (Milne Edwards and Haime, 1849) Brown, green or red, usually with distinctly contrasting valley and wall colours.

Exposed upper reef slopes.

(Ali *et al.*, 2014)

Genus *Echinophyllia* Klunzinger, 1879

Echinophyllia aspera (Ellis and Solander, 1786)

Near the crests of reefs in shallow water, more common at middle depths of between 10 and 30 m (30 and 100 ft) where it is generally found in sheltered fore reef habitats

(IUCN Red List; <https://www.reeflex.net>)

Genus *Acanthastrea* Milne Edwards and Haime, 1848.

Acanthastrea echinata (Dana, 1846) varies from brown to grey or green, usually green oral discs.

Diverse reef areas. (IUCN Red List)

Family Pocilloporidae Gray, 1842

Genus *Pocillopora* Lamarck, 1816

Pocillopora damicornis (Linnaeus, 1758)

At depths to about 40 m, most common between 5 - 20 m on coral rocks

(Ali *et al.*, 2014)

Family Poritidae Gray, 1842

Genus *Paramonastrea* Huang and Budd, 2014

Paramonastrea peresi (Faure and Pichon, 1978)

Up to 40 m. depth

(DE Vantier *et al.*, 2008 as *Goniastrea peresi*)

Genus *Goniopora* de Blainville, 1830

Goniopora stokesi Milne Edwards and Haime, 1851

On soft substrates, generally to depths of 30 m

(DE Vantier *et al.*, 2008)

Goniopora lobata Milne Edwards, 1860

In turbid water, generally to depths of 30 m.

(DE Vantier *et al.*, 2008)

Goniopora albiconus Veron, 2000

Found in lagoons and turbid water conditions

(Ali *et al.*, 2014)

Goniopora djiboutiensis Vaughan, 1907.

Found in lagoons and turbid water conditions

(Ali *et al.*, 2014)

Goniopora cf. savignyi (Dana, 1846).

Found in lagoons and turbid water conditions

(Ali *et al.*, 2014)

Goniopora somaliensis Vaughan, 1907.

Found in lagoons and turbid water conditions

(Ali *et al.*, 2014)

Goniopora tenuidens (Quelch, 1886)

Found sub tidally in various reef habitats and in lagoons, at depths down to about 30 m (100 ft).

(IUCN Red List)

Goniopora sp.

subtidal



From Pakistan Underwater Explorers

Genus *Psammocora* Dana, 1846

Psammocora columna Dana, 1846

Found in lagoons and turbid water conditions

(Ali *et al.*, 2014 as *Goniopora columna* Dana)

Psammocora haimiana Milne Edwards and Haime, 1851

Found in lagoons and turbid water conditions

(Ali *et al.*, 2014)

Genus *Porites* Link, 1807.

Porites lutea Milne Edwards and Haime 1851. Usually cream or yellow but may be bright colours in shallow water over 4 meters across usually form intertidal habitats. Occurs on back reef margins, lagoons and fringing reefs

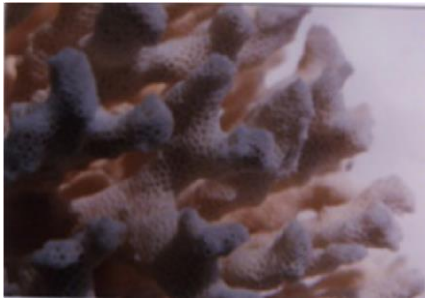
(Sheppard *et al.*, 2008; Ali *et al.*, 2014)



(Photo taken from Veron)

Porites lobata Dana, 1846

Back reef margins, lagoons and some fringing reefs, generally to depths of 30 m. (Ali *et al.*, 2014).

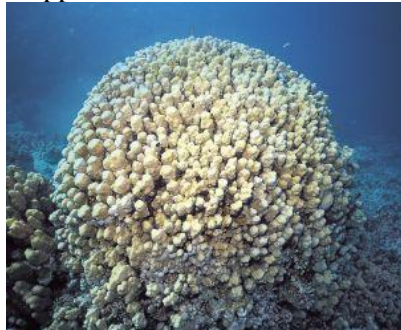


Porites monticulosa Dana, 1846

Usually brown or blue
In shallow reef environments found from 3m to more than 20m. (Ali *et al.*, 2014)

Porites nodifera Klunzinger, 1879

Depths of 5- 15 m. On sheltered area (Sheppard *et al.*, 2008; Ali *et al.*, 2014)



(After Veron, 2000)

Porites solida (Forskål, 1775)

Shallow reef environments, generally to depths of 30 m. (Sheppard, *et al.*, 2008)



(After Veron, 2000)

Porites harrisoni Veron, 2002

In shallow fringing reefs, generally to depths of 15 m. (DE Vantier *et al.*, 2008)

Porites echinulata Klunzinger, 1879

In shallow reef environments, generally in clear water

(De Vantier *et al.*, 2008)

Porites mayeri Vaughan, 1918

At the depth of 3-12 m (Mondal *et al.*, 2015)

Porites decasepta Claereboudt, 2006

Rocky

(Ali, 2017 unpublished thesis)

Family Coscinaraeidae Benzoni, Arrigoni, Stefani, and Stolarski, 2012

Genus *Coscinaraea* Milne Edwards and Haime, 1848

Coscinaraea monile Forskål, 1775.

Generally to depths of 50 m.

(Sheppard *et al.*, 2008; Ali *et al.*, 2014)



Family Psammocoridae Chever and Beauvais, 1987

Genus *Psammocora* Dana, 1846

Psammocora contigua (Esper, 1794)

Commonly found from 9-15 m.

(Sheppard, *et al.*, 2008; Ali *et al.*, 2014, also as *Psammocora obtusangulata* (Lamarck,)

1816)

Psammocora haimeana Milne Edwards and Haime, 1851

Foreslope, outer reef slope, neritic, lagoon (Zipcode Zoo)

Psammocora profundacella Gardiner, 1898

Neritic, coral Reef. Outer Reef Channel, Back Slope, foreslope, soft substratum (Ali *et al.*, 2014 as *Psammocora superficialis*)

Psammocora columna Dana, 1846

Found in lagoons and turbid water conditions

(Ali *et al.*, 2014 as *Goniopora columna*)



(Picture courtesy Y .Ali)

Family Euphylliidae Alloiteau, 1952

Genus *Galaxea* Oken, 1815

Galaxea fascicularis (Linnaeus, 1767)

3-25 m., in areas protected from strong waves

(Raza *et al.*, 2014)

Galaxea astreata (Lamarck, 1816)

In reef environments protected from strong wave action

(De Vantier *et al.*, 2008)

Genus *Physogyra* Quelch, 1884

Physogyra lichtensteini (Milne Edwards and Haime, 1851)

Found more often in turbid reef environments

(DeVantier *et al.*, 2008)

Family Fungiidae Dana, 1846

Genus *Lithophyllon* Rehberg, 1892

Lithophyllon concinna (Verrill, 1864)

Depth range 0 - 40 m

(Hoeksema *et al.*, 2014 as *Fungia concinna*)



Genus *Cycloseris* Milne Edwards and Haime, 1849

Cycloseris curvata (Hoeksema, 1989)

Soft inter-reef and sometimes reef substrates.

(Hoeksema *et al.*, 2014 as *Fungia curvata*)

Cycloseris cyclolites (Lamarck, 1815) Up to 5 cm, generally pale cream or green, sometimes brightly coloured

In shallow water, often common on sandy substrates between reefs

(Hoeksema *et al.*, 2014 as *Fungia cyclolites*)



(From Wikimedia)

Cycloseris fragilis (Alcock, 1893)

maximum size 15 cm in diameter

Found on soft substrata on lower reef slopes and reef bases, depth range from 1 m to 40 m.

(Hoeksema *et al.*, 2014 as *Fungia fragilis* and *Fungia patelliformis*)



(Picture taken from Google)

Genus *Pleuractis* Verrill, 1864

Pleuractis moluccensis (Van der Horst, 1919)

Reef slopes and turbid environments.

(Hoeksema *et al.*, 2014 as *Fungia moluccensis*)

Pleuractis paumotensis (Stutchbury, 1833) usually brown

Reef slopes and lagoons

(Hoeksema *et al.*, 2014 as *Fungia paumotensis*)



(From Wikimedia)

Genus *Ctenactis* Verrill, 1864
Ctenactis echinata (Pallas, 1766)
 Moderately elongate and may reach 1 m in length
 Solitary, often found in large aggregations at intermediate depths on reef slope benches
 (IUCN Red List)
Herpolitha limax (Esper, 1792)
 Found on reef slopes and platforms, common in soft or rocky soils of the reef, with shallow, protected and sunny waters, such as those of coral lagoons. Depth range between 1 and 30 m,
 (<https://second.wiki/wiki>)

Family Caryophylliidae Dana, 1846
 Genus *Heterocyathus* Milne Edwards and Haime, 1848.
Heterocyathus alternatus Verrill, 1865
 Pale brown, often with a greenish oral disc. Always found on soft horizontal substrates Depth range 0-319 m
 (Harrison, 1911; Moazzam and Moazzam, 2016 as *Heterocyathus aequicostatus* Milne Edwards and Haime)



(After Moazzam and Moazzam, 2016)

Genus *Paracyathus* Milne Edwards and Haime, 1848



Paracyathus stokesii Milne Edwards and Haime, 1848
 At 72 m.
 (Moazzam and Moazzam, 2016)
 Class Cubozoa Werner, 1973
 Order Chirodripida Haeckel, 1880

Family Chiropsalmidae Thiel, 1936
 Genus *Chiropsoides* Southcott, 1956
Chiropsoides buitendijki (van der Horst, 1907)
 Pelagic
 (Tahera and Kazmi, 2006)



Chiropsoides quadrigatus (Haeckel, 1880)
 Pelagic
 (Kazmi, 1996 as *Chiropsalmus quadrigatus* Haeckel; Tahera and Kazmi, 2006)



Order Carybdeida Gegenbaur, 1856

Family Carybdeidae Haeckel, 1879
 Genus *Alatina* Gershwin, 2005
Alatina alata (Reynaud, 1830) Height to 25 cm, width 1/3 to 1/2 of height
 Pelagic
 (Stiasny, 1937 as *Tamoya alata*)



Alatina grandis (Agassiz and Mayer, 1902)
Pelagic
(Kazmi and Sultana, 2007 as *Carybdea marsupialis* (Linnaeus); ref. to change Straehler-Pohl and Gul, 2017)



Class Scyphozoa Götte, 1887
Order Semaestomeae Agassiz, 1862

Family Ulmaridae Haeckel, 1879
Genus *Aurelia* Lamarck, 1816
Aurelia aurita (Linnaeus, 1758)
Coastal, upper epipelagic
(Fanning *et al.*, 2011)



(WoRM image)

Family Pelagiidae Gegenbauer, 1856.
Genus *Sanderia* Goette, 1886
Sanderia malayensis Goette, 1886.
Diameter of the bell 3 to 8 cm, can be as large as 13 cm transparent, and may be yellowish or tinged violet. Sometimes with radiating rows of reddish spots on the bell or on the mouth-arms.
From 1000-0 m, surface.
(Stiasny, 1937; Morandini and Gul, 2016)



(After Morandini and Gul, 2016)

Genus *Pelagia* Peron and Lesueur, 1809
Pelagia noctiluca (Forsskal, 1775)
Up to 70 m., but usually found up to 20 m or 50 m.
(Stiasny, 1937, present study)
Pelagia* cf. *noctiluca (Forsskal, 1775)
planktonic
(Gul and Morandini, 2013)
Genus *Rhopilema* Haeckel, 1880
Rhopilema hispidum Vanhoffen 1888
Bell 900 mm in diameter
Neritic, epipelagic
(Muhammed and Sultana, 2008 as *Rhizostoma pulmo*; Tahera and Kazmi, 2015 as *Rhopilema nomadica* Galil; Gul and Morandini, 2015).



Genus *Chrysaora* Péron and Lesueur, 1810

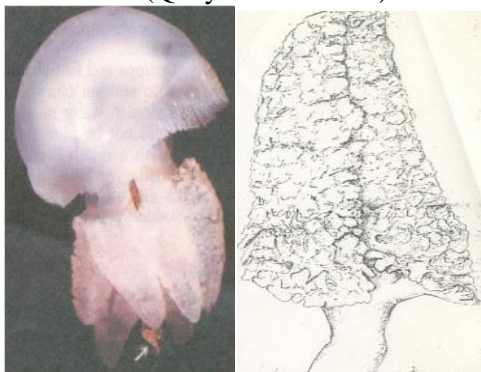
Chrysaora hysoscella (Linnaeus, 1767)
Offshore
(Gul and Osmany, 2017)



(After Gul and Osmany, 2017)

Chrysaora* cf. *kynthia Gershwin and Zeidler, 2008
Offshore
(Gul and Osmany, 2017)
Order Rhizostomae Cuvier, 1799
Suborder Daktyliophorae

Family Catostylidae Gegenbour, 1857
 Genus *Catostylus* Agassiz, 1862
Catostylus perezii Ranson, 1945. Umbrella
 21x183 mm, mouth arm 93 mm.
 Shallow sandy bottom, deltaic region
 (Tahera and Kazmi, 2005 as *Catostylus*
mosaicus (Quoy and Gaimard)



One mouth arm

Genus *Crambionella* Stiasny, 1921
Crambionella orsini Van hoffer, 1888
 Surface to deep sea
 (Roghay, 2011)



(Photo contributed by Moazzam)

Family Lychnorhizidae Haeckel, 1880
 Genus *Lychnorhiza* Haeckel, 1880
Lychnorhiza malayensis Stiasny, 1920
 Offshore
 (Gul and Osmany, 2017)
 Suborder Kolpophorae Stiasny, 1921

Family Cepheidae Stiasny, 1921
 Genus *Cephea* Peron and Leseur, 1809
Cephea sp.
 Pelagic
 (Stiasny, 1936)
Cephea coerulea Vanhöffen, 1902 Max
 length: 5.7 cm.
 Pelagic, offshore
 (Gul et al., 2015)



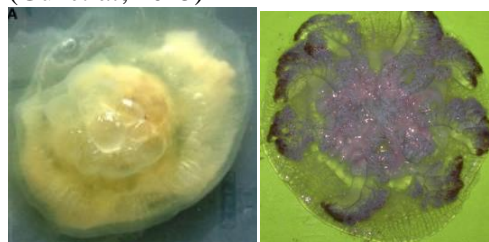
(After Gul et al., 2015)

Genus *Netrostoma* Schultze, 1898
Netrostoma setouchianum (Kishinouye,
 1902)
 Pelagic, offshore
 (Gul et al., 2015)



(Picture Via Wikipedia)

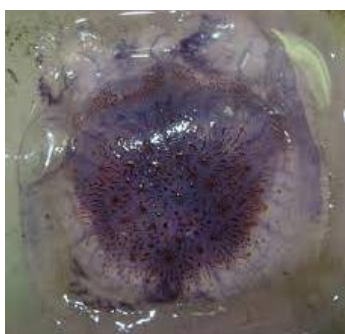
Netrostoma coerulescens Maas, 1903
 Pelagic
 (Gul et al., 2015)



(After Gul et al., 2015)

Genus *Marivagia* Galil, Gershwin, Douek
 and Rinkevich, 2010

Marivagia stellata Galil, Gershwin,
 Douek and Rinkevich, 2010 Umbrella
 translucent pale purplish-blue; oral arms
 with translucent jelly and purplish-blue
 mouths in life. Ornamented only with
 raised reddish-brown dots, streaks and
 starburst-like marks clustered in the
 central part
 Littoral
 (Gul et al., 2014).



(After Gul *et al.*, 2014).

Class Hydrozoa Owen, 1843
 Subclass Hydroidolina Collins and Marques, 2004
 Order Anthoathecata Cornelius, 1992

Family Tubulariidae Goldfuss, 1818
 Genus *Ectopleura* L. Agassiz, 1862
Ectopleura larynx (Ellis and Solander, 1786)
 Pelagic
 (Vannucci and Navas, 1973)



Order Leptothecata Cornelius, 1992

Family Aequoreidae Eschscholtz, 1829
 Genus *Aequorea* Péron and Lesueur, 1810
Aequorea sp.
 Planktonic
 (Ahmed and Rizvi, 1980 unpublished report)
Aequorea pensilis (Haeckel, 1879)
 Pelagic
 (Kazmi, 1993 unpublished, photographed only; Gul and Gravili, 2013)



Aequorea forskalea Peron and Lesueur, Pelagic
 (Fanning *et al.*, 2011)



(WoRM image)

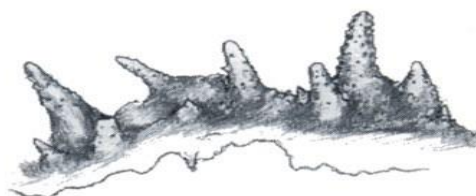
Suborder Filifera Kuhn, 1913
 Superfamily Hydractinioidea Agassiz, 1862

Family Hydractiniidae Agassiz, 1862
 Genus *Hydractinia* Van Beneden, 1841
Hydractinia epidocleensis Leloup, 1931
 Colonies attached to crabs.
 (Moazzam and Moazzam, 2006 in Bougainviliidae)



(After Moazzam and Moazzam, 2006)

Hydractinia albocincta Ehlers, 1864
 As mat on shell stones and rocks
 (Present study)



Family Eudendriidae Agassiz, 1862
 Genus *Eudendrium* Ehhreberg, 1834
Eudendrium capillare Alder, 1856
 Attached to hydroids found under rocks in caves from 6 m. downwards.
 (Billard, 1926; Moazzam and Moazzam, 2006)



Stem and hydranth
(After Moazzam and Moazzam, 2006)
Order Anthoathecata Cornelius, 1992
Suborder Capitata Kühn, 1913 (sensu stricto)

Family Cladonematidae Gegenbaur, 1857
Genus ?*Eleutheria* Quatrefages, 1842
Eleutheria sp.
Crawling in small rock pools in tidal region on weeds
(Present study)



Genus *Cladonema* Dujardin, 1843
Cladonema radiatum Dujardin, 1843
Intertidal
(Ghory *et al.*, 2020)



(After Ghory *et al.*, 2020)

Family Porpitidae Brandt, 1835
Genus *Porpita* Lamarck, 1801
Porpita porpita (Linnaeus, 1758)
Planktonic.
(Kazmi, unpublished photo; Gul and Gravili, 2014)

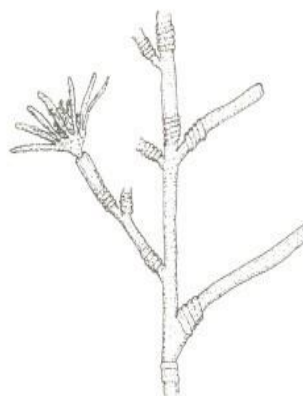


Genus *Veleva* Lamarck, 1801

Veleva veleva (Linnaeus, 1758) 12 mm. length x 8 mm. widths with deep blue margin, shiny silver sail, dactylozooids of light blue colour distally
Holoplanktonic, pleustonic
(Gul, 2015)



Family Pennariidae McCrady, 1859
Genus *Pennaria* Goldfuss, 1820
Pennaria disticha Goldfuss, 1820
Attached colonies.
(Moazzam and Moazzam, 2006)



(After Moazzam and Moazzam, 2006)

Sub order Aplanulata Collins, Winkelman, Hadrys and Schierwater, 2005

Family Corymorphidae Altman, 1872
Genus *Branchiocerianthus* Mark, 1898
Branchiocerianthus imperator (Allman, 1888)
On soft bottom
(Stechow, 1909)

Family Corynidae Johnston, 1836
Genus *Sarsia* Lesson, 1843
Sarsia sp.
In the upper water layers.
In sheltered coastal waters
(Present study)

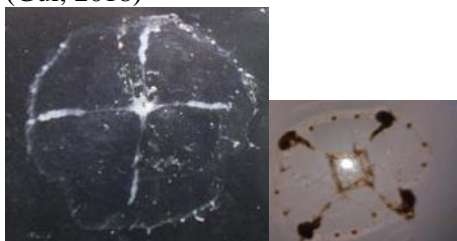


Order Leptothecata Cornelius, 1992
 Family Bougainvilliidae Allman, 1876
 Genus *Bougainvillia* Lesson, 1830
Bougainvillia muscus (Allman, 1863)
 On drift wood, stones, calcareous algae,
 sponges, shells etc.
 (Billard, 1926)



(From Wikipedia)

Family Campanulariidae Johnston, 1836
 Genus *Clytia* Lamouroux, 1812
Clytia discoida (Mayer, 1900) 4- 5 mm.
 bell width
 Planktonic
 (Gul, 2018)
Clytia lomae (Torrey, 1909) 10 mm. bell
 width
 Planktonic
 (Gul, 2018)

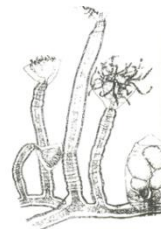


(After Gul, 2018)

Clytia noliformis (Mccrady, 1859)
 Epiphyte on red algae
 (Moazzam and Moazzam, 2006)



Clytia hummelincki (Leloup, 1935)
 Epiphyte on red and brown algae
 (Moazzam and Moazzam, 2006; record
 from Pakistan by Moazzam and Moazzam
 2006 presumably based on a
 misidentification of *C. edentula* Gibbons
 and Ryland. fide Calder and Faucci,
 2021).



Colony with gonotheca (After Moazzam
 and Moazzam, 2006).

Subclass Trachylinae Haeckel, 1879
 Order Limnomedudae Krmp, 1938

Family Geryoniidae Eschscholtz, 1829
 Genus *Liriope* Lesson, 1843
Liriope tetraphylla (Chamisso and
 Eysenhardt, 1821) Transparent, colourless
 bell may be up to 3 cm .diameter.
 Holopelagic, epipelagic
 (Gul, 2018 .Present study)



Genus *Obelia* Péron and Lesueur, 1810
Obelia geniculata (Linnaeus, 1758) 2.5 -
 6.0 mm. Diameter of full-grown umbrella
 On intertidal rocks. Typically found in
 coastal and offshore waters.
 Floats on pilings, rocks, shells and other
 solid substances.
 (Billard, 1926 as *Laomedea geniculata*
 (Linnaeus))



(WORM image)

Obelia longissima (Pallas, 1766)

Predominately sub tidal, intertidal being constrained to low shore pools. Polyp stage found as fur-like growth on the rocks, stones, mollusc shells, and sea weeds. Typically found in coastal and offshore waters. Floats on pilings, rocks, shells and other solid substances.

(Saeed *et al.*, 2021)

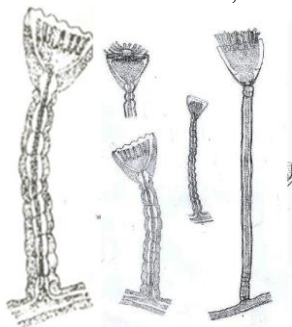
Genus *Orthopyxis* Agassiz, 1862

Orthopyxis* cf. *crenata

(Hartlaub, 1901)

Epiphyte on red algae

(Moazzam and Moazzam, 2006)



(After Moazzam and Moazzam, 2006)

Family Kirchenpaueriidae Stechow, 1921

Genus *Ventromma* Stechow, 1923

Ventromma haleciodes Alder, 1859
20mm.

Epizoic

(Billard, 1926 as *Dynamena haleciodes*)



(After Moazzam and Moazzam, 2006)

Superfamily Plumularioidea McCrady, 1859

Family Plumulariidae Hincks, 1868

Genus *Plumularia* Lamarck, 1816

Plumularia insignis Allman, 1883

Colonial on rocks

(Sayed and Haque, 1973 as *Plumularia flabellum*)

Family Aglaopheniidae Marktanner-

Turneretscher,

1890

Genus *Pycnotheca* Stechow, 1919

Pycnotheca mirabilis (Allman, 1883)

Epiphytes on red algae

(Moazzam and Moazzam, 2006 in Plumulariidae)



Genus *Taxella* Allman, 1874

Taxella eximia Allman, 1874

Depth range 76 - 650 m.

(Rees and Vervoort, 1987)



(After Gustav, 1887)

Genus *Macrorhynhia* Kirchenpauer, 1872

Macrorhynhia philippina (Kirchenpauer, 1872)

Rockpools, attached to the rocks

(Ritchie, 1910 as *Lytocarpus philippinus*)



Family Sertulariidae Fleming, 1828

Genus *Amphisbetia* L. Agassiz, 1862

Amphisbetia distans (Lamouroux, 1816)

Sessile; brackish; depth range 0 - 44 m.

Known from tidal inlets, sounds, caves,

shallow coastal benthic habitats (< 25 m)

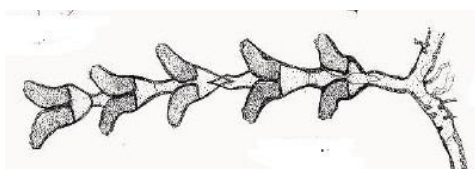
and surface or near surface water layers,

including porpitids, halopelagic

Sargassum fauna and mangroves

(Moazzam and Moazzam, 2006 as

Sertularia distans).

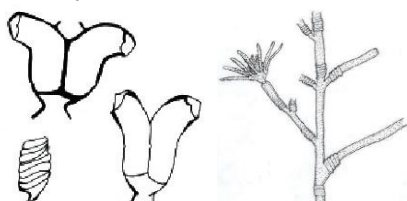


Hydrotheca (After Moazzam and Moazzam, 2006)

Genus *Dynamena* Lamouroux, 1816

Dynamena disticha (Bosc, 1802)

Grows on kelp, fucoids, and rocks
(Billard, 1926 as *Dynamena cornicina* McCrady)



Part of stem (After Moazzam and Moazzam, 2006).

Dynamena crisioides Lamouroux, 1824

Epiphytes on brown algae, underneath rocks.

(Moazzam and Moazzam, 2006)



Hydrothecae (After Moazzam and Moazzam, 2006)

Dynamena quadridentata (Ellis and Solander, 1786)

Attached to the underside of the rocks
(Moazzam and Moazzam, 2006)



Hydrothecae and a gonotheca (After Moazzam and Moazzam, 2006)

Genus *Tridentata* Stechow, 1920

Tridentata turbinata (Lamouroux, 1816)
45 cm.

Found on buoys, stone and shells, hard and sandy bottom, shallow water.

(Javed and Mustaqim, 1995 as *Sertularia turbinata* (Lamouroux))

Genus *Sertularella* Gray, 1848

Sertularella dubia Billard, 1907

Attached to rocks

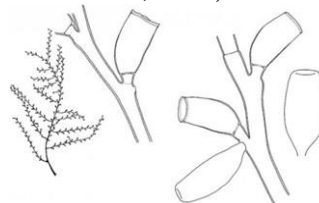
(Rees and Vervoort, 1987)

Genus *Thyrosocyphus* Allman, 1877

Thyrosocyphus fruticosus (Esper, 1793)

Muddy

(Syed and Haque, 1973 as *Campanularia juncea* Allman, 1976)



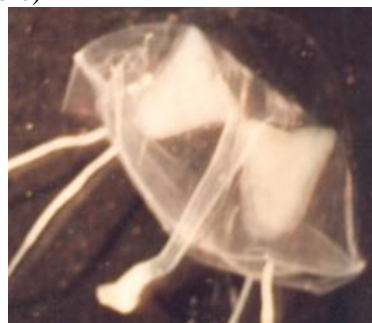
Order Leptothecata Cornelius, 1992

Family Lovenellidae Russell, 1953

Genus *Eucheilota* McCrady, 1859

Planktonic

(Present study, provisionally referred here)

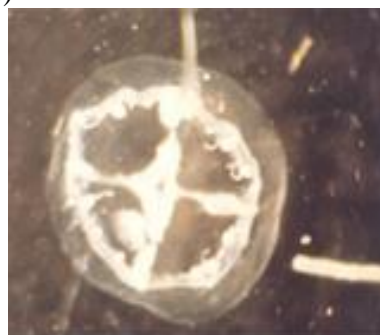


Family Eirenidae Haeckel, 1879

Genus *Eutima/ Eirene* Eschscholtz, 1829

Planktonic

(Present study, provisionally referred here)



Order Siphonophora Eschscholtz, 1829

Suborder Calycophorae Leuckart, 1854

Family Abylidae Agassiz, 1862

Subfamily Abylinae L. Agassiz, 1862

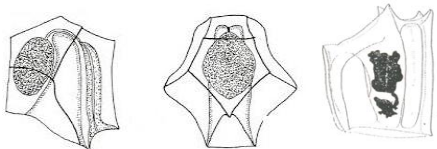
Genus *Abyla* Quoy and Gaimard, 1827

Abyla haeckeli Lens and van Riemsdijk, 1908

Muddy

Epipelagic to 2000 m.

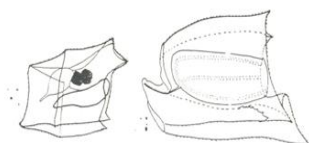
(Khan and Shehnaz, 2001a)
 Genus *Ceratocymba* Chun, 1888
Ceratocymba leuckarti (Huxley, 1859)
 Offshore
 (Khan and Shehnaz, 2001a)



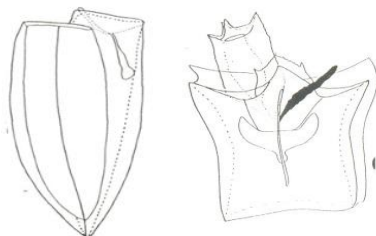
Genus *Enneagonum* Quoy and Gaimard, 1827
Enneagonum hynum Quoy and Gaimard, 1827
 Upto 200 m.
 (Khan and Shehnaz, 2001a)



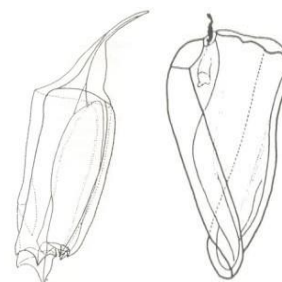
Subfamily Abylopsinae Totton, 1954
 Genus *Abylopsis* Chun, 1888
Abylopsis eschscholtzi (Huxley, 1859)
 Surface
 (Khan and Shehnaz, 2001a)



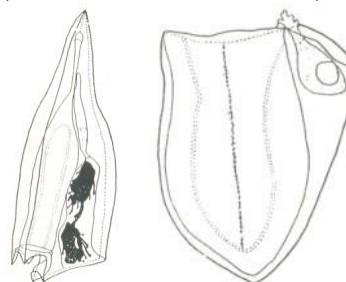
Abylopsis tetragona Otto, 1823
 Water Surface
 (Khan and Shehnaz, 2001a)



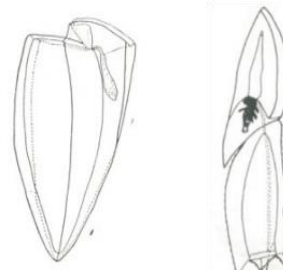
Abylopsis trigona Quoy and Gaimard, 1827
 Surface
 (Khan and Shehnaz, 2001a)



Lensia cossack Totton, 1954
 Upto 1350 m. offshore.
 (Khan and Shehnaz, 2001a)



Lenia hotspur Totton, 1941
 At 146 m. depth. Offshore
 (Khan and Shehnaz, 2001)



Lensia subtiloides (Lens and van Riemsdijk, 1908)
 Offshore
 (Khan and Shehnaz, 2001)
Lensia subtilis Chun, 1886
 Depth 0-600 m. offshore
 (Khan and Shehnaz, 2001a)



Lensia meteori (Leloup, 1934)
 Epipelagic
 (Saeed *et al.*, 2022)
Lensia havock Totton, 1941
 Epipelagic

(Saeed *et al.*, 2022)

Lensia hardy Totton, 1941

Epipelagic

(Saeed *et al.*, 2022)

Genus *Chelophyes* Totton, 1932

Chelophyes appendiculaa (Eschscholtz, 1829)

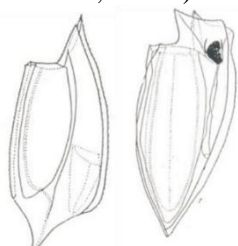
Upto 600 m, epipelagic

(Khan and Shehnaz, 2001a)

Chelophyes contorta (Lens and van Riemsdijk, 1908)

Epipelagic

(Khan and Shehnaz, 2001a)

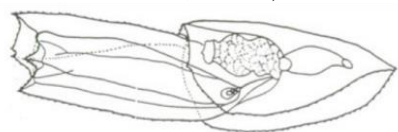


Genus *Eudoxoides* Huxley, 1859

Eudoxoides mitra (Huxley, 1859)

Epipelagic

(Khan and Shehnaz, 2001a)



Genus *Dimophyes* Moser, 1925

Dimophyes arctica (Chun, 1897)

In upper layers in the high latitude, in deeper layers in temperate and tropico-equatorial regions

(Khan and Shehnaz, 2001a)

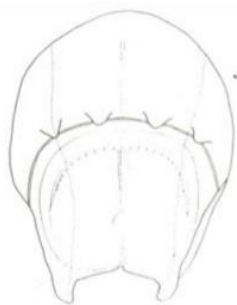
Family Hippopodiidae Kolliker, 1853

Genus *Hippopodius* Quoy and Gaimard, 1827

Hippopodius hippopus Forsskal, 1776

Upto 200 m.

(Khan and Shehnaz, 2001a)



Family Prayidae Kolliker, 1853

Genus *Amphicaryon* Chun, 1888

Amphicaryon acaule Chun, 1888

Epipelagic

(Khan and Shehnaz, 2001a)

Genus *Rosacea* Quoy and Gaimard, 1827

Rosacea plicata (Quoy and Gaimard, 1833)

Upto 400 m depth

(Khan and Shehnaz, 2001a)

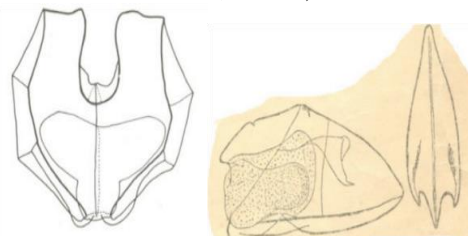
Family Sphaeronectidae Huxley, 1859

Genus *Bassia* Agassiz, 1862

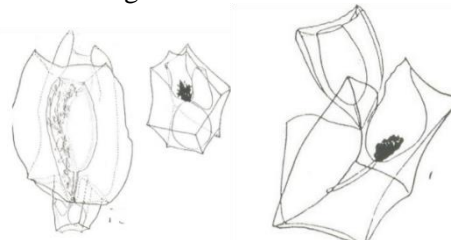
Bassia bassensis Quoy and Gaimard, 1834

Surface

(Khan and Shehnaz, 2001a)



Swimming bell bract.



Family Galmidae Brandt, 1825

Genus *Agalma* Eschscholtz, 1825

Agalma elegans (Sars, 1846)

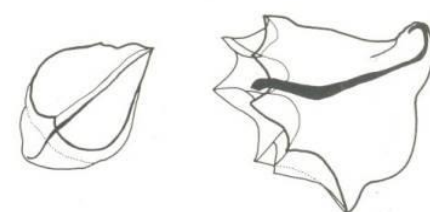
At different depths

(Khan and Shehnaz, 2001b)

Agalma okeni Eschscholtz, 1825

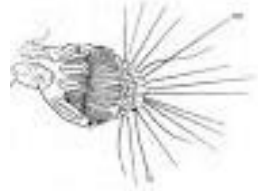
Surface

(Khan and Shehnaz, 2001b)



Genus *Cordagalma* Totton, 1932

Cordagalma ordinatum (Haeckel, 1888)
 Planktonic
 (Khan and Shehnaz, 2001b as
Cordagalma cordiforme Totton, 1932)



Genus *Stephanomia* Peron and Lesueur, 1807

Stephanomia rubra (Vogt, 1852)
 Upto 400 m depth
 (Khan and Shehnaz, 2001b as *Hstema rubrum*)



Stephanomia bijuga (Delle Chiaje, 1842)
 Surface.
 (Khan and Shehnaz, 2001b as *Nanomia bijuga*)



Suborder Cystonectae Haeckel, 1887

Family Physalidae Brandt, 1835
 Genus *Physalia* Lamarck, 1801
Physalia physalis (Linnaeus, 1758)
 Pelagic
 (Syed and Haque, 1973, also as *Physalia utriculus*)



Unidentified cnidarian taxa
 Attached to hard surface
 (Present study)



Hormathids

Attached on rocks, intertidal region
 (Present study)



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Chapter 4

Phylum Ctenophora

Ctenophora is a phylum of invertebrate animals that live in marine waters worldwide, ranging from about 1 millimeter (0.039 in) to 1.5 meters (4.9 feet) in size. Most ctenophores that live near the surface are mostly colourless and almost transparent. However some deeper-living species are strongly pigmented. The number of known living ctenophore species is uncertain, since many of those named and formally described have turned out to be identical to species known under other scientific names. One estimate is that there about 100 to 150 valid species that are not duplicates, and that at least another 25, mostly deep-sea forms, have been recognized as distinct but not yet support a formal description and naming.

I have retained the conservative system of ctenophore classification until the structure of the phylum can be confirmed by more work.

Phylum Ctenophora Eschscholtz, 1928
Class Tentaculata Eschscholtz, 1925
Order Cestida Gegenbaur, 1856

Family Cestidae Gegenbaur, 1856
Genus *Cestum* Lesueur, 1813
Cestum veneris Lesueur, 1813 Length up to 2 m. Young animals transparent, older ones often become violet with greenish-blue or ultra-marine fluorescence.

Oceanic
(Gul and Jahangir, 2019)



(After Gul and Jahangir, 2019)

Order Cydippida Lesson, 1843

Family Pleurobrachiidae Chun, 1880
Genus *Pleurobrachia* Fleming, 1821
Pleurobrachia sp.
Pelagic, estuarine
(Ahmed and Rizvi, 1980 unpublished report)

Pleurobrachia globosa Moser, 1903
Pelagic
(Present study)



Pleurobrachia pileus (O. F. Müller, 1776) 0.8 to 17mm. long
Pelagic
(Gul and Jahangir, 2019)



(After Gul and Jahangir, 2019)

Class Tentaculata Eschscholtz, 1825
Order Lobata Eschscholtz, 1825

Family Leucotheidae Krumbach, 1925
Genus *Leucothea* Mertens, 1833
Leucothea multicornis (Quoy & Gaimard, 1824)
Pelagic
(Gul and Jahangir, 2019)



(After Gul and Jahangir, 2019)

Family Bolinopsidae Bigelow, 1912
Genus *Mnemiopsis* Agassiz, 1860
Mnemiopsis sp.

Planktonic

(Ahmed and Rizvi, 1980 unpublished)

Genus *Bolinopsis* L. Agassiz, 1860

Bolinopsis infundibulum (O.F. Müller, 1776)

Planktonic

(Gul and Oliveira, 2015)

Family Ocyropsidae Harbison and Madin, 1982

Genus *Ocyropsis* Mayer, 1912

Ocyropsis maculata (Rang, 1828)

Planktonic

(Gul and Oliveira, 2015)



(Google image)

Class Nuda Chun, 1879

Order Beroida Eschscholtz, 1829

Family Beroidae Eschscholtz, 1825

Genus *Beroe* Gronov, 1760

Beroe cucumis Fabricius, 1780 Up to 15cm length. Transparent, mature specimens pink in colour especially along the meridional canals and comb rows.

Pelagic. Found on bay and near shore, outer continental shelf, and slope

(Gul and Jahangir, 2019)



(After Gul and Jahangir, 2019)

Beroe forskalii Milne Edwards, 1841)

Open ocean, lives near the shore or as deep as 500 m in the ocean.

(Gul and Jahangir, 2019)



(After Gul and Jahangir, 2019)

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Chapter 5

Phylum Rotifera

The Rotifera make up a phylum of microscopic and near-microscopic pseudocoelomate animals. Rotifers are mainly freshwater, but one Class Pararotatoria is marine and some species can be found worldwide; they are relatively large and live in the gills of crustaceans. Approximately 2,000 species of aquatic invertebrates that constitute the phylum Rotifera.

Phylum Rotifera Cuvier, 1798

Class Pararotatoria Sudzuki, 1964

Order Seisonida Wesenberg-Lund, 1899

Family Seisonidae Wesenberg-Lund, 1899

Genus *Hydatina* Ehrenberg, 1830 (non Schumacher (1817))

***Hydatina* sp**

Epizoic

(Khan *et al.*, 2014)

Class Monogononta Plate, 1889

Family Brachionidae Ehrenberg, 1838

Genus *Platylabus* Harring, 1913

Platylabus patulus (Müller, 1786)

Estuarine.

(Haq *et al.*, 2001)



Genus *Brachionus*

Brachionus plicatilis (Müller, 1786)

Estuarine

(Kazmi, 2004)

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Chapter 6

Phylum Platyhelminthes

Platyhelminthes are unsegmented, bilaterally symmetrical flat worms. Some forms are free living but many are parasitic. Flatworms lack a respiratory or circulatory system; these functions take place by absorption through the body wall. Non parasitic forms have a simple, incomplete gut; even this is lacking in many parasitic species.

Marine flatworms include a large number of parasitic forms, some of which are extremely damaging to fish populations. Marine flatworms are ferocious predators that glide around the shores like liquid death. The marine flatworms (polycladids) are the largest of the free-living flatworms, sometimes reaching lengths of 15 centimeters.

Phylum Platyhelminthes Gegenbaur, 1859

Class Rhabditophora Ehlers, 1985

Order Polycladida Lang, 1884

Suborder Cotylea Lang, 1884

Family Euryleptidae Stimpson, 1857

Genus *Maritigrella* Newman and Cannon, 2000

Maritigrella makranica Maghsoudlou and Rahimian, 2014 (possibilities of occurrence in Pakistan). Dorsal background with medial cream -white reticulated appearance containing pale orange spots in a honeycomb pattern, a distinct orange submarginal band around the entire body margin and between the marginal tentacles, black spots scattered around mid-dorsal surface, becoming more sparse on raised median region and towards body margin, surrounded by dark-grey halo around the body midline and orange-black halo towards margin. Associated with ecteinascidians, intertidal rocky shore (Maghsoudlou and Rahimian, 2014).



(After Maghsoudlou and Rahimian, 2014)

Suborder Acotylea (Lang 1884, Prudhoe 1985)

Genus *Leptoplana* Ehrenberg, 1831

Leptoplana tremellaris (Müller, 1773) average length 25 mm, width 10 mm. the fresh specimen colour light ash brown, light ash brown colour, luminous, with dorsal brownish shade.

Rocky ledge, under stones and shells between tidemarks. Occurs in large numbers on *Mytilus* colonies. Also among algae in rock pools, in *Laminaria* holdfasts, on colonies of bryozoans and ascidians. May be dredged in depths to 100 m. Found in rock crevices along the intertidal zone; under stones on generally sandy shores.

(Kazmi, 2016 as *Stylochus* sp.; Naz and Saher, 2022).



Family Cestoplanidae Lang, 1884

Genus *Cestoplana* Lang, 1884

Cestoplana? rubrocincta (Grube, 1840)

Reddish-yellow with four longitudinal red bands, two in the middle, one near each lateral edge; cephalic regions and the ventral surface whitish. The median band in the present material made of twin lines thus differing from typical pattern of the species

Tidepool, under rock

(Kazmi, 2016)



In water pool



Family Stylochidae Stimpson, 1857

Genus *Stylochus* Ehrenberg 1831

Stylochus sp.

Intertidal rockpools, found on mussels banks under stones, often in swarms (Kazmi, 1996)



Family Stylochoplanidae Faubel, 1983
Genus *Emprosthopharynx* Bock, 1913
Emprosthopharynx pallida (Quatrefage, 1845)

Encrustations on rocks mussel bed exposed to surf (Fatima and Barkati, 1999 as *Stylochoplana pallida*; Ali, 2006)

Family Notoplanidae Marcus and Marcus, 1966
Genus *Notoplana* Laidlaw, 1903
Notoplana? alcinoi (Schmidt, 1862)
Common under stones in intertidal region (Kazmi, 1996 as *Notoplana* sp; Kazmi, 2016)



?Family Notocomplanidae Litvaitis, Bolaños and Quiroga, 2019
Genus *Notocomplana* Faubel, 1983
Notocomp plana sp. 30-50 mm. Dorsal surface of pale flesh-colour, caused by numerous specks of pigments; margins paler, not translucent; Under stones in intertidal region (Kazmi, 2016)



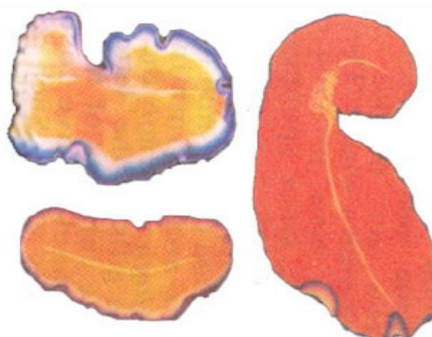
Suborder Cotylea (Lang 1884, Prudhoe 1985)

Family Pseudoceritidae (Lang 1884, Prudhoe 1985)

Genus *Pseudoceros* Lang 1884

Pseudoceros susanae Newman and Anderson 1997 Dorsal surface bright orange with white stripe at the mid-dorsal region and margin with a white band at the centre followed with a dark purple band. 60 mm.

Under stones in intertidal region, found in association with various tunicates (Kazmi, 1996 as *Pseudoceros* sp.; Kazmi, 2016)



Genus *Thysanozoon* Grube 1840)

Thysanozoon brocchii (Risso, 1818) two morphotypes found, the first morph with a buff brownish papillate dorsal surface, with few specimens having white spots; second morph with light coloured papillae which form a distinct cross marking along the dorsal surface.

Among seaweeds (Kazmi, 1996 as *Thysanozoon* sp; Kazmi, 2016)



Genus *Phrikoceros* Newman and Cannon, 1996

Phrikoceros lizardensis (Newman and Cannon, 1996) Light brown with cream mottling composed of dots forming loose transverse streaks medially and laterally, marginal black band, interrupted with

short white transverse streaks of dots at rim, margin narrow, bright orange band. Pseudotentacles with white tips and cream mottling between. Ventrally purplish brown toward the margin, orange submargin and black rim
Intertidal, under rocks
(Kazmi, 2016)

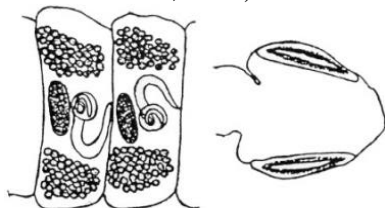


Genus *Pseudobiceros* Faubel, 1984
Pseudobiceros sp.
Reefs
(Kazmi, 2016)



Class Cestoda Rudolphi, 1808
Subclass Eucestoda Southwell, 1930
Order Bothriocephalidea Kuchta, Scholz, Brabec and Bray, 2008

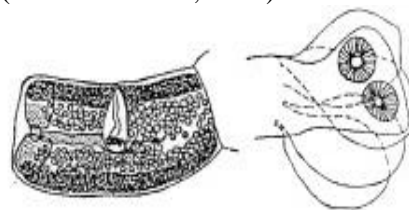
Family Bothriocephalidae Blanchard, 1849
Genus *Ptychobothrium* Lönnerberg, 1889
Ptychobothrium belones (Dujardin, 1845)
Parasitic. Hosts: *Chelon planiceps* (Fish)
(Zaidi and Khan, 1976)



Scolex and mature proglottids (After Bilqees, 1985)

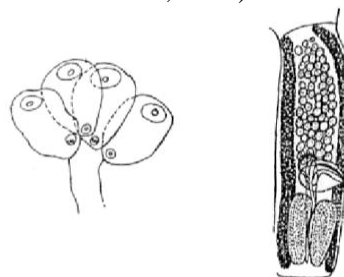
Order Phyllobothriidea Caira, Jensen, Waeschenbach, Olson and Littlewood, 2014

Family Phyllobothridae Braun, 1900
Genus *Myzophyllobothrium* Shipley and Hornell, 1906
Myzophyllobothrium rubrum Shipley and Hornell, 1906
Parasitic. Host: *Aetobatis nocellatus* (Fish)
(Zaidi and Khan, 1976)



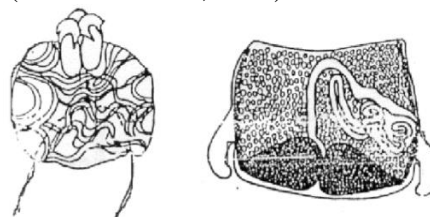
Scolex and mature segment (After Zaidi and Khan, 1976)

Genus *Pithophorus* Southwell, 1925
genus inquirendum
Pithophorus pakistanensis Zaidi and Khan, 1976 species inquirenda 5.5 x 10 mm.
Parasitic. Hosts: *Chiloscyllium indicum*, *Aetobatus ocellatus* (Fish)
(Zaidi and Khan, 1976)



Scolex and mature proglottid (After Bilqees, 1983)

Genus *Thysanocephalum* Linton, 1889
Thysanocephalum karachii Zaidi and Khan, 1976
Parasitic. Hosts: *Himantura bleekeri*, *Galacercado cuvier* (Fish)
(Zaidi and Khan, 1976)



Scolex and mature proglottid (After Zaidi and Khan, 1976)

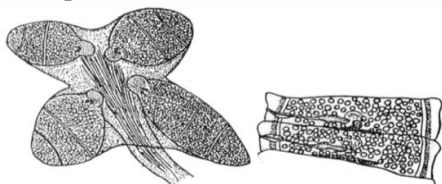
Order Tetraphyllidea Caurus, 1863

Family Onchobothriidae Braun, 1900

Genus *Acanthobothrium* Blanchard, 1848

Acanthobothrium karachiense Bilqees, 1980

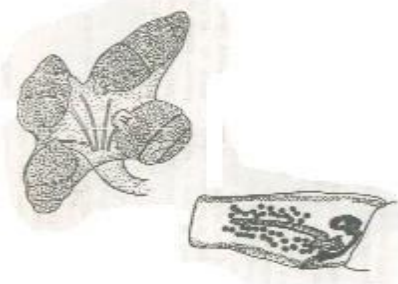
Parasitic. Host: *Mustelus mosis* (Fish) (Bilqees, 1980c)



Scolex and mature segment (After Bilqees, 1980c)

Acanthobothrium mujibi Bilqees, 1980

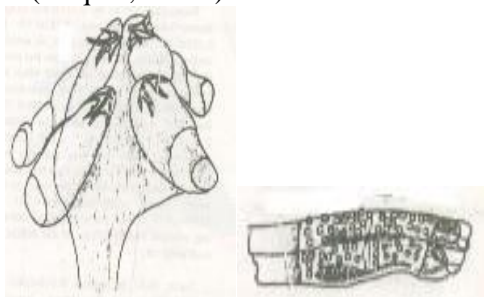
Parasitic. Host: *Mustelus mosis* (Fish) (Bilqees, 1980c)



Scolex and mature segment (After Bilqees, 1980)

Acanthobothrium rubrum Bilqees, 1980 90 mm.

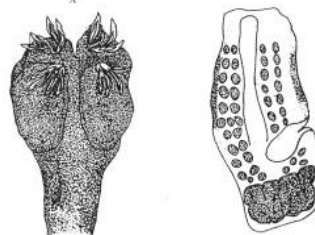
Parasitic. Host: *Mustelus mosis* (Fish) (Bilqees, 1980c)



Scolex and mature proglottids (After Bilqees, 1980)

Acanthobothrium timlei Bilqees and Muslehuddin, 1975

Parasitic. Host: *Narcine timlei* (Fish) (Bilqees and Muslehuddin, 1975)



Scolex and mature segment (After Bilqees and

Muslehuddin, 1975)

Order Lecanicephalidea Hyman, 1951

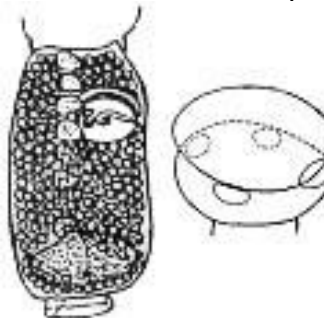
Family Cephalobothriidae Pintners, 1928

Genus *Tylocephalum* Linton, 1890

Tylocephalum dierama Shipley and Hornell, 1906 (taxon inquirendum)

Parasitic. Hosts: *Aetomylaeus milvus*, *Mustelus mosis* (Fish)

(Zaidi and Khan, 1976 as *Cephalobothrium dierama* sp inqd.)

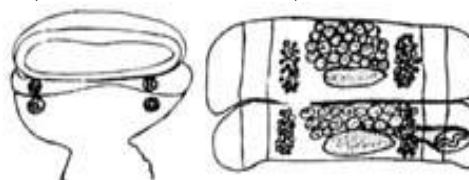


Mature proglottid and scolex (After Bilqees, 1983)

Genus *Cephalobothrium* Shipley and Hornell, 1906

Cephalobothrium gymnurai Zaidi and Khan, 1976 taxon inquirendum

Parasitic. Host: *Gymnura* sp. (Fish) (Zaidi and Khan, 1976)



Scolex and mature segments (After Bilqees, 1983)

Family Lecanicephalidae Braun, 1900

Genus *Hexacanalis* Perrenoud, 1931

Hexacanalis pteroplateae (Zaidi and Khan, 1976) Cielocha and Jensen, 2011

Parasitic. Host: *Gymnura poecilura* (Fish)

(Zaidi and Khan, 1976 as *Cephalobothrium pteroplateai*)



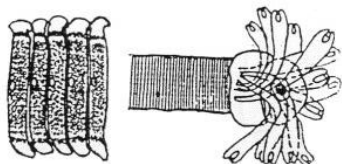
Scolex and mature segment (After Bilqees, 1983)

Genus *Calycobothrium* Stiles and Hassall, 1912 taxon inq.

Calycobothrium typicum (Southwell, 1911)

Parasitic. Host: *Brachirus orientalis* (Fish)

(Zaidi and Khan, 1976; this record should be considered suspect cf. Jensen, 2005)



Scolex and immature segments (After Bilqees, 1983)

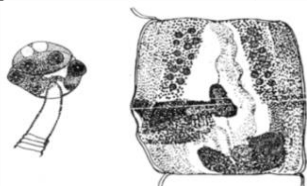
Family Tetragnocophalidae Yamaguti, 1959

Genus *Tetragnocephalum* Shipley and Hornell, 1905

Tetragnocephalum stegostomai Bilqees and Fatima, 1982 (nomen nudum)

Parasitic. Host: *Stegostoma fasciatum* (Fish).

(Bilqees and Fatima, 1982)



Scolex and mature segment (After Bilqees and Fatima, 1982)

Tetragnocephalum varium Bilqees and Fatima, 1982 (nomen nudum)

Parasitic. Host: *Stegostoma fasciatum* (Fish)

(Bilqees and Fatima, 1982)



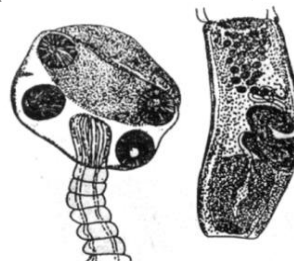
Scolex and mature segment (After Bilqees and Fatima, 1982)

Tetragnocephalum karachiensis

Bilqees and Fatima, 1982 nomen nudum

Parasitic. Host: *Stegostoma fasciatum* (Fish)

(Bilqees and Fatima, 1982)



Scolex and mature segment (After Bilqees and Fatima, 1982)

Order Trypanorhyncha Diesing, 1863

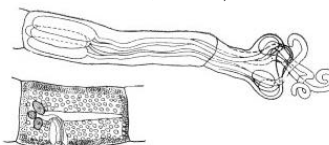
Family Mixodigmatidae Dailey and Vogelbein, 1982

Genus *Halysiorhynchus* Pintner, 1913

Halysiorhynchus macrocephalus

(Shipley and Hornell, 1906)

Parasitic. Host: *Gymnura poecilura* (Fish) (Zaidi and Khan, 1976)



Scolex and mature segment

Sub order Trypanoselachoida Olson, Caira, Jensen, Overstreet, Palm and Beveridge, 2010

Family Pterobothriidae Pintner, 1931

Genus *Pterobothrium* Diesing, 1850

Pterobothrium heteracanthum Diesing, 1850

Parasitic. Hosts: *Netuma thalassina*, *Grammoplites scaber* (Fish)

(Bilqees and Shah, 1982 as larva of *Neogymnorhynchus platycephali*;

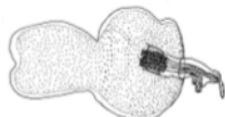
Bilqees and Khurshid, 1986 as *Neogymnorhynchus magna* (part) in Gymnorhynchidea)



(After Bilqees and Shah, 1982)

Pterobothrium lintoni (MacCallum, 1916)

Parasitic. Host: *Protonibea diacanthus* (Fish)
(Bilqees and Khurshid, 1987 as larva of *Pterobothrium malleum* Linton)



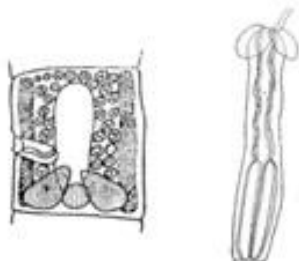
Pterobothrium pearsoni (Southwell, 1929)

Parasitic. Host: *Mustelus mosis* (Fish)
(Bilqees, 1980a as *Myrmillorhynchus pearsoni* in Gynmorhynchidea)



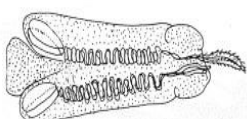
Scolex (After Bilqees, 1980)

Family Hornelliellidae Yamaguti, 1954
Genus *Hornelliella* Yamaguti, 1954
Hornelliella palasoorahi Zaidi and Khan, 1976 taxon inquirendum
Parasitic . Host: *Scoliodon laticaudus* (Fish)
(Zaidi and Khan, 1976, sp. inqd.)

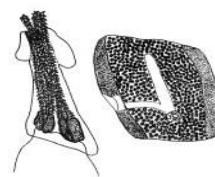


Scolex and mature segment

Family Obothriidae Dollfus, 1942
Genus *Obothrium* Linton, 1890
Obothrium mugilis Hiscock, 1954
Parasitic. Host: *Otolithes ruber* (Fish)
(Bilqees and Khurshid, 1987b as larva of *Paramecistobothrium hexacanthus* cf. Schaeffner and Beveridge, 2012)



Obothrium karachiensis Bilqees and Muslehuddin, 1975 (taxon inquirendum)
Parasitic Host: *Mustelus mosis* (Fish)
(Bilqees and Muslehuddin, 1975)



Scolex and segment
Obothrium minutum Subhpradha, 1955

Parasitic. Host: *Netuma thalassina* (Fish)
(Bilqees and Khurshid, 1987 as larva)



Genus *Poecilancistrum* Dollfus, 1929

Poecilancistrum caryophyllum

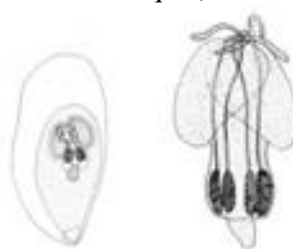
(Diesing, 1850)

Parasitic. Hosts: *Protonibea diacanthus*; *Chirocentrus dorab* (Fish)
(Bilqees and Khurshid, 1978 as *Paramecistobothrium magnabulbosa* larva; Bilqees and Shah, 1983 as *Poecilancestrum ilisha* (Southwell and Prasad)



Family Pseudotobothriidae Palm, 1995
Genus *Parotobothrium* Palm, 2004
Parotobothrium balli (Southwell, 1929)
Palm, 2004

Parasitic. Hosts: *Scomberomorus guttatus*, *Lates calcarifer* (Fish)
(Khurshid and Bilqees, 1987b as *Obothrium karachii*; Khurshid and Bilqees, 1988 as *Nybelinia karachii* Khurshid and Bilqees)



Genus *Pseudotobothrium* Dollfus, 1942
Pseudotobothrium arii (Bilqees and Shaukat, 1976)

Parasitic. Hosts: *Netuma thalassina*, *Arius maculatus*, *Scomberomorus guttatus* (Fish).

(Bilqees and Shaukat, 1976 as *Otobothrium arii*; Bilqees and Khurshid, 1987 as *Otobothrium megatentaculum* larva)



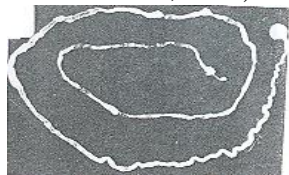
Family Gymnorhynchidae Dollfus, 1935

Genus *Gymnorhynchus* Rudolphi, 1819

Gymnorhynchus gigas (Cuvier, 1817)

Parasitic. Host: *Otolithes ruber* (Fish)

(Bilqees and Kazmi, 1974)



Family Tentaculariidae Poche, 1926

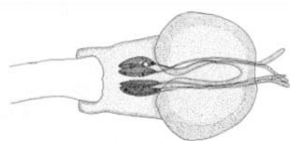
Genus *Heteronybelinia* Palm, 1999

Heteronybelinia macrocephala Asmi,

1983 in Bilqees and Khursheed, 1987

Parasitic. Host: *Mustelus mosis* (Fish)

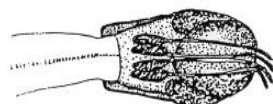
(Asmi, 1983 unpublished as *Nybelinia macrocephala* in Bilqees and Khurshid 1987))



Heteronybelinia elongata (Shah and Bilqees, 1979)

Parasitic. Hosts: *Ilisha elongata* and *Mustelus mosis* (Fish)

(Shah and Bilqees, 1979 as *Nybelinia elongata* (larva); Bilqees and Asmi, 1983 (adult))



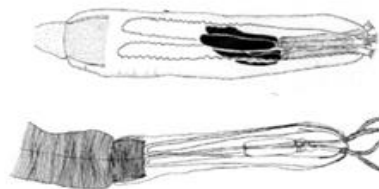
Mature segment and scolex (After Shah and Bilqees, 1979)

Genus *Tentacularia* Bosc, 1797

Tentacularia coryphaenae Bosc, 1802

Parasitic. Host: *Scomberomorus guttatus* (Fish)

(Bilqees and Khurshid, 1985)



Scolex

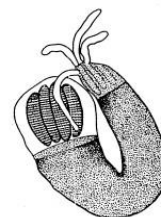
Family Lacistorhynchidae Guiart, 1937

Genus *Pseudogilquinia* Bilqees and Khatoon, 1980

Pseudogilquinia karachienses Bilqees and Khatoon, 1980

Parasitic. Host: *Pomadasys olivaceus* (Fish)

(Bilqees and Khatoon, 1980 as larva)



(After Bilqees and Khatoon, 1980)

Pseudogilquinia brevibothria

(MacCallum, 1917)

Parasitic. Host(s): *Protonibea diacanthus*, *Scomberomorus guttatus* (Fish)

(Bilqees and Khurshid, 1985 as larva

Pseudogilquinia magna Bilqees and Khurshid)



Genus *Callitetrarhynchus* Pintner, 1931

Callitetrarhynchus sp.

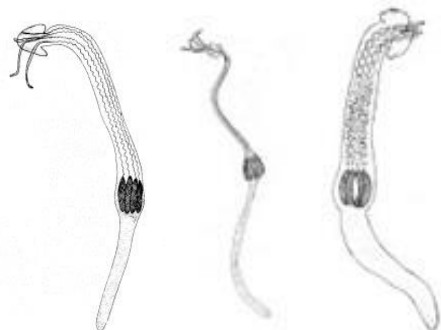
Parasitic. Host: *Protonibea diacanthus* (Fish)

(Bilqees, 1988)

Callitetrarhynchus gracilis (Rudolphi, 1819)

Parasitic. Hosts: *Netuma thalassina*, *Scomberomorus guttatus* (Fish)

(Bilqees and Khurshid, 1987 as larva of *Callitetrarhynchus elongatus* Bilqees and Khurshid and *Callitetrarhynchus megacanthus* Bilqees and Khurshid)



Callitetrarhynchus macfie (Southwell, 1930)
Parasitic. Host: *Scomberomorus guttatus* (Fish)
(Bilqees and Jabeen, 1986 (larva))



Callitetrarhynchus speciosus (Linton, 1897)
Parasitic. Host: *Scomberomorus guttatus* (Fish)
(Bilqees and Khurshid, 1987, larva a)



Order Protocephalidea Mola, 1928

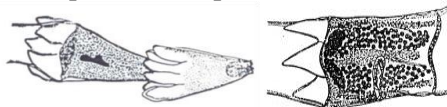
Family Protocephalidae La Rue, 1911
Genus *Vermaia* Nybelin, 1942
Vermaia sorrakowai Zaidi and Khan, 1976
Parasitic. Host: *Scoliodon laticaudus* (Fish)
(Zaidi and Khan, 1976 as larva; Biquees, 1985 as adult)



Head and Proglottid (After Bilqees, 1985)

Order Tetraphyllidea Carus, 1853

Genus *Neolitobothrium* Bilqees, 1983, Bray, 2010 genus inquirendum
Neolitobothrium hexalacinatum Bilqees, 1982
Parasitic. Host: *Mustellus mosis* (Fish)
(Bilqees, 1982, sp. Inq. fide Bray, 2010)



Scolex (After Bilqees, 1982)

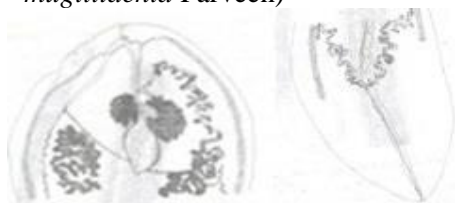
Order Caryophyllidea van Beneden, 1963
in Olsson, 1893

Family Lytocestidae Hunter, 1927
Genus *Bovienia* Fuhrmann, 1931
Bovienia ilishai Zaidi and Khan, 1976
Parasitic. Host(s): *Tenulosa ilisha* (Fish)
(Zaidi and Khan, 1976)



Subclass Cestodaria Monticelli, 1892
Order Amphilinidea Poche, 1922

Family Schizozoeridae Poch, 1922
Genus *Gigantolia* Poche, 1922
Gigantolia mugilitaenia (Parveen, 1970)
Parasitic. Host: *Valamugil speigleri* (Fish)
(Parveen, 1970 as *Gyrometra mugilitaenia* Parveen)



Head and tail end (After Parveen, 1970)

Order Dactylogridea Bychowsky, 1937

Family Neocalceostomatidae Lim, 1995
Genus *Neocalceostoma* Tripathi, 1957
Neocalceostoma elongatum (Tripathi, 1957) Kritsky, Noble and Moserl, 1978.
Parasitic. Host: *Netuma thalassina* (Fish)
(Kritsky *et al.*, 1978)



(After Kritsky *et al.*, 1978)

Genus *Neocalceostomoides* Kritsky, Mizelle and Bilqees, 1978

Neocalceostomoides arii (Unnithan, 1964) Kritsky, Mizelle and Bilqees, 1978
Parasitic. Host: *Arius* sp. (Fish)
(Kritsky *et al.*, 1978)

Subclass Polyopisthocotylea Odhner, 1912

Order Mazocraeidea Price, 1936

Family Chauhaneidae Euzet and Trilles, 1960

Genus *Pseudochauhanea* Yamaguti, 1965

Pseudochauhanea forsteri Hadi and Bilqees, 2015

Parasitic. Host(s): *Sphyaena jello* (Fish)
(Hadi and Bilqees, 2015, abstract)

Family Allopyraptoridae Yamaguti, 1953

Genus *Allomicrocotyla* Yamaguti, 1965

Allomicrocotyla niger Hadi and Bilqees, 2010

Parasitic. Host: *Parastromateus niger* (Fish)
(Hadi and Bilqees, 2010)



(After Hadi and Bilqees, 2010)

Family Allodiscocotylidae Tripathi, 1959

Genus *Allodiscocotyla* Yamaguti, 1953

Allodiscocotyla chorinemi Yamaguti, 1953.

Parasitic. Host: *Scomberoides commersonianus* (Fish)

(Bilqees, 1980, Bilqees, 1981 as *Allodiscoides chornemi*)



Allodiscocotyla elongata Bilqees and Shabbir, 2004

Parasitic. Host: *Scomberoides lysan* (Fish)

(Bilqees and Shabbir, 2004 miss-spelled as *A. elongatum*)



(After Bilqees and Shabbir, 2004)

Alldiscocotyla pakistanensis Hadi and Bilqees, 2011

Parasitic. Host: *Scomberoides tol* (Fish)
(Hadi and Bilqees, 2011a)



(After Hadi and Bilqees, 2011)

Genus *Allopyraptor* Yamaguti, 1963

Allopyraptor niger Hadi and Bilqees, 2010

Parasitic. Host: *Parastromateus niger* (Fish)
(Hadi and Bilqees, 2010)

Family Gotocotylidae Yamaguti, 1963

Genus *Neogotocotyla* Hadi and Bilqees, 2010

Neogotocotyla rohdii Hadi and Bilqees, 2010

Parasitic. Host: *Scomberoides lysan* (Fish)
(Hadi and Bilqees, 2010)



(After Hadi and Bilqees, 2010)

Genus *Bicotylophora* Price, 1936

Bicotylophora blochii Hadi and Bilqees, 2014

Parasitic. Host: *Trachinotus blochii* (Fish)
(Hadi and Bilqees, 2014a, Publication not compliant with Article 8.5 (2012) of the ICZN e-publications)



(After Hadi and Bilqees, 2014)

Genus *Cathucotyle* Lebedev, 1968

Cathucotyle arabiansis Hadi and Bilqees, 2012

Parasitic. Host: *Scomberomorus guttatus* (Fish)
(Hadi and Bilqees, 2012)



(After Hadi and Bilqees, 2012)
Cathucotyle bilqeesae Hadi and Bilqees, 2012

Parasitic. Host: *Scomberomorus commerson* (Fish)
(Hadi and Bilqees, 2012a)



Entire and anterior portion (After Hadi and Bilqees, 2012)

Genus *Neocathucotyle* Hadi, 2009
Neocathucotyle pakistanensis Hadi, 2009
Parasitic. Host: *Scomberomorus lineolatus* (Fish)
(Hadi, 2009 unpublished)

Family Heteraxinidae Unnithan, 1957
Genus *Heteraxinoides* Yamaguti, 1963
Heteraxinoides karachiensis Hadi and Bilqees, 2014

Parasitic. Host: *Scomberomours guttatus* (Fish)
(Hadi and Bilqees, 2014 Publication not compliant with Article 8.5 (2012) of the ICZN e-publications)



(After Hadi and Bilqees, 2014)

Family Diclidophoridae Fuhrmann, 1928
Genus *Choricotyle* Beneden and Hesse, 1863

Choricotyle pellowae Kritsky and Bilqees, 1973

Parasitic. Host: *Illisha elongata* (Fish)
(Kritsky and Bilqees, 1973)



(After Kritsky and Bilqees, 1973)

Family Microcotylidae Taschenberg, 1879
Genus *Microcotyle* Van Beneden and Hesse, 1863

Microcotyle argenticus Hadi and Bilqees, 2011

Parasitic. Host: *Pampus argenteus* (Fish)
(Hadi and Bilqees, 2011)



(After Hadi and Bilqees, 2011)

Microcotyle jonii Hadi, Bilqees and Khatoon, 2011

Parasitic. Host: *Lutjanus johnii* (Fish)
(Hadi *et al.*, 2011)



(After Hadi *et al.*, 2011)

Microcotyle rubrum Hadi and Bilqees, 2010

Parasitic. Host: *Otolithes ruber* (Fish)
(Hadi and Bilqees, 2010b)



(After Hadi and Bilqees, 2010)

Genus *Cynoscionicola* Price, 1962

Cynoscionicola calcariferi Hadi, Khalil, Khan, Ibrahim and Bilqees, 2017

Parasitic. Host: *Lates calcarifer* (Fish)
(Hadi *et al.*, 2017)

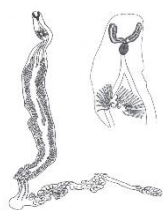


(After Hadi *et al.*, 2017)

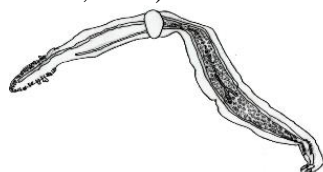
Genus *Polynemicola* Unnithan, 1971

Polynemicola indicus Hadi, Mehwish, Tooba, Khalil and Ibrahim, 2019

Parasitic. Host: *Polynemus indicus* (Fish)
(Hadi, *et al.*, 2019)



(After Hadi, *et al.*, 2019)
Genus *Metamicrocotyla* Yamaguti, 1953
Metamicrocotyla cribbi Ibrahim, Khatoon, Aly Khan and Hadi, 2019
Parasitic. Host: *Moolgarda seheli* (Fish)
(Ibrahim *et al.*, 2019)



(After Ibrahim *et al.*, 2019)
Family Gastrocotylilidae Price, 1943
Genus *Pellonicola* Unnithan, 1967
Kritsky and Bilqees, 1973
Pellonicola lanceolatum Kritsky and Bilqees, 1973
Parasitic. Host: *Illisha elongata* (Fish)
(Kritsky and Bilqees, 1973)



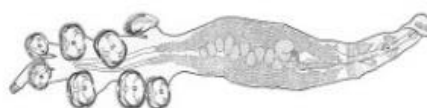
(After Kritsky and Bilqees, 1973)
Genus *Asymmetra* Bilqees, Khalil, Khan, Perveen and Haseeb, 2016 taxon inquirendum
Genus *Asymmetra* Hadi, 2009 (nomen nudum, erected in an unpublished thesis)
Asymmetra magnacirrosa Bilqees, Khalil, Khan, Perveen and Haseeb, 2016
Parasitic. Host: *Acanthopagrus berda* (Fish)
(Bilqees *et al.*, 2016)



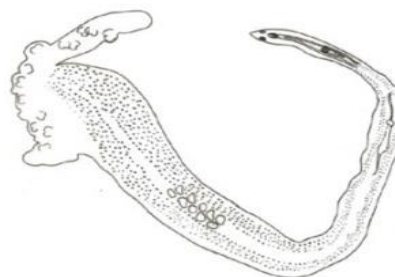
(After Bilqees *et al.*, 2016)
Family Multigonadidae Bilqees, 1970
Genus *Multigonadus* Bilqees, 1970
Multigonadus microcecus Bilqees, 1970
Parasitic. Host: *Mustelus mosis* (Fish)
(Bilqees, 1970a)



(After Bilqees, 1970)
Family Mazocraeidae Price, 1936
Genus *Paramazocraes* Tripathi, 1959
Paramazocraes tripathi Kritsky and Bilqees, 1973
Parasitic. Host: *Illisha elongata* (Fish)
(Kritsky and Bilqees, 1973)



(After Kritsky and Bilqees, 1973)
Family Axinidae Monticelli, 1903
Genus *Axinoides* Yamaguti, 1938
Axinoides belangerii Hadi and Bilqees, 2014
Parasitic. Host: *Johnius belangeri* (Fish)
(Hadi and Bilqees, 2014)



(After Hadi and Bilqees, 2014)
Class Trematoda (Rudolphi, 1808)
Cavalier-Smith, 1998
Subclass Digenea Carus, 1863
Order Plagiorchiida La Reu, 1957
Suborder Hemiurata Skrjabin and Guschanskaja, 1954

Family Accacoeliidae Odhner, 1911
Genus *Accacladocoelium* Odhner, 1928
Accacladocoelium owrae (Hutton, 1954)
Parasitic. Host: *Sagitta enflata* (Chaetognatha)
(Ahmad and Khan, 1976 as *Metacercaria owrae*, larva)
Genus *Tetrochetus* Looss, 1912
Tetrochetus balochistanensis Ahmed, Birmani and Naz, 2018

Parasitic. Host: *Coryphaena hippurus* (Fish)
(Ahmed *et al.*, 2021)

Family Hemiuridae Looss, 1899
Genus *Opisthadena* Linton, 1910
Opisthadena karachii (Srivastava, 1941
Skrjabin and Guschanskaja, 1955)
Parasitic. Host: *Sardinella longiceps* (Fish)
(Srivastava, 1937 as *Sterrhurus karackii*;
Bilqees, 1981)



(After Srivastava, 1941)

Genus *Neodichaena* Yamaguti, 1971
Neodichaena magnavescicula Bilqees,
Hadi, Shaukat, Khatoon and Haseeb, 2010
Parasitic. Host: *Tricanthus biaculeatus*
(Fish)
(Bilqees *et al.*, 2010)



(After Bilqees *et al.*, 2010)

Genus *Erilepturus* Woolcock, 1935
Erilepturus karachiensis Bilqees and
Nighat, 1981
Parasitic. Host: *Scomberomorus guttatus*
(Fish)
(Bilqees and Nighat, 1981)



(After Bilqees and Nighat, 1981)

Erilepturus hamatai (Yamaguti, 1937)
Parasitic. Hosts: *Scomberoides* sp.
Otolithus argenteus (Fish)
(Bilqees, 1981 as *Uterovesiculurus*
hamati)
Erilepturus lemeriensis (Tubangui and
Masilungan, 1935)
Parasitic. Host: *Otolithes ruber* (Fish)
(Bhutta and Khan, 1975)



(After Bhutta and Khan, 1975)

Genus *Ectenurus* Looss, 1907
Ectenurus crenidensis Bilqees, 1971
Parasitic. Host: *Crenidens indicus* (Fish)
(Bilqees, 1971d)



(After Bilqees, 1971)

Ectenurus minutus Zaidi and Khan, 1977
Parasitic. Host: *Caranx ignobilis* (Fish)
(Zaidi and Khan, 1977)



(After Zaidi and Khan, 1977)

Ectenurus glandocaudum (Bilqees,
1971)
Parasitic. Host: *Netuma thalassina* (Fish)
(Bilqees, 1971 as *Magnacetabulum*
glandocaudum Bilqees)



(After Bilqees, 1971)

Ectenurus lepidus Looss, 1907
Parasitic. Host: *Harpadon nehereus* (Fish)
(Bilqees, 1981 as *Magnacetabulum*
trachuri Yamaguti, 1937)



(After Bilqees, 1981)

Ectenurus malabaricus Bilqees Khalil,
Nawaz and Khan, 2010
Parasitic. Host: *Carangoides malabaricus*
(Fish)
(Bilqees *et al.*, 2010 abstract)
Ectenurus karachiensis Bilqees, Khalil,
Nawaz and Khan, 2010
Parasitic. Hosts: *Caranx djedaba* (Fish)
(Bilqees *et al.*, 2010, abstract)
Ectenurus indicus Bilqees, 1971
Parasitic. Host: *Cynoglossus sindensis*
(Fish)
(Bilqees, 1971)

Genus *Mecoderus* Manter, 1940
Mecoderus cordylai Zaidi and Khan, 1977
 Parasitic. Host: *Megalapsis cordyla* (Fish)
 (Zaidi and Khan, 1977)



(After Zaidi and Khan, 1977)

Genus *Tubulovesicula* Yamaguti, 1934
Tubulovesicula angusticauda (Nicoll, 1915)
 Parasitic. Hosts: *Harpadon nehereus*; *Muraenesox cinereus* (Fish)
 (Bilqees and Khan, 1975; Zaidi and Khan, 1977 as *Tubulovesicula anguillae* Yamaguti; Bilqees and Nighat, 1981 as *Tubulovesicula magna*)



Tubulovesicula spari Yamaguti, 1934
 Parasitic. Host: *Muraenesox cinereus* (Fish)
 (Bilqees, 1981)



(After Bilqees, 1981)

Tubulovesicula magnacirrosa Bilqees and Shaukat, 2011
 Parasitic. Host: *Protonibea diacanthus* (Fish)
 (Shaukat and Bilqees, 2011)



(After Shaukat and Bilqees, 2011)

Tubulovesicula microcaudum Shaukat and Bilqees and Haseeb, 2008
 Parasitic. Host: *Otolithes ruber* (Fish)

(Shaukat *et al.*, 2008)



(After Shaukat *et al.*, 2008)

Tubulovesicula dorabi Bilqees, Khalil, Khatoon, Rehman and Perveen, 2010
 Parasitic. Host: *Chirocentrus dorabi* (Fish)
 (Bilqees *et al.*, 2010)



(After Bilqees *et al.*, 2010)

Tubulovesicula olivaceus Shaukat and Bilqees, 2011
 Parasitic. Host: *Pomadasys olivaceum* (Fish)
 (Shaukat and Bilqees, 2011)



(After Shaukat and Bilqees, 2011)

Tubulovesicula karachiensis Shaukat and Bilqees, 2008
 Parasitic. Host: *Protonibea diacanthus* (Fish)
 (Shaukat and Bilqees, 2008)

Tubulovesicula macrovesicula Bilqees, Khalil, Khan, Haseeb and Perveen, 2010
 Parasitic. Host: *Plectorhinchus cinctus* (Fish)
 (Bilqees *et al.*, 2010 erroneously also as lapsus of *Tubulovesicula magnavesicula* Bilqees, Khalil, Khan, Haseeb and Perveen)

Tubulovesicula microrchis Bilqees, Khalil, Khan, Haseeb and Perveen, 2010
 Parasitic. Host: *Plectorhinchus cinctus* (Fish)
 (Bilqees *et al.*, 2010)



Male (After Bilqees *et al.*, 2010)

Genus *Lecithocladium* Luhe, 1901
Lecithocladium apolecti Velasquez, 1962
 Parasitic. Hosts: *Stromateus* sp. *Caranx jedaba* *Carangoides presustus* (Fish) (Bilqees, 1971 as *Magnapharyngium arabiana*; Bilqees, 1971 as *Magnapharyngium hexavitellarii*; Bilqees, 1971 as *Magnapharyngium microcaudum*; Bilqees, 1971 as *Magnapharyngium octovitellarii*; Bilqees, 1971 as *Magnapharyngium microductus*; Bilqees, 1971 as *Magnapharyngium anteporus*; Bilqees, 1971 as *Magnapharyngium tetravitellarii*; Farooq and Khanum, 1980 as *Lecithocladium stromatei* Farooq and Khanum)



(After Bilqees, 1971)

Lecithocladium karachii Zaidi and Khan, 1977
 Parasitic. Hosts: *Carangoides praeustus*, *Carangoides malabaricus* (Fish) (Zaidi and Khan, 1977, also as *Lecithocladium pakistanense*)



(After Zaidi and Khan, 1977)

Lecithocladium lateropharyngium Skaukat, Bilqees, Haseeb and Muti-ur Rehman, 2008
 Parasitic. Host: *Pampus chinensis* (Fish) (Skaukat *et al.*, 2008)



(After Skaukat *et al.*, 2008)
Lecithocladium psenopsis Yamaguti, 1934
 Parasitic. Host: *Pampus chinensis* (Fish) (Bilqees, 1980)



(After Bilqees, 1980)

Lecithocladium thynense Bilqees and Nighat, 1985
 Parasitic. Host: *Thunnus* sp. (Fish) (Bilqees and Nighat, 1985 as *Lecithocladium thynensis*)



(After Bilqees and Nighat, 1985)

Lecithocladium olivacae Bilqees, Khatoon, Khan and Mutiur-Rehman, 2006
 Parasitic. Host: *Pomadasys olivaceus* (Fish) (Bilqees *et al.*, 2006 abstract)

Lecithocladium arii Bilqees, Khatoon, Shabbir, Shaukat, Muti-ur-Rehman and Khan, 2005

Parasitic. Host: *Netuma thalassina* (Fish) (Bilqees *et al.*, 2005)

Lecithocladium karachiensis Shaukat and Bilqees, 2010

Parasitic. Host: *Parasromateus niger* (Fish) (Shaukat and Bilqees, 2010)



(After Shaukat and Bilqees, 2010)

Lecithocladium magnasoma Shaukat and Bilqees, 2007

Parasitic. Host: *Sromateus chinensis* (Fish)

(Shaukat and Bilqees, 2007)



(After Shaukat and Bilqees, 2007)
Lecithocladium megalaspis Yamaguti, 1953

Parasitic Host: *Megalaspis cordyla* (Fish)
 (Farooq and Khanum, 1980 as *Lecithocladium arabicum* Farooq and Khanum)



(After Farooq and Khanum, 1980)

Lecithocladium cybii Shaukat and Bilqees, 2011

Parasitic. Host: *Scomberomous guttatus* (Fish)
 (Shaukat and Bilqees, 2011)



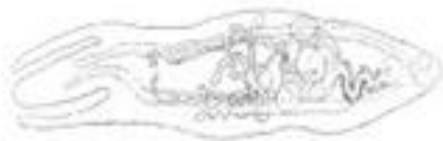
(After Shaukat and Bilqees, 2011)

Lecithocladium magnavesicula Shaukat and Bilqees, 2008

Parasitic. Host: *Pomadasys olivaceus* (Fish)
 (Shaukat and Bilqees, 2008)

Genus *Lecithochirium* Luhe, 1910
Lecithochirium orientale (Bhutta and Khan, 1975)

Parasitic. Host: *Lutjanus johni* (Fish)
 (Bhutta and Khan, 1975 as *Sterrhurus orientalis* Bhutta)



Lecithochirium harpodontis Zaidi and Khan, 1977

Parasitic. Host: *Harpodon nehereus* (Fish)
 (After Zaidi and Khan, 1977)



(After Zaidi and Khan, 1977)

Lecithochirium canadus Bilqees, 1972

Parasitic. Host: *Rachycentron canadum* (Fish)

(Bilqees, 1972)



(After Bilqees, 1972)

Lecithochirium harpodoni Bilqees, 1972

Parasitic. Host: *Harpodon nehereus* (Fish)
 (Bilqees, 1972)



(After Bilqees *et al.*, 2009)

Lecithochirium musculoatrium Bilqees, 1972

Parasitic. Host: *Lactariuslactarus* (Fish)
 (Bilqees, 1972)



(After Bilqees, 1972)

Lecithochirium spindale Bilqees, 1972

Parasitic. Host: Fish of unknown identity
 (Bilqees, 1972)



(After Bilqees, 1972)

Lecithochirium johni Bilqees, Haseeb, Muti-ur Rehman and Perveen, 2009

Parasitic. Host: *Lutjanus johni* (Fish)
 (Bilqees *et al.*, 2009)

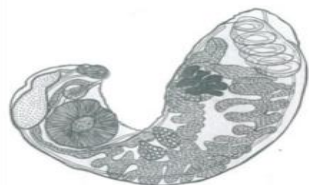


Lecithochirium sihamai (Srivastava, 1937)

Parasitic. Host: *Sillago sihama* (Fish)
 (Srivastava, 1937 as *Sterrhurus sihama*)



Lecithochirium dicanthi Bilquees, Haseeb, Muti-ur Rehman and Perveen, 2009
Parasitic. Host: *Protonibea diacanthus* (Fish)
(Bilquees *et al.*, 2009)



(After Bilquees *et al.*, 2009)

Lecithochirium stromatei (Bilquees, 1972)
Parasitic. Host: *Stromateus chinensis* (Fish)
(Bilquees, 1972 as *Sterrhurus stromatei* Bilquees)



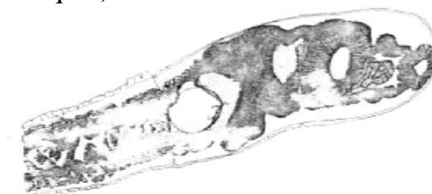
(After Bilquees, 1972)

Lecithochirium tetradontus (Shaikh, Shaikh, Shaikh and Abbasi, 2002)
Parasitic. Host: *Lagocephalus lunaris* (Fish)
(Shaikh *et al.*, 2002 as *Sterrhurus tetradontus*)
Genus *Stomachicola* Yamaguti, 1934
Stomachicola muraenesocis Yamaguti, 1934
Parasitic. Hosts: *Cybiium*; *Muraenesox cinereus*, *Netuma thalassina* (Fish)
(Jahan, 1970 as *Acerointestinecola karachiensis*; Bilquees, 1971 as *Cameronia octovitellarii*, *Cameronia pakistani* Bilquees; *Cestodera gastroceus* Bilquees; *Cestodera unicecus* Bilquees; *Stomachicola cinereus* Bilquees; *Segmentatum karachiense* Bilquees; *Segmentatum agnaesophagustum* Bilquees)



(After Jahan, 1969)

Stomachicola unicecus (Bilquees, 1971)
Parasitic. Hosts: *Muraenesox cinereus*/*Netuma thalassina*
(Bilquees, 1971 as *Cestodera unicecus* Bilquees)



Anterior region (After Bilquees, 1971)

Stomachicola cinereus (Bilquees, 1971)
Parasitic. Host: *Muraenesox cinereus* (F)
(Bilquees, 1971 as *Segmentatum cinereus* Bilquees)



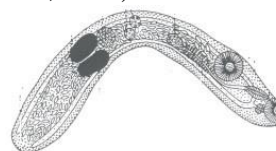
Anterior and posterior ends (After Bilquees, 1971)

Genus *Aphanurus* Looss, 1907
Aphanurus stossichii (Monticelli, 1891)
Parasitic. Host: *Tenualosa ilisha* (Fish)
(Monticelli, 1891; Srivastava, 1941)



(After Chauhan, 1953)

Genus *Ahemiurus* Chauhan, 1953
Ahemiurus karachii (Srivastava, 1941)
Parasitic. Host: *Sardinella longiceps* (Fish)
(Chauhan, 1953)



(After Chauhan, 1953)

Genus *Microvesicula* Bilquees, Khalil, Khan and Haseeb, 2009
Microvesicula otolithi Bilquees, Khalil, Khan and Haseeb, 2009
Parasitic. Host: *Otolithes ruber* (Fish)
(Bilquees *et al.*, 2009)

Family Sclerodistomidae Odhner, 1927

Genus *Prosogonotrema* Perez Viguera, 1940

Prosogonotrema diacanthi Bilqees and Durrani, 1980

Parasitic. Host: *Protonibea diacanthus* (Fish)

(Bilqees and Durrani, 1980)

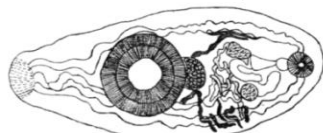


(After Bilqees and Durrani, 1980)

Prosogonotrema karachiense Bilqees and Durrani, 1980

Parasitic. Host: *Lutjanus johni* (Fish)

(Bilqees and Durrani, 1980)



(After Bilqees and Durrani, 1980)

Family Sclerodistomidae Odhner, 1927

Genus *Prosorchi* Yamaguti, 1934

Prosorchi breviformis Srivastava, 1936

Parasitic. Host: *Harpadon nehereus* (Fish)

(Bilqees, 1980)



Prosorchi hexavitellatus Bilqees, 1971

Parasitic. Host: *Pampus chinensis* (Fish)

(Bilqees, 1971)



Prosorchi stromatei Bilqees, 1971

Parasitic. Host: *Pampus chinensis* (Fish)

(Bilqees, 1971)



Prosorchi macroacetabulum Bilqees, Khalil and Mutiur-Rehman, 2009

Parasitic. Host: *Parastromateus niger* (Fish)

(Bilqees *et al.*, 2009)



(After Bilqees *et al.*, 2009)

***Prosorchi* sp.**

Parasitic. Host: *Scomberomorus guttatus* (Fish)

(Bilqees *et al.*, 2010)

Genus *Dinurus* Looss, 1907

Dinurus dorabi Bilqees and Nighat, 1983

Parasitic. Host: *Chirocentrus dorab* (Fish)

(Bilqees and Nighat, 1983)

Genus *Allostomachicola* Srivastava, 1939

Allostomachicola chirocentri Jahan and Azam, 1975

Parasitic. Host: *Chirocentrus dorab* (Fish)

(Jahan and Azam, 1975)



Middle and anterior parts (After Jahan and Azam, 1973)

Allostomachicola mugili Bilqees and Khan, 1993

Parasitic. Host: *Osteomugil speigleri* (Fish)

(Bilqees and Khan, 1993)

Allostomachicola secundus (Srivastava, 1939)

Parasitic. Host: *Osteomugil speigleri* (Fish)

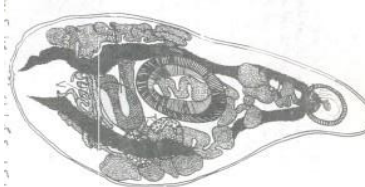
(Bilqees, 1980)

Genus *Qadriana* Bilqees, 1971

Qadriana fusiformis Bilqees, 1971

Parasitic. Host: *Johnius glauca* (Fish)

(Bilqees, 1971)

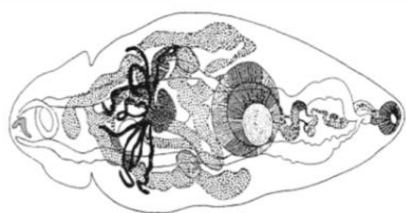


Qadriana otolithi Bilquees, Hadi,,
Khatoon, Muti-ur- Rehman and Parveen,
2009 taxon inquirendum
Parasitic. Host: *Otolithes ruber* (Fish)
(Bilquees *et al.*, 2005 as *Stromaturus*
otolithii (taxon inquirendum))



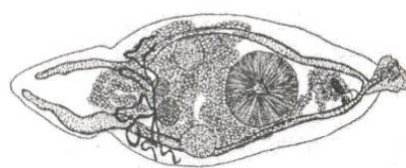
(After Bilquees *et al.*, 2009)

Qadriana karachiensis (Bilquees and
Khatoon, 2003) sp inq 4.9 x 2.1 cm.
Parasitic. Host: *Parasstromateus niger*
(Fish)
(Bilquees and Khatoon, 2003 as
Stromaturus karachiensis)



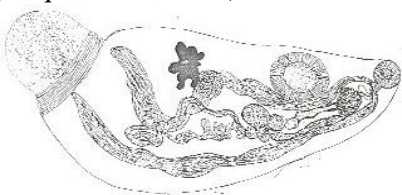
(After Bilquees and Khatoon, 2003)

Qadriana trilobata (Bilquees, Khatoon and
Nawaz, 2011)
Parasitic. Host: *Otolithes ruber* (Fish)
(Bilquees *et al.*, 2011 as *Conica trilobata*)



(After Bilquees *et al.*, 2011)

Genus *Pseudodinosoma* Yamaguti, 1970
Pseudodinosoma robustum Bilquees,
Khalil, Ibrahim, Talat and Rahman, 2010
Parasitic. Host: *Harpodon nehereus* (Fish)
(Bilquees *et al.*, 2010)



(After Bilquees *et al.*, 2010)

Family Derogenidae Nicoll, 1910
Genus *Caudovitellaria* Bilquees, Khalid
and Talat, 2010
Caudovitellaria lobata Bilquees, Khalid
and Talat, 2010
Parasitic. Host: *Terapon jarbua* (Fish)
(Bilquees *et al.*, 2010)



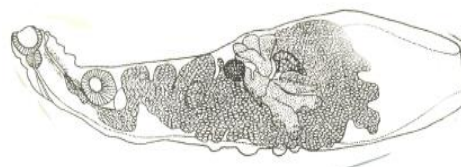
(After Bilquees *et al.*, 2010)

Family Hirudinellidae Dollfus, 1932
Genus *Lampritrema* Yamaguti, 1940
Lampritrema savalai Zaidi and Khan,
1977
Parasitic. Host: *Lepturacanthus savala*
(Fish)
(Zaidi and Khan, 1977 (taxon
inquirendum, a hemiurid, fide Gibson
and Bray, 1979)



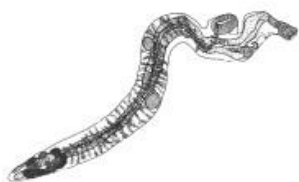
(After Zaidi and Khan, 1977)

Family Lecithasteridae Odhener, 1905
Genus *Hysterolecitha* Linton, 1910
Hysterolecitha flaticaudata Bilquees,
Feroze and Shaukat, 2004
Parasitic. Host: *Thryssa purava* (Fish)
(Bilquees *et al.*, 2004)



(After Bilquees *et al.*, 2004)

Hysterolecitha lintoni Srivastava, 1939
Parasitic. Host: *Plicofollis dussumieri*
(Fish)
(Srivastava, 1939)
Genus *Trifoliovarium* Yamaguti, 1940
Trifoliovarium triacanthi (Parukhin,
1964)
Parasitic. Host: *Triacanthus biaculeatus*
(Fish)
(Bilquees, 1973)



(After Bilqees, 1973)

Genus *Microvescicula* Bilqees, Khalil, Khan and Haseeb, 2009

Microvescicula otolithi Bilqees, Khalil, Khan and Haseeb, 2009

Parasitic. Host: *Otolithes ruber* (Fish) (Bilqees *et al.*, 2009)

Order Plagiorchiida La Rue, 1957

Suborder Xiphidiata Olson, Cribb, Tkach, Bray and Littlewood, 2003

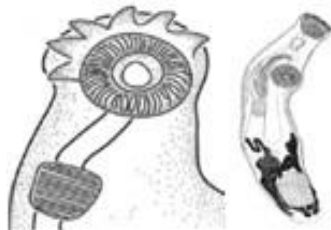
Family Haploporidae Nicoll, 1914

Genus *Waretrema* Srivastava, 1937

Waretrema piscicolum (Srivastava, 1939)

Parasitic. Hosts: *Ellochelon vaigiensis*, *Scatophagus argus* (Fish)

(Srivastava, 1939; undescribed member of *Capitimita* fide Pulis, 2014 thesis)



Habitus (after Bilqees, 1980); oral sucker

(After Srivastava, 1939)

Suborder Echinostomata La Rue, 1926

Family Rhytidodidae Odhner, 1926

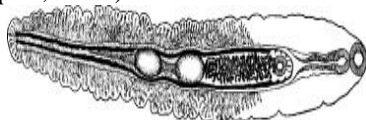
Genus *Rhytidodes* Looss, 1901

Rhytidodes gelatinosus (Rudolphi, 1819)

Parasitic. Host: *Chelonia mydas*

(Reptilia)

(Bilqees, 1974)



Family Echinostomatidae Looss, 1902

Genus *Pseudechinostomum* Odhner, 1902

Pseudechinostomum calidrii Farooq and Qamar, 1996

Parasitic. Host: *Calidris minutus* (Aves)

(Farooq and Qamar, 1996)

Genus *Echinochasmus* Dietz, 1909

Echinochasmus accipteri Bhutta, 1975

Parasitic. Host: *Tachybaptus ruficollis capensi* (Aves)

(Bhutta and Khan, 1975)

Genus *Stephanoprora* Odhner, 1902

Stephanoprora minutus Bhutta and Khan, 1975

Parasitic. Host (Aves)

(Bhutta and Khan, 1975)

Suborder Cyclocoelata La Rue, 1957

Family Cyclocoelidae Stossich, 1902

Genus *Uvitellina* Witenberg, 1926

Uvitellina indica Siddiqui and Jairajpuri, 1962

Parasitic. Host: *Vanellus indicus* (Aves) (Bilqees, 1980)

Genus *Wardianum* Witenberg, 1923

Wardianum triangulare (Harrah, 1922)

Parasitic. Host: *Calidris minutus* (Aves) (Farooq and Qamar, 1996)

Suborder Opisthorchiata La Rue, 1957

Family Cryptogonimidae Ward, 1917

Genus *Acanthostomum* Looss, 1899

Acanthostomum nigeri Zaidi and Khan, 1977

Parasitic. Host: *Parastromateus niger* (Fish)

(Zaidi and Khan, 1977as

Acanthostomum (*Orientoacanthostomum*) *nigeri*)



(After Zaidi and Khan, 1977)

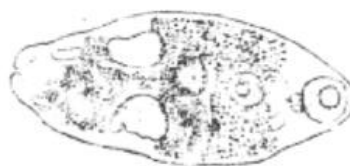
Genus *Mehrailla* Srivastava, 1939

Mehrailla ovocaudatus Srivastava, 1939

Parasitic. Hosts: *Stromateus cinereus*,

Pampus argenteus, *Lutjanus johnii* (Fish)

(Bilqees, 1981)



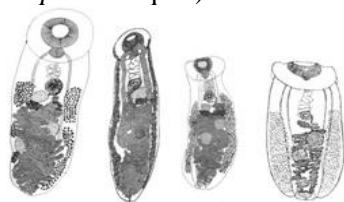
(After Bilqees, 1981)

Genus *Orientodiploproctodaem* Bhutta and Khan, 1970

Orientodiploproctodaem diacanthi

Bhutta and Khan, 1970

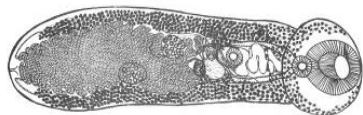
Parasitic. Hosts: *Pomadasys olivaceus*, *Protonibea diacanthus* (Fish) (Bhutta and Khan, 1970; Bilqees, 1973(abstract); Bilqees, 1974 as *Anterodiscus triuteri* Bilqees; Bilqees, 1974 as *Multiovarium heteroformis* Bilqees; Bilqees, 1974 as *Multiovarium interruptum* Bilqees)



(After Bhutta and Khan, 1970; Bilqees, 1974)

Orientodiploproctodaem biseminalis (Bilqees, 1974)

Parasitic. Host: *Pampusargenteus* (Fish) (Bilqees, 1974 as *Anterodiscus biseminalis* Bilqees)



(After Bilqees, 1974)

Suborder Bucephalata La Rue, 1926

Family Bucephalidae Poche, 1907

Genus *Macrorchirhynchus* Bilqees, Ibrahim, Aly Khan, Ajazuddin and Talat, 2010.

Macrorchirhynchus macrorchis Bilqees, Ibrahim, Aly Khan, Ajazuddin and Talat, 2010.

Parasitic. Host: *Psettodes erumei* (Fish) (Bilqees *et al.*, 2010)



(After Bilqees *et al.*, 2010)

Genus *Bucephalus* Baer, 1826

Bucephalus hexalobatus Bilqees, Khatoon and Haseeb, 2006

Parasitic. Host: *Pomadasys olivaceus* (Fish)

(Bilqees *et al.*, 2006)

Bucephalus margaritae Ozaki and Ishibashi, 1934

Parasitic. Host: *Sphyraena obtusata* (Fish)

(Bilqees, 1981 as *Bucephalus varicus* Manter, 1940)



(After Bilqees, 1981)

Bucephalus otolithi Shaukat, Bilqees and Heckman, 2009

Parasitic. Host: *Otolithes ruber* (Fish) (Shaukat *et al.*, 2009 abstract)

Bucephalus mujibi Shaukat, Bilqees and Heckman, 2009

Parasitic. Host: *Scomberomorus guttatus* (Fish)

(Shaukat *et al.*, 2009 abstract)

Genus *Alcicornis* McCallum, 1917

Alcicornis karachii Zaidi and Khan, 1977.

Parasitic. Host: *Grammoplites scabar* (Fish)

(Zaidi and Khan, 1977)



(After Zaidi and Khan, 1977)

Genus *Telorhynchus* Crowcroft, 1947

Telorhynchus scaberi Zaidi and Khan, 1977

Parasitic. Host: *Grammoplites scaber* (Fish)

(Zaidi and Khan, 1977)



Genus *Prosorhynchus* Odhner, 1905

Prosorhynchus erumenis Bilqees, 1976 2.6 x 0.5 mm.

Parasitic. Host: *Psettodes erumei* (Fish) (Bilqees, 1976)

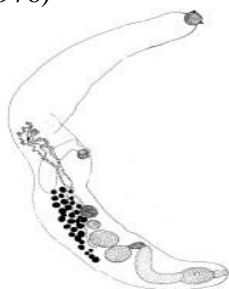


(After Bilqees, 1976)

Prosorhynchus magnacirrus Shaukat, Bilqees and Muti-ur-Rehman, 2008
Parasitic. Host: *Psettodes erumei* (Fish)
(Shaukat *et al.*, 2008)



(After Shaukat *et al.*, 2008)
Prosorhynchus longus Velasquez, 1959
3.8 x 0.4 mm.
Parasitic. Host: *Psettodes erumei* (Fish)
(Bilqees, 1976)



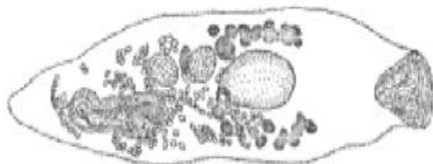
(After Bilqees, 1976)

Prosorhynchus platycephali (Yamaguti, 1934)
Parasitic. Host: *Grammoplites scaber* (Fish)
(Bilqees, 1980)



(After Bilqees, 1980)

Prosorhynchus thapari Manter, 1953
Parasitic. Host: *Plectorhynchus cinctus* (Fish)
(Bilqees, 1980)



(After Bilqees, 1980)

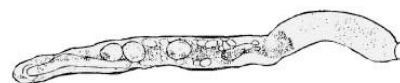
Genus *Neidhartia* Nagaty, 1937
Neidhartia longivesicula (Bilqees, Khalil, Khan, Perveen and Muti-ur-Rehman, 2009) Bray and Justine, 2013
Parasitic. Host: *Atule mate* (Fish)
(Bilqees *et al.*, 2009 as *Prosorhynchus longivesicula* Bilqees *et al.*)



(After Bilqees *et al.*, 2009)

Genus *Prosorhynchoides* Dolfus, 1929
Prosorhynchoides tenuis (Yamaguti, 1979)

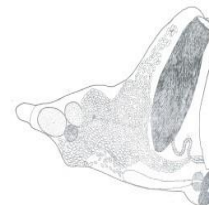
Parasitic. Host: *Sphyraena obtusata* (Fish)
(Bilqees, 1980 as *Bucephalopsis tenuis*)



(After Bilqees, 1980)

Suborder Haplospalchnata Olson, Cribb, Tkach, Bray and Littlewood, 2003

Family Haplospalchnidae Poche, 1926
Genus *Haplospalchnus* Looss, 1902
Haplospalchnus caudatus (Srivastava, 1937) Skrjabin and Guschanskaja, 1954.
Parasitic. Hosts: *Rachycentron canadum*, *Protonibea diacanthus* (Fish)
(Jahan, 1973 as *Laruea straightum* Jahan and as *Laurea caudatum* Jahan)

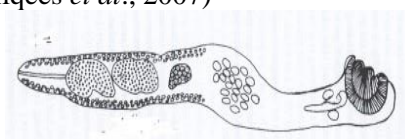


(After Jahan, 1973)

Sub Order Allocreadiata Skrjabin, Petrow, Koval, 1958

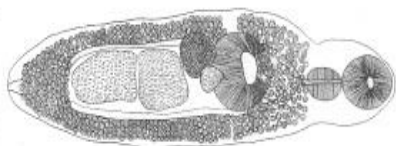
Family Allocreadidae (Looss 1902)
Genus *Rastridostomum* Bilqees, Khatoon, Bibi and Muti-ur-Rehman, 2007

Rastridostomum kanagurtae Bilqees, Khatoon, Bibi and Muti-ur-Rehman, 2007
Parasitic. Host: *Rastrelliger kanagurta* (Fish)
(Bilqees *et al.*, 2007)



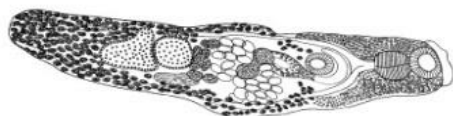
(After Bilqees *et al.*, 2007)

Family Apocreadiidae Skrjabin, 1942)
 Genus *Neopocreadium* Siddiqi and
 Cable, 1960
Neopocreadium caranxi (Bilqees, 1976)
 Parasitic. Host: *Atule mate* (Fish)
 (Bilqees, 1976 as *Crassicutis caranxi*)



(After Bilqees, 1976)
 Suborder Lepocreadiata Olson, Cribb,
 Tkach, Bray and Littlewood, 2003

Family Lepocreadiidae (Odhner, 1905)
 Nicoll, 1935
 Genus *Bianium* Stunkard, 1930
Bianium plicatum (Linton, 1928)
 Stunkard, 1931
 Parasitic. Host: *Lagocephalus inermis*
 (Fish)
 (Bilqees, 1974)



(After Bilqees, 1974)

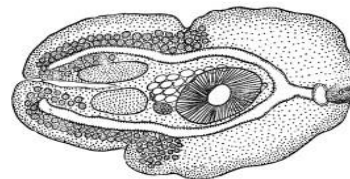
Bianium magnavesicula Bilqees, 2010
 Parasitic. Host: *Lagocephalus lunaris*
 (Fish)
 (Bilqees, 2010 abstract)
 Genus *Lepocreadioides* Yamaguti, 1936
Lepocreadioides orientalis Bray, 1998
 Parasitic. Host: *Cynoglossus bilineatus*,
Grammoplites scaber (Fish)
 (Srivastava, 1941 as *Lepocreadioides*
indicus; Bilqees, 1973 as *Bicaudum*
interruptum Bilqees)



(After Bilqees, 1980)

Lepocreadioides otolithi (Bilqees, 1971)
 Parasitic. Host: *Otolithes ruber* (Fish)

(Bilqees, 1971 as *Bicaudum otolithi*
 Bilqees)



(After Bilqees, 1971)

Genus *Neodiploproctodaeum* Bilqees,
 Khalil, Khan and Haseeb, 2012
Neodiploproctodaeum karachiensis
 Bilqees, Khalil, Khan and Haseeb, 2012
 Parasitic. Host: *Lagocephalus lunaris*
 (Fish)
 (Bilqees *et al.*, 2012)



(After Bilqees *et al.*, 2012)

Genus *Thynotrema* Bilqees, Khatoon and
 Muti-ur Rehman, 2007 taxon inquirendum
Thynotrema elongatum Bilqees, Khatoon
 and Muti-ur-Rehman, 2007.
 Parasitic. Host: *Euthynnus affinis* (Fish)
 (Bilqees *et al.*, 2007. Originally erected as
 a member of the Spirorchiidae, an error
 fide WoRMS)
Thynotrema thynotrema Bilqees,
 Khatoon and Mutiur-Rehman, 2007.
 (Taxon inquirendum)
 Parasitic. Host: *Euthynnus affinis* (Fish)
 (Bilqees *et al.*, 2007. Originally erected as
 a member of the Spirorchiidae, an error
 fide WoRMS)

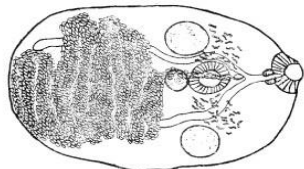
Family Aephaniogenidae Yamaguti, 1934
 Genus *Aephaniogenes* Nicoll, 1915
Aephaniogenes senegalensis Dollfus
 and Capron, 1958
 Parasitic. Host: *Crenidens crenidens*
 (Fish)
 (Bilqees, 1980)



(After Bilqees, 1980)
 Sub Order Opecoelata Odening, 1960

Family Callodistomidae Odhner, 1910

Genus *Callodistomum* Poch, 1926
Callodistomum minutus Zaidi and Khan, 1977
 Parasitic. Host: *Lates calcarifer* (Fish)
 (Zaidi and Khan, 1977)



(After Zaidi and Khan, 1977)

Family Gorgoderidae Looss, 1901
 Genus *Anaporrhutum* Offeenheim, 1900
Anaporrhutum torpedoensis Khan and Begum, 1991
 Parasitic. Host: *Torpedo sinuspersici* (Fish)
 (Khan and Begum, 1991)



(After Khan and Begum, 1991)

Family Fellodistomidae Nicoll, 1909
 Genus *Benthotrema* Manter, 1934
Benthotrema hilsii Zaidi and Khan, 1977
 Parasitic. Host: *Tenualosa ilisha* (Fish)
 (Zaidi and Khan, 1977)
 Genus *Monodharmis* Dolfuss 1937
Monodharmis torpedinis Dollfus, 1937
 Parasitic. Host: *Netuma thalassina* (Fish)
 (Bilqees, 1980)
Monodharmis elongates Bilqees, 1970
 species inquirenda
 Parasitic. Host: *Erethistes elongata* (Fish)
 (Bilqees, 1970)
 Genus *Lintonium* Stunkard and Nigrelli, 1930
Lintonium isorchis (Bilqees, 1972)
 Parasitic. Host: *Lagocephalus lunaris* (Fish)
 (Bilqees, 1972 as *Paradiplobulbus isorchis*)



(After Bilqees, 1972)

Lintonium heterorchis (Bilqees, 1972)
 Parasitic. Host: *Lagocephalus lunaris* (Fish)
 (Bilqees, 1972 as *Paradiplobulbus heterorchis* Bilqees, 1972)



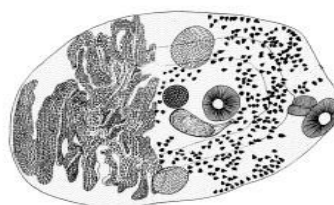
(After Bilqees, 1972)

Genus *Theledera* Linton, 1910
Theledera karachiensis (Bilqees, 1978)
 Parasites. Host: *Parastromateus sinensis* (Fish)
 (Bilqees, 1978 as *Tergestia karachiense* Bilqees)



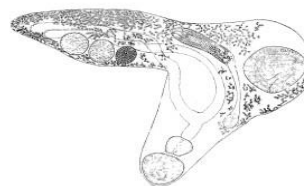
(After Bilqees, 1978)

Genus *Pseudohypertrema* Bilqees, 1976
Pseudohypertrema karachiense Bilqees 1976
 Parasitic. Hosts: *Pomadasyss olivaceus*; *Lates calcarifer* (Fish)
 (Bilqees 1976 b sp. inq)



(After Bilqees 1976)

Genus *Complexobursa* Oshmarin and Mamaev, 1963
Complexobursa magna Bilqees, 1980
 Parasitic. Host: *Lates calcarifer* (Fish)
 (Bilqees, 1980)



(After Bilqees, 1980)

Genus *Paradiscogaster* Yamaguti, 1934
Paradiscogaster niger Bilqees, 1976

Parasitic. Host: *Parastromateus niger*
(Fish)
(Bilqees, 1976)



(After Bilqees, 1976)

Genus *Proctoeces* Odhner, 1911

Proctoeces sp.

Parasitic. Hosts: *Ostrea nomads*,
Saccostrea cucullata (Mollusca)
(Afsar *et al.*, 2014)

Genus *Monascus* Looss, 1907

Monascus filiformis (Rudolph, 1819)

Parasitic. Host: *Atule mate* (Fish)
(Bilqees, 1973 as *Karachitrema trilobata*
Bilqees. Ref. to change Bray and Gibson,
1980)



(After Bilqees, 1973)

Genus *Buckleytrema* Gupta, 1956

Buckleytrema indicum Gupta, 1956

Parasitic. Host: *Netuma thalassina* (Fish)
(Bilqees, 1980 as *Buckleytrema*
postacetabulorchis)

Family Opecoelidae Ozaki, 1925

Genus *Maculifer* Nicoll, 1915

Maculifer indicus (Gupta, 1968)

Parasitic. Host: *Lagocephalus lunaris*
(Fish)

(Bilqees, 1972 as *Diplobulbus vitellosus*
Bilqees; as *Alloheterolebes indicus*
(Gupta) Hafeezullah)



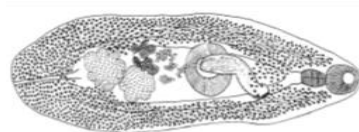
(After Bilqees, 1972)

Genus *Hamacreadium* Linton, 1910

Hamacreadium phyllorchis (Bilqees,
1976)

Parasitic., Host: *Pomadasys olivaceus*
(Fish)

(Bilqees, 1976 as *Olivacreadium*
phyllorchis Bilqees)



(After Bilqees, 1976)

Hamacreadium heterorchis (Bilqees,
1976)

Parasitic. Hosts: *Lutjanus johnii*; *Johnius*
dussumieri (Fish)

(Bilqees, 1976 as *Olivacreadium*
heterorchis Bilqees, 1976).



(After Bilqees, 1976)

Hamacreadium karachiensis Bilqees and
Masood, 1975

Parasitic. Host: *Rastrelliger kanagurta*
(Fish)

(Bilqees and Masood, 1975)



(After Bilqees and Masood, 1975)

Genus *Prodistomum* Linton, 1910

Prodistomum waltairense (Madhavi,
1972) Bray and Gibson, 1990

Parasitic. Host: *Rastrelliger kanagurta*
(Fish)

(Bilqees and Masood, 1975 as
Hamacreadium rastrellii Bilqees and
Masood)



(After Bilqees and Masood, 1975)

Genus *Allopodocotyle* Pritchard, 1966

Allopodocotyle korangiai Bilqees, 1972

Parasitic. Host: *Muraenesox cinereus*
(Fish)

(Bilqees, 1972 as *Acanthocolpus korangiai* (Bilqees)



(After Bilqees, 1972)

Genus *Podocotyloides* Yamaguti, 1934
Podocotyloides trichiurii Bilqees, 1972
nomen dubium

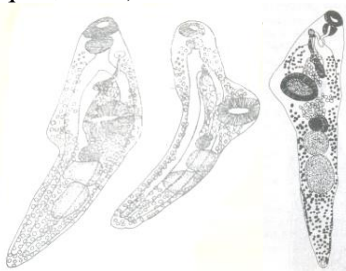
Parasitic. Host: *Lepturacanthus savala* (Fish)

(Bilqees, 1972)

Podocotyloides sindensis Bilqees, 1971
nomen dubium

Parasitic. Hosts: *Cynoglossus sindensis* /
Cynoglossus bilineatus (Fish)

(Bilqees, 1971)



(After Bilqees, 1971, 1990)

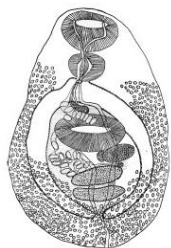
Genus *Caudotestis* Issaitschikov, 1928

Caudotestis mujibi (Bilqees, 1972)

Parasitic. Host: *Crenidens indicus* (Fish)

(Bilqees, 1972 as *Plagioporus*

(*Caudotestis*) *mujibi*)



(After Bilqees, 1972)

Genus *Plagioporus* Stafford, 1904

Plagioporus heterorchis Bilqees, 1977

Parasitic. Host: *Pomadasys olivaceus* (Fish)

(Bilqees, 1977)

Plagioporus (*Caudotestis*) *mujibi*

Bilqees, 1972 taxon inquirendum

Parasitic. Host: *Crenidens indicus* (Fish)

(Bilqees, 1972)

Plagioporus karachiensis Shaukat, 2008

Parasitic. Host: *Atule mate* (Fish)

Genus *Pseudoplagioporus* Yamaguti, 1938

Pseudoplagioporus interruptus Durio and Manter, 1968

Parasitic. Host: *Crenidens indicus* (Fish)

(Bilqees, 1981)

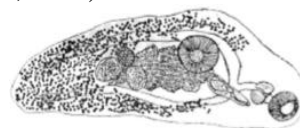


(After Bilqees, 1981)

Pseudoplagioporus lethrini Yamaguti, 1938

Parasitic. Host: *Crenidens indicus* (Fish)

(Bilqees, 1981)



(After Bilqees, 1981)

Genus *Helicometrina* Linton, 1910

Helicometrina nimia Linton, 1910

Parasitic. Hosts: *Pampus argenteus*,

Epinephelus diacanthus, *Lactarius*

lactarius, *Johnius dussumieri*, *Diodon*

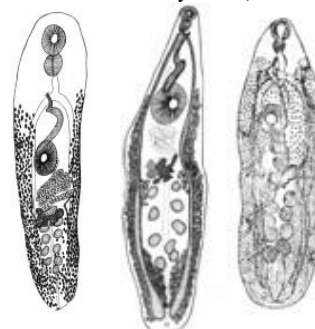
hystrix, *Stromateus cinereus* (Fish)

(Bilqees, 1972 as *Helicometrina*

karachiensis, *Helicometrina delicatulus*;

Bhutta and Khan, 1975; Bilqees, 1976 as

Helicometrina chilomycteri)



(After Bilqees, 1972; 1976)

Helicometrina otolithi Bilqees, 1972

Parasitic. Host: *Otolithes ruber* (Fish)

(Bilqees, 1972)



(After Bilqees, 1972)

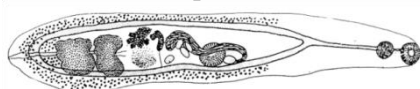
Helicometrina plectorhynchii Jahan, 1973
Parasitic. Host: *Plectorhinchus* sp. (Fish)
(Jahan, 1973)



(After Jahan, 1973)

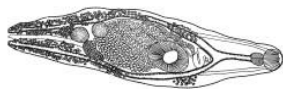
Helicometrina sp.
Parasitic. Host: *Epinephelus chlorostigma* (Fish)
(Present study)
Genus *Coitocaecum* Nicoll, 1915
Bilqees, 1972

Coitocaecum thrissoclesis (Bilqees, 1972)
Parasitic. Host: *Thryssa purava* (Fish)
(Bilqees, 1972 as *Pseudocoitocaecum thrissoclesis* Bilqees)



(After Bilqees, 1972)

Genus *Notoporus* Yamaguti, 1938
Notoporus hystrix Bilqees, 1972 taxon inquirendum
Parasitic. Host: *Diodon hystrix* (Fish)
(Bilqees, 1972)



(After Bilqees, 1972)

Notoporus pristipomatis (Srivastava, 1942) Ahmad, 1985
Parasitic. Host: *Pomadasys pommersonnii* (Fish)
(Srivastava, 1942 as *Horatrema pristipomatis*)
Genus *Neonotoporus* Srivastava, 1942
Neonotoporus leiognathi (Hafeezullah, 1971) Ahmad, 1985.
Parasitic. Host (Fish)
(Srivastava, 1942)
Genus *Opegaster* Ozaki, 1928

Opegaster alykhani Bilqees, Hadi, Khatoon, Muti-ur-Rehman, Perveen and Haseeb, 2009
Parasitic. Host: *Lutjanus argentimaculatus* (Fish)
(Bilqees *et al.*, 2009. Incertae sedis fide Bray and Justine, 2013)



(After Bilqees *et al.*, 2009)

Genus *Parapolylekithum* Bilqees, Ghazi, Aly Khan and Khatoon, 2004
Parapolylekithum karachiensis Bilqees, Ghazi, Aly Khan and Khatoon, 2004
Parasitic. Host: *Scomberomorus guttatus* (Fish)
(Bilqees *et al.*, 2004)



(After Bilqees *et al.*, 2004)

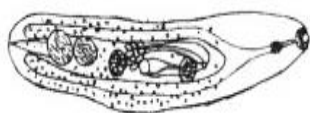
Genus *Decemtestis* Yamaguti, 1934
Decemtestis johnii Shaukat and Bilqees, 2012
Parasitic. Host: *Lutjanus johnii* (Fish)
(Shaukat and Bilqees, 2012)



Female (After Shaukat and Bilqees, 2012)
Genus *Thynstenopera* Bilqees and Khatoon, 2004
Thynstenopera lobata Bilqees and Khatoon, 2004
Parasitic. Host: *Euthynnus affinis* (Fish)
(Bilqees and Khatoon, 2004a)



(After Bilqees and Khatoon, 2004)
Family *Lepidapedidae* Yamaguti, 1958
Genus *Lepidapedon* Stafford, 1904
Lepidapedon elongatum (Labour, 1908); Nicoll, 1915
Parasitic. Hosts: *Pampus argenteus*, *Stromateus cinereus* (Fish)
(Bilqees, 1980)



(After Bilqees, 1980)

Lepidapedon genge Yamaguti, 1938
Parasitic. Hosts: *Terapon jarbua*,
Parastromateus niger (Fish)
(Bilqees, 1980)



(After Bilqees, 1980)

Lepidapedon coelorhynchi Yamaguti,
1938
Parasitic. Host: *Pampus argenteus* (Fish)
(Bilqees, 1980)
Genus *Lepidapedoides* Yamaguti, 1970
Lepidapedoides nelson (Gupta and
Mehrotra, 1969) Bray, 1985
Parasitic. Host: *Parastromateus niger*
(Fish)
(Bilqees, 1976 as *Lepidapedon*
parastromatei Bilqees, 1976)



(After Bilqees, 1976)

Family Monorchiidae Odhner, 1911
Genus *Diplomonorchis* Hopkins, 1941
Diplomonorchis rafiae Ibrahim, Aly
Khan, Khatoon, Waheed and Noor-un-
Nisa, 2022

Parasitic: Host *Ellochelon vaigiensis*
(Fish)

(Ibrahim et al., 2022)

Genus *Opisthomonorcheides* Parukhin,
1966

Opisthomonorcheides biovarium
(Bilqees, 1971)

Parasitic. Host: *Pampus* sp. (Fish)
(Bilqees, 1971 as *Tritesticulum biovarium*
Bilqees)

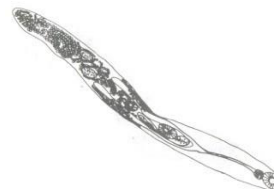


(After Bilqees, 1971)

Genus *Pseudohurleytrema* Yamaguti,
1954

Pseudohurleytrema magnum Kaikabad
and Bilqees in Bilqees, 1991

Parasitic. Host: Fish of unknown Identity
(Kaikabad et al., 1991)



(After Bilqees, 1990)

Genus *Diacanthomonorchis* Bilqees,
Khatoon, Ghazi and Aly Khan, 2004

Diacanthomonorchis karachiensis
Bilqees, Khatoon, Ghazi and Aly Khan,
2004.

Parasitic. Host: *Protonibea diacanthus*
(Fish)

(Bilqees et al., 2004)

Family Enenteridae Yamaguti, 1958

Genus *Enenterum* Linton, 1910

Enenterum theraponii Zaidi and Khan,
1977

Parasitic. Host: *Terapon jarbua* (Fish)
(Zaidi and Khan 1977)



(After Zaidi and Khan 1977)

Genus *Neoenenterum* Bilqees and
Khatoon, 2004

Neoenenterum minutum Bilqees and
Khatoon, 2004

Parasitic. Host: *Euthynnus affinis* (Fish)
(Bilqees and Khatoon, 2004)



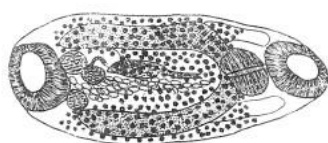
(After Bilqees and Khatoon, 2004)

Family Opistholebetidae Fakui, 1929

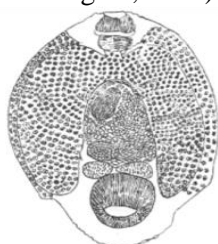
Genus *Opistholebes* Nicoll, 1915

Opistholebes equicotylus Bilqees and
Nighat, 1982

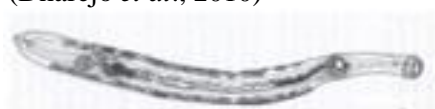
Parasitic. Host: *Diodon hystrix* (Fish)
(Bilqees and Nighat, 1982)



Female (After Bilqees and Nighat, 1982)
Opistholebes diodontis Cable, 1956
 Parasitic. Host: *Diodon hystrix* (Fish)
 (Bilqees and Nighat, 1982)



Female (After Bilqees and Nighat, 1982)
 Family Opisthorchiidae Looss, 1899
 Genus *Nigierina* Baugh, 1958
Nigierina hardoiensis Baugh, 1958
 Parasitic. Host: *Phalacrocorax niger*
 (Aves)
 (Dharejo *et al.*, 2010)



(After Dharejo *et al.*, 2010)
 Genus *Astiotrema* Looss, 1900
Astiotrema karachiense (Bilqees,
 Khatoon and Khan, 2002) Karar, Blend,
 Dronen and Adel, 2021
 Parasitic. Host: *Chelonia mydas* (Reptilia)
 (Bilqees *et al.*, 2002 as *Astioglossimetra*
karachiensis Bilqees, Khatoon and Kha)



(After Bilqees *et al.*, 2002)
 Family Plagiorchiidae Lühe, 1901
 Genus *Glossimetra* Mehra, 1937
Glossimetra lobata Shaikh, Shaikh and
 Bilqees, 2000
 Parasitic. Host: *Chelonia mydas*
 (Reptilia)
 (Shaikh *et al.*, 2000)



(After Shaikh *et al.*, 2000)
 Suborder Pronocephalata Olson, Cribb,
 Tkach, Bray and Littlewood, 2003
 Family Pronocephalidae Looss, 1899
 Genus *Metacetabulum* Teixeira de Freitas
 and Lent, 1938
Metacetabulum karachiense Bilqees,
 1973
 Parasitic. Host: *Chelonia mydas*
 (Reptilia)
 (Bilqees, 1973)

Family Acanthocolpidae Lühe, 1906
 Genus *Pleorchis* Railliet, 1896
Pleorchis heterorchis Shaukat and
 Bilqees, 2006
 Parasitic. Hosts: *Lutjanus johni*, *Otolithes*
ruber, *Johnius dussumieri* (Fish)
 (Shaukat and Bilqees, 2006)



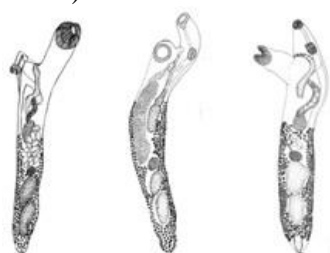
(After Shaukat and Bilqees, 2006)
Pleorchis otolithi Shaukat and Bilqees,
 2006
 Parasitic. Hosts: *Lutjunus johnii*;
Otolithus ruber (Fish)
 (Shaukat and Bilqees, 2006a)
Pleorchis sciaenae Yamaguti, 1938
 Parasitic. Hosts: *Protonibeia diacanthus*
 and other spp. (Fish)
 (Bilqees, 1977 as *Pleorchis ghanensis*
 Fischthal *et* Thomas)



(After Bilqees, 1977)
Pleorchis karachiensis Bilqees, Shabbir,
 Khalil, Khan and Perveen, 2010
 Parasitic. Host: *Johnius dussumieri* (Fish)
 (Bilqees *et al.*, 2010)



Female (After Bilqees *et al.*, 2010)
 Genus *Acanthocolpus* Luhe, 1906
Acanthocolpus liodorus Lühe, 1906
 Parasitic. Hosts: *Chirocentrus dorab*,
Lepturocanthus savala (Fish)
 (Bilqees, 1972 as *Podocotyloides dorabii*
 Bilqees; Bilqees, 1972 as *Allopodocotyle*
trichiurii; Bilqees and Khatoon, 2004 as
Podocotyloides pakistanicus, Bilqees and
 Khatoon, 2004 as *Pedunculotrema*
pakistanicum Bilqees and Khatoon
 Bilqees and Khatoon, 2004 as *Podocotyle*
pakistanicus)



(After Bilqees, 1972; Bilqees and
 Khatoon, 2004)

Acanthocolpus elongatus Bhutta and
 Khan, 1975
 Parasitic. Host: Ribbonfish
 (Bhutta and Khan, 1975)



(After Bhutta and Khan, 1975)

Acanthocolpus indicus Srivastava, 1939
 Parasitic. Hosts: *Alepes djedaba*,
Lepturocanthus savala, *Johnius glauca*
 (Fish)

(Srivastava, 1939)

Genus *Tormopsolus* Poche, 1926

Tormopsolus longisaccus Bhutta and
 Khan, 1975

Parasitic., Host: *Pampus argenteus* (Fish)
 (Bhutta and Khan, 1975)



(After Bhutta and Khan, 1975)

Tormopsolus filiformis Sogandares-
 Bernal and Hutton, 1958

Parasitic. Host: *Scomberomorus* sp. (Fish)
 (Bilqees, 1972 as *Tormopsolus*
spatulatum Bilqees)



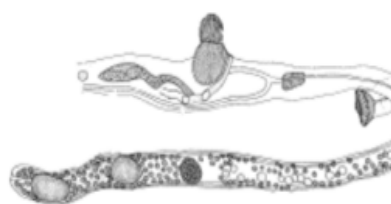
(Anterior and posterior parts after Bilqees,
 1972)

Genus *Stephanostomum* Looss, 1899

Stephanostomum dicotylus Bilqees, 1972

Parasitic. Host: *Scomberomorus guttatus*
 (Fish)

(Bilqees, 1972)



Anterior and posterior end (After Bilqees,
 1972)

Stephanostomum ditrematis (Yamaguti,
 1939) Manter, 1947

Parasitic. Host: *Protonibea diacanthus*
 (Fish)

(Bilqees, 1980)



(After Bilqees, 1980)

Stephanostomum gibsoni Shaukat and
 Bilqees, 2007

Parasitic. Host: *Pomadasys olivaceus*
 (Fish)

(Shaukat and Bilqees, 2007)



(After Shaukat and Bilqees, 2007)

Stephanostomum olivaceum Shaukat and
 Bilqees, 2007

Parasitic. Host: *Pomadasys olivaceus*
 (Fish)

(Shaukat and Bilqees, 2007)

Genus *Pseudacaenodera* Yamaguti, 1965

Pseudacaenodera karachiensis Bilqees
 and Malik, 1980 6.8 x 0.64 mm.

Parasitic. Host: *Pomadasys* sp. (Fish)

(Bilqees and Malik, 1980)



(After Bilqees and Malik, 1980)

Genus *Pseudolepidapedon* Yamaguti, 1938

Pseudolepidapedon lethrini Yamaguti, 1952

Parasitic. Host: *Leptomelanosoma indicum* (Fish)

(Zaidi and Khan, 1977).



(After Zaidi and Khan, 1977)

Genus *Stephanostomoides* Mamaev and Oshmarin, 1966

Stephanostomoides diacanthi Bilqees and Nighat, 1986 taxon inquirendum

Parasitic. Host: *Protonibea diacanthus* (Fish)

(Bilqees and Nighat, 1986; Bilqees *et al.*, 2000; Ali, 2000, invalid re-erection of name as '*sp. n.*')



(After Bilqees *et al.*, 2000)

Suborder Zoogonata Odening, 1961

Family Zoogonidae Stossich, 1904

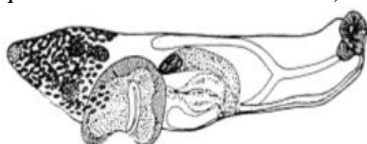
Genus *Diphtherostomum* Stossich, 1903

Diphtherostomum karachiensis (Bilqees, Shaukat and Haseeb, 2003)

Parasitic. Host: *Protonibea diacanthus* (Fish)

(Bilqees *et al.*, 2003 as

Neodiphtherostomum karachiensis)



(After Bilqees *et al.*, 2003)

Suborder Monorchiata Olson, Cribb, Tkach, Bray and Littlewood, 2003

Family Monorchiidae Odhner, 1911

Genus *Proctotrematoides* Yamaguti, 1938

Proctotrematoides diacanthi Zaidi and Khan, 1977

Parasitic. Host: *Epinephelus diacanthus* (Fish)

(Zaidi and Khan, 1977)



(After Zaidi and Khan, 1977)

Genus *Monorchis* (Monticelli, 1893) Looss, 1902

Monorchis heterorchis Bilqees, 1979

Parasitic. Host: *Muraenesox cinereus* (Fish)

(Bilqees, 1979)



(After Bilqees, 1979)

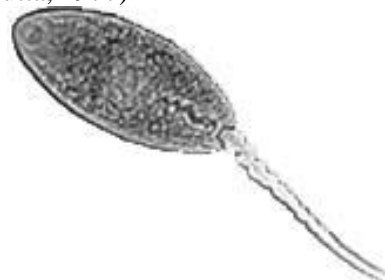
Family Gymnophallidae Odhner, 1905

Genus *Cercaria* Müller, 1773

Cercaria pravicaudata Stunkard and Shaw, 1931

Parasitic. Host: *Littorina saxatilis* (Mollusca)

(Bhutta, 1977)



Order Diplostomida Olson, Cribb, Tkach, Bray and Littlewood, 2003

Family Clinostomidae Luehe, 1901

Genus *Clinostomum* Leidy, 1856

Clinostomum complanatum (Rud., 1814) Braun, 1899

Parasitic. Host: *Microcarbo niger* (Aves) (Abro *et al.*, 2016)

Family Spirorchiidae Stunkard, 1921
 Genus *Monticellius* Mehra, 1939
Monticellius indicus Mehra, 1939
 Parasitic. Host: *Chelonia myda* (Reptilia)
 (Mehra, 1939)



(After Mehra, 1939)

Metacercarial cysts of undetermined species

Parasitic. Host, intermediate: *Uca lactea*
 (Crustacea)
 (Ahmed and Khan, 1976)

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Chapter 7

Phylum Annelida

The phylum Annelida embraces about 13,000 species. All of the annelid classes: Clitellata, Polychaeta, Oligochaeta and Gephyrea, Hirudinea and one Superclass Annelida *incertae sedis* (temporary name) are found in the oceans, in freshwaters and on land. The species have adapted to various ecologies—those living in marine environments as distinct as tidal zones and hydrothermal vents.

The order Sipuncula or Sipunculida (common name peanut worms) recently added to Annelida is a group containing 144–320 species (estimates vary) of bilaterally symmetrical, unsegmented marine worms, 5-10 cm long. When contracted, their ridged skins looks like the texture of peanut shells. Most are only a few millimeters long. Some burrow in mud, while others hide in crevices or abandoned snail shells and even in tubeworm tubes. What is unique to peanut worms is their introvert, a long tube on their front end. The Order Echiurida is also now an order of Polychaete annelids.

Phylum Annelida Lamarck, 1809
Class Clitellata Michaelsen, 1919
Subclass Hirudinea Lamarck, 1818
Infraclass Euhirudinea Lukin, 1956
Order Rhynchobdellida Blanchard, 1894

Family Ozobanchidae Pinto, 1921
Subfamily Ozobanchinae Pinto, 1921
Genus *Ozobanchus* De Quatrefages, 1852

Ozobanchus jantseanus Oka, 1912
Parasitic. Host: *Himantura bleekeri* (Fish).
(Moazzam, unpublished)

Family Piscifcolidae Johnston, 1865
Subfamily Pontobdellinae Llewellyn, 1966
Genus *Pontobdella* Leach, 1815
Pontobdella muricata Linnaeus, 1758
30mm.
Parasitic. Host: *Carcharhinus melanopterus* (Fish)
(Moazzam, unpublished)
Genus *Stibarobdella* Leigh-Sharpe, 1925
Stibarobdella macrothela Schmarda, 1861.

Parasitic. Host: *Galeocerdo cuvier* (Fish)
(Moazzam, unpublished).
Sub class Oligochaeta Grube, 1850
Order Haplotaxida Brinkhurst, 1971

? Family Naididae Ehrenberg, 1828
Interstitial
(Present study)



Class Polychaeta Grub, 1850
Sub class Echiura Margulis, and Schwartz, 1998
Order Echiurida Bock, 1942

Family Echiuridae de Blainville, 1827
Genus *Ochetostoma* Leuckart and Ruppell, 1828
Ochetostoma bombayensis (Prashad and Awati, 1929).
Sandy burrows or crevices in rocks and corals.
(Kazmi, 1993 as *Ochetostoma* sp.).



Ochetostoma formosulum (Lampert, 1883)
Lower intertidal zone
(Published in NMNH occurrence DwC-A)



Genus *Listriolobus* Fischer, 1926 [not Spengel, 1912]
Listriolobus brevis Chen and Yeh, 1958 60 mm with proboscis fully extended, pinkish-brown
Lower intertidal zone
(Present study)



Subclass Errantia Affudouin and H Milne Edwards, 1832
Order Eunicida Read, 2010

Family Dorvilleidae Chamberlin, 1919
Genus *Dorvillea* Parfitt, 1866
Dorvillea gardineri (Crossland, 1924)
Intertidal zone at rocky shore
(Khan *et al.*, 2019)



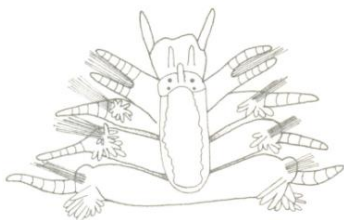
(After Khan *et al.*, 2019)

Genus *Schistomeringos* Jumars, 1974,
Schistomeringos japonica (Annenkova, 1937)
Settlement panels deployed at harbour
(Khatoon *et al.*, 2020)



(After Khatoon *et al.*, 2020)

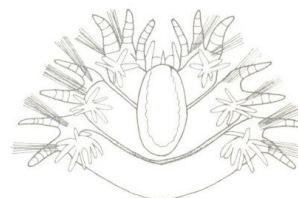
Family Amphinomidae Savigny in Lamarck, 1818
Genus *Eurythoe* Kinberg, 1857
Eurythoe complanata (Pallas, 1766).
120-140mm. greyish white
Under rocks on coastal platforms or dead coral on sandy reef flats
(Bindra, 1927 as *Eurythoe indica*,
Eurythoe macrotricha)



Head (After Siddiqui, 1983)

Eurythoe karachiensis Bindra, 1927
Under rocks on coastal platforms or dead coral on sandy reef flats

(Bindra, 1927)
Eurythoe matthai Bindra, 1927. 65-110x5-8mm.
Under stones in rock pools, among decaying vegetation
(Bindra, 1927)



Head (After Siddiqui, 1983)

Genus *Hermodice* Kingberg, 1857
Hermodice smaragdina (Schmarda, 1861) 33mm. light yellow.
Under rocks in tide pools associated with algae
(Bindra, 1927 as *Eurythoe smaragdina*)

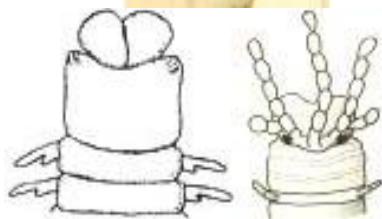


(After Farooque, 1971 unpublished thesis)

Genus *Linopherus* Quaterfages, 1805
Linopherus sp.
Oxygen minimum zone 800-1000 m.
(Murty *et al.*, 2009)
Linopherus sp. nov.
Oxygen minimum zone
(Jefferys *et al.*, 2012)

Family Eunicidae Berthold, 1827
Genus *Leodice* Lamarck, 1818
Leodice antennata Savigny in Lamarck, 1818 12-24mm. reddish
Rocky region of intertidal zone
(Aziz, 1938 as *Eunice antennata* (Savigny))





Head

Genus *Eunice* Cuvier, 1817
Eunice australis Quatrefages, 1866
 60mm.
 Rocky area of the beach
 (Aziz, 1938)



Eunice manorae Aziz, 1938
 Intertidal, rocky
 (Aziz, 1938)
 Genus *Lysidice* Lamarck, 1818
Lysidice collaris Grube, 1870 29-67mm. Anterior part dark orange, posterior part light orange.
 Rocky area, sea grass, intertidal, estuarine
 (Aziz, 1938; Mustaquim, 2000)



Lysidice natalensis Kinberg, 1865 30-80mm
 Rock crevices, corals, from under rocks in rock pools, from muddy sand., (Mustaquim, 2000; Identity of the species in Pakistan doubtful, cf. Simon *et al.*, 2021)
 Genus *Marphysa* Quatrefages, 1865
Marphysa corallina (Kinberg, 1865) 85-190 mm. brownish

Crevices of stones in rocky ledges, in mucus-sand tubes in algal mats inundated with sand, intertidal rocky shores
 (Aziz, 1938)

Marphysa depressa (Schmarda, 1861)
 28-36mm.
 Rock crevices, intertidal
 (Mustaquim, 2000)



Anterior region (After Mustaquim, 2000)



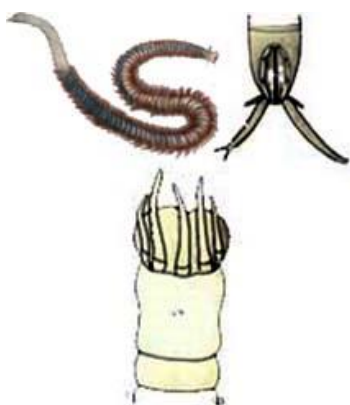
Head

Marphysa macintoshi Crossland, 1903
 200-300mm.
 Crevices of stones, sandy mud
 (Aziz, 1938)



Anterior end (After Day, 1967)

Marphysa sanguinea (Montagu, 1815)
 190-280 mm. Yellowish orange, brownish red or pinkish grey, strongly iridescent; gills bright red
 In fine sand, mud and mixtures of both, clay, under stones, in crevices of rocks, on wooden pilings, in oyster beds, in sponges, in empty worm tubes, from the intertidal zone to a depth of about 200 m., lives in well-defined burrows lined with mucus, mud and sand, may also form long galleries in fissures of rocks
 (Aziz, 1938)



Habitus, anterior and posterior ends

Marphysa mossambica (Peters, 1855)

5cm.

Subtidal, sandy muddy

(Aziz, 1938; Mushtaq and Mustaqum, 2006 as *Nauphanta novaehollandiae*; Ref to change: Glasby and Huchings, 2010)

Genus *Palola* Gray, 1847

Palola valida (Gravier, 1900)

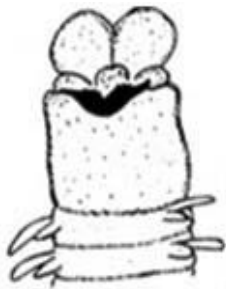
Intertidal, among rocks and algae

(Mushtaq and Mustaqum, 2006)

Palola siciliensis (Grube, 1840) 102 mm. yellow.

Rocky region, intertidal, associated with rock borer bivalves

(Aziz, 1938 as *Eunice siciliensis* Grube)



Family Lumbrineridae Schmarda, 1861

Subfamily Lumbrinerinae Malgrem, 1867

Genus *Lumbrineris* Blainville, 1828

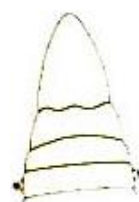
Lumbrineris crosslandi Perkins, 1979

Intertidal, low tide

(Mushtaq and Mustaqum, 2006)

Lumbrineris latreilli Audouin and Milne-Edwards, 1834 50-150mm. Pale pink, orange or brown, iridescent

Sandy mud, mud, shell fragments, gravel, and mixtures of these, coralligene, under stones, amongst algae and sea grass associates with sea urchin, from the intertidal zone to a depth of about 4800 m. (Mushtaq and Mustaqum, 2006)



Head (After Mushtaq and Mustaqum, 2006)

Lumbrineris mustaqumi Carrera-Parra, 2006 3.3mm.

Intertidal sandy shore

(Carrera-Parra, 2006)

Genus *Kuwaita* Muhammad, 1973

Kuwaita heteropoda (Marenzeller, 1879)

150-300mm.

Found in a mixture of sand and mud

(Aziz, 1938 under family Eunicidae as

Lumbrineris heteropoda Marenzeller)

Kuwaita papillifera (Fauvel, 1929)

Sandy region

(Mushtaq and Mustaqum, 2006 as

Lumbrineris papillifera Fauvel)

Genus *Scoletoma* Blainville, 1828

Scoletoma laurentiana (Grube, 1863)

Benthic; brackish; depth range 1 - 1000 m

(Hasan, 1960 as *Lumbrineris impatientis*)



Habitus, anterior region, late phase of development

Family Oeonidae Kinberg, 1865

Genus *Arabella* Grube, 1850

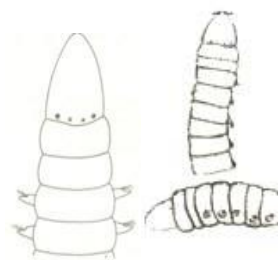
Arabella iricolor (Montagu, 1804) 50-90 mm

Intertidal, shallow water

(Mustaqum, 2000; Mushtaq and

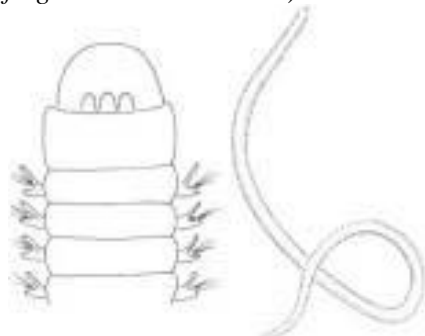
Mustaqum, 2006 as *Arabella*

multidentata Ehlers)



Head, anterior region (left figure, after Pettibone, 1963; right figure after Mustaqum, 2000)

Genus *Oenone* Savigny, 1818
Oenone fulgida (Savigny in Lamarck, 1818). 225mm. orange above, light yellow on sides and below
 Burrows in mixture of sandy and muddy habitat near low tide within rocks (Aziz, 1938; Ahmed, 1969 as *Aglaurides fulgida* under Eunicidae)



Anterior part, habitus
 (After Jones *et al.*, 1985)

Genus *Augeneria* Monro, 1930
Augeneria tentaculata Monro, 1930
 Shelf and inshore waters
 (Mushtaq and Mustaqim, 2006)

Family Onuphidae Kinberg, 1865
 Genus *Diopatra* Audouin and Milne Edwards, 1833
Diopatra neapolitana Delle Chiaje, 1841. 150-500mm. pale yellow
 Muddy sand
 (Aziz, 1938 under family Eunicidae)



Anterior portion

Genus *Heptaceras* Ehlers, 1868
Heptaceras phyllocirra (Schmarda, 1861) 40 - 60 mm long and 2- 3 mm wide
 Inter tidal zone at low tide
 (Mushtaq and Mustaqim, 2006 as *Tradopia maculata*)
 Genus *Hyalinoecia* Malmgren, 1867

Hyalinoecia sp.
 Oxygen minimum zone 1200m
 (Levin *et al.*, 2009; Murthy *et al.*, 2009)
 Genus *Onuphis* Audouin and Milne Edwards, 1833
Onuphis eremita Audouin and Milne Edwards, 1833 80-120mm. dorsal surface violet, ventral white
 In membranous tubes, sticking in the sand at low water mark
 (Siddiqui, 1983 unpublished thesis)



Head (After Siddiqui, 1983)

Order Amphinomida Fauchald, 1977

Family Amphinomidae Lamarck, 1818
 Genus *Hipponoe* Audouin and Milne Edwards, 1830
Hipponoe gaudichaudi Audouin and Milne Edwards, 1830
 Associate of goose barnacle
 (Moazzam and Moazzam, 2019)



Worm embedded in barnacles bed
 (After Moazzam and Moazzam, 2019)

Family Euphrosinidae Williams, 1851
 Genus *Euphrosine* Savigny in Lamarck, 1818
Euphrosine foliosa Audouin and Milne Edwards, 1833 30mm.
 Benthos, epifauna.
 (Swaleh, 1995, unpublished thesis)



Anterior portion entire (After Fauvel, 1953)

Euphrosine myrtosa Savigny, 1818

20mm, bright pink

Under rocks associated with weeds

(Aziz, 1938 as *Euphrosyne myrtosa*;

Hasan, 1960 under Amphinomidae)



Anterior portion

Order Phyllodocida Dales, 1962

Family Nephtyidae Grube, 1850

Genus *Nephtys* Cuvier, 1817

Nephtys sp

Fine sand

(Hasan, 1960)

Genus *Aglaophamus* Kinberg, 1866

Aglaophamus longicephalus Hartman,

1976

Shallow water sediment

(Hartman, 1976)

Family Acoetidae Kinberg, 1858

Genus *Eupanthalis* McIntosh, 1876

Eupanthalis kinbergi McIntosh, 1876

Tube building

(Hartman, 1974)



(After Martinez, 2007)

Genus *Acoetes* Audouin and

MilneEdwards, 1832

Acoetes melanonota(Grube,1876) 6mm.

Benthic, infaunal

(Mustaquim, 1991 as *Polyodontes*

melanotus)



Head (After Mustaquim, 1991)

Family Glyceridae Grube, 1850

Genus *Glycera* Savigny, 1818

Glycera cinnamomea Grube, 1874

70mm.

Rocky area, continental shelf, continental slope, intertidal, subtidal.

(Fauvel, 1932 as *Glycera manorae*

Fauvel)



Anterior part, Probocsis

Glycera subaenea Grube, 1878.

Low water, bottom of clay, mud mixed

with sand, fine gravel

(Hartman, 1976)

Glycera tridactyla? Schmarda, 1861

(Hartman, 1976 as *Glycera convoluta*

Keferstein, 1862)



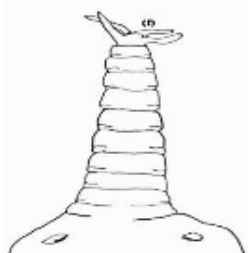
Glycera alba (Muller, 1776) 60-100mm.

Estuarine, intertidal to 55m, prefers fine sediments, also found in coarser sediments
(Hasan, 1960)



Entire and proboscis (After Siddiqui, 1983)

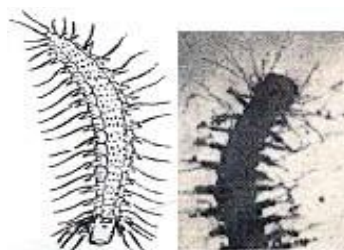
Glycera longipinnis Grube, 1878
At low tide mark on sandy shore, benthic
(OBIS, 2016; Arshad *et al.*, 2019)



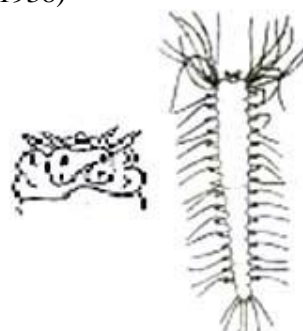
Anterior part of prostomium (After Arshad *et al.*, 2019)

Family Goniadidae Kinberg, 1866
Genus *Goniada* Audin and M. Edward, 1833
Goniada asiatica Hartman, 1976
In sand
(Hartman, 1974[1976])

Family Hesionidae Grube, 1850
Genus *Hesione* Savigny in Lamarck, 1818
Hesione splendida Savigny in Lamarck, 1818 30-60mm. Red brown with bright cross stripes or chequered. White-yellow circular spots located on back in the middle of the transverse bands.
Pelagic in the shallow water pools, under rock or crevices of rocks
(Aziz, 1938 as *Hesione pantherina* Risso)



Genus *Leocrates* Kinberg, 1866
Leocrates claparedii (Costa, in Claparède, 1868) 23 mm. flesh coloured
Intertidal, Shallow water, under stones, with weeds, sponges
(Aziz, 1938)



Head and entire (After Siddiqui, 1983)
Leocrates diplognathus Monro, 1926
23mm. back dark chestnut brown traversed by inter segmental white bands
Under rocks in tide pools associated with algae
(Farooque, 1971, unpublished thesis)

Family Nereididae Johnston, 1845
Genus *Ceratonereis* Kinberg, 1866
Ceratonereis marmorata (Horst, 1924).
Intertidal, soft shore, infaunal, upper estuarine, in tube
(Hartman, 1974)
Genus *Leonnates* Kinberg, 1866
Leonnates indicus Kingberg, 1866
80mm. Dark brownish red with dark spots
Benthic; depth range 294 - 1100 m. on muddy substrate
(Fauvel, 1932 as *Leonnates jousseaumei* Gravier)



Head

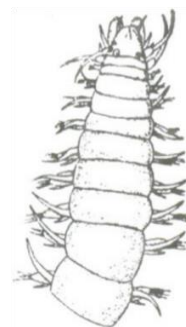
Genus *Neanthes* Kinberg, 1866
Neanthes willeyi (Day, 1934) 30mm.
 reddish
 Rocky littoral zone, usually found in
 crevices
 (Siddiqui and Mustaqim, 1998 as
Neanthes capensis Willey)



Neanthes unifasciata (Willey, 1905)
 70mm.
 At mid tide in crevices, rocky littoral
 zone
 (Farooque, 1971, unpublished thesis)
Neanthes glandicincta (Southern, 1921)
 Exposed sandy beaches, shelly soft
 bottoms
 (Aslam *et al.*, 2020 as *Ceratonereis*
(Composetia) burmensis (Monro)
 Genus *Nereis* Linnaeus, 1758
Nereis coutieri Gravier, 1900. 5-25mm.
 Sandy mud
 (Mustaqim, 1997)

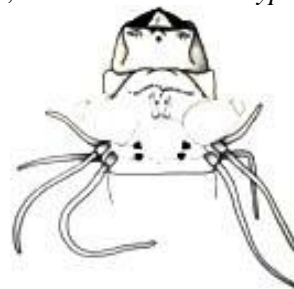


Nereis zonata persica Fauvel, 1911.
 In burrows, sea bottom
 (Hartman, 1974)
Nereis jacksoni Kingberg, 1866. 15-
 30mm.
 In burrows in sea bottom
 (Hartman, 1974)
Nereis heteromorpha (Horst, 1924) 52-
 54mm. light pink
 Within rocks
 (Farooque, 1971, unpublished thesis)
 Genus *Namalycastis* Hartman, 1959
Namalycastis indica (Southern, 1921).
 12-150mm. Reddish brown
 Muddy cum sandy part of the coast and
 creeks, fresh water
 (Aziz, 1938 as *Lycastis indica* (Southern))



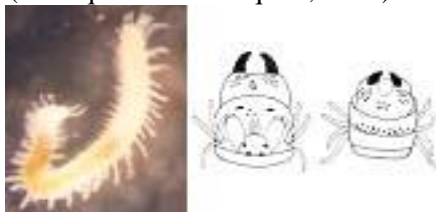
Anterior portion

Genus *Perinereis* Kinberg, 1866
Perinereis nuntia (Savigny in Lamarck,
 1818) 125 mm.
 Sandy part of beach
 (Aziz, 1938)
Perinereis nuntiatypica (Grube, 1857)
 72mm. pinkish
 Rocky shore, within rocks
 (Aziz, 1938 as *Perinereis typica*)



Head

Perinereis cultrifera (Grube, 1840)
 85 mm.
 Sandy part of the beach, shingles
 (Aziz, 1938)
Perinereis nigropunctata (Horst, 1889).
 60mm. Prostomium with three rows of
 dark pigment and v-shaped spot Found in
 crevices, intertidal, among oysters and
 weeds estuarine
 (Siddiqui and Mustaqim, 1998).



Habitus and Head

Perinereis matthaii Aziz, 1938
 Sandy part of the beach, at high water
 mark
 (Aziz, 1938)



Perinereis vallata (Grube, 1857).

120mm.

Intertidal mud flats, reef flats or rocky shores, under boulders (Fauvel 1932 1953; Aziz, 1938 as *Perinereis nuntiavar. vallata*; presumably to be misidentifications, from the Indian subcontinent region, still to be verified, fide Glasby and Hwey-Lian Hsieh, 2006)

Perinereis vancaurica indica Bhatt in Parulekar, 1972 40-70mm.

Intertidal, mangrove, also under oysters and barnacle encrusted rocks (Aziz, 1938 as *Perineieis horsti* Gravier)



Head and habitus

Perinereis perspicillata (Grube, 1875)

64mm.

Rocky shore (Hasan, 1960)

Genus *Platynereis* Kinberg, 1866

Platynereis dumerilii (Audouin and Milne Edwards, 1834) 21mm. Yellowish green

Rocky shore, low water, associated with algal masses and floating seaweeds in tenacious transparent tubes (Hasan, 1960)



Head

Platynereis sp, bright red, in mucous tubes attached to algae

Intertidal (Present study)



Genus *Tylonereis* Fauvel, 1911

Tylonereis bogoyawlenskyi Fauvel, 1911 60mm. Bright pink with transverse brown band on each segment

Mud flats, intertidal

(Hasan, 1960)

Genus *Pseudonereis* Kinberg, 1866

Pseudonereis variegata (Grube, 1857)

20-40mm. bluish grey.

Found among sea weeds and barnacles on rocky littoral zone

(Siddiqui and Mustaqim, 1988)

Pseudonereis anomala Gravier, 1900 20-

65mm. Found under stones on sand

(Siddiqui and Mustaqim, 1988)

Genus *Tambalagamia* Pillai, 1961

Tambalagamia orientalis Hartman, 1976

Littoral

(Hartman, 1974)

Family Phyllodocidae Oersted, 1843

Genus *Eulalia* Savigny, 1822.

Eulalia viridis (Linnaeus, 1767) 5-15cm. bright-green

Found under rocks, weeds or in mussel beds in rocky crevices and shallow water (Aziz, 1938).



Head, proboscis everted and habitus

Family Pilargidae Saint-Joseph, 1899

Genus *Sigambra* Mueller, 1858

Sigambra constricta (Southern, 1921)

Muddy

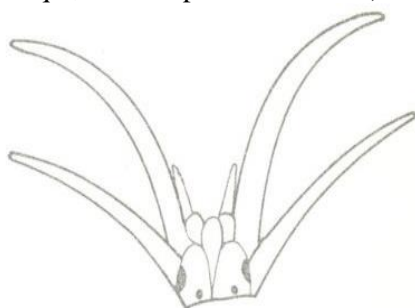
(Hartman, 1974)

Sigambra pettiboneae Hartman, 1979

Intertidal,

creek
(Iqbal *et al.*, 2019, abstract)
Sigambra tentaculata (Treadwell, 1941)
Intertidal, creek
(Iqbal *et al.*, 2019, abstract)

Family Polynoidae Kingberg, 1856
Subfamily Iphionine Kingberg, 1856
Genus *Iphione* Kinberg, 1856
Iphione muricata (Lamarck, 1818) 10-20mm.
In shallow waters with coral reef, or under stones at mid tide
(Siddiqui, 1983 unpublished thesis)



Genus *Gaudichaudius* Pettibone 1986
Gaudichaudius cimex (Quatrefages, 1866)
Intertidal sand
(Quatrefages, 1866 as *Iphione cimex*)

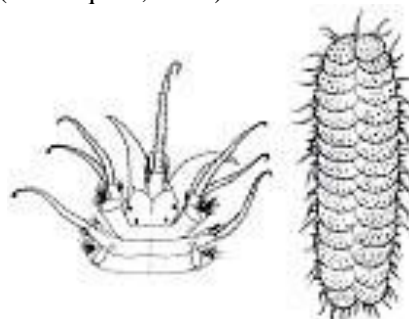


Entire and head (After Rasheed and Mustaqim, 2003)
Genus *Pseudopolynoe* Day, 1962
Pseudopolynoe inhaca (Day, 1951)
Intertidal rocks
(Hartman, 1974 as *Lumbrineris inhacae*)
Sub family Harmothoinae Willey, 1902
Genus *Harmothoe* Kinberg, 1855
Harmothoe imbricata Linnaeus, 1769 6.5 cm long; 1.9 cm wide; dark green or gray in first few segments then a little lighter with mottling, also may be orange, tan, brown, reddish, black, speckled or mottled, or with a black stripe down back; no transverse bands.

Rocky shore and low water under rocks. Also found commensally in the shells of hermit crabs or in tubes of polychaetes. 0–3711 m
(Aziz, 1938 under family Aphroditidae)



Anterior portion
Harmothoe hirsuta Johnson, 1897
Intertidal to 98 m.
(Khanum and Mustaqim, 2012, Abstract)
Harmathoe liaoi Barnich, Fiege and Sun, 2004
Intertidal rocky-stony
(Khanum and Mustaqim, 2012, abstract)
Harmothoe dictyophora (Grube, 1878) 8-15mm. Benthic; on rocks,mud, depth range 0 - 20 m.
(Mustaqim, 1991)



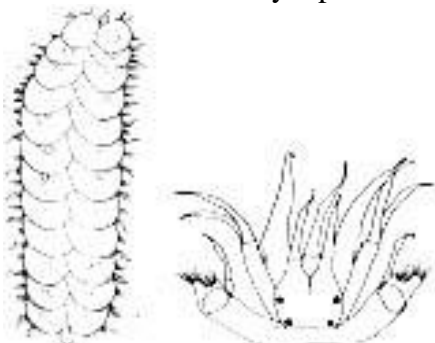
Head and entire (After Rasheed and Mustaqim, 2003)
Harmothoe goreensis Augener, 1918 8-11 mm.
Known from seamounts and knolls
(Hartman, 1976)



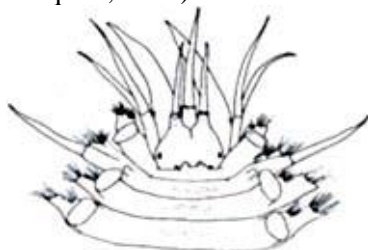
Head (After Rasheed and Mustaqim, 2003)

Sub family Lepidonotinae Willey, 1902
Genus *Lepidonotus* Leach, 1816
Lepidonotus hedleyi Benham, 1915. 20 mm. Dorsal cirri brown, with a dark band below the enlarged tip, elytra pale grey
Intertidal rocks

(*Lepidonotus carinulatus* (Grube, 1870).
Light and dark brown, 14-27 mm.
Rocky shore, associated with algae, sponges. Intertidal.
(Fauvel, 1953 as *Lepidonotus hedley* Benham under family Aphroditidae)

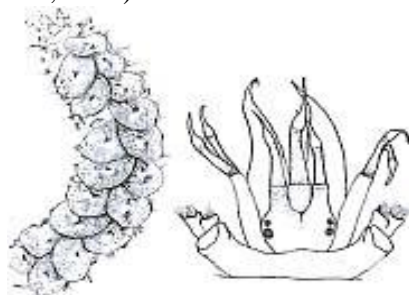


Anterior portion (After Rasheed and Mustaqim, 2003)



Head (After Rasheed and Mustaqim, 2003)

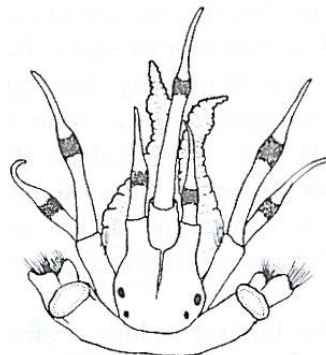
Lepidonotus tenuisetosus (Gravier, 1901) 7-22 mm., colour grey
Intertidal, shallow water, under stones, rocks, covered with algae, on sand.
Muddy covered with shelves, corals Aziz, 1938).



Habitus and head (After Rasheed and Mustaqim, 2003)

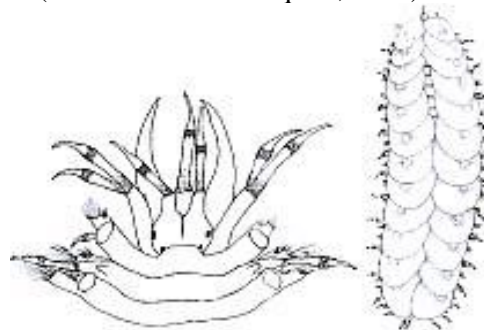
Lepidonotus jacksoni Kinberg, 1856 6-10 mm.

Intertidal rocks
(Rasheed and Mustaqim, 2003)



Head (After Rasheed and Mustaqim, 2003)

Lepidonotus purpureus Potts, 1910
Intertidal rocks, mangroves
(Rasheed and Mustaqim, 2003)



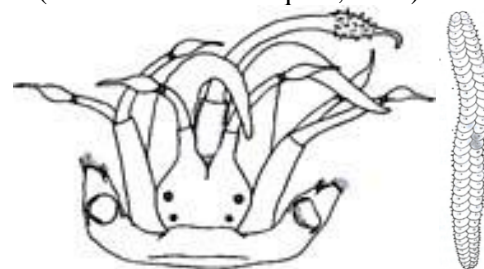
Head and habitus (After Rasheed and Mustaqim, 2003)

Lepidonotus natalensis Day, 1951
Intertidal zone (algae, rhodoliths) Rocky-stony, up to 5 m.
(Day, 1951)

Genus *Parahalosydropsis* Pettibone, 1977

Parahalosydropsis tubicola (Day, 1973)
25-35 mm.

Intertidal rocks
(Rasheed and Mustaqim, 2003)



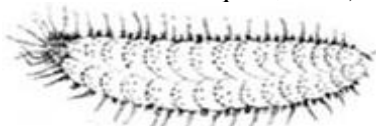
(After Rasheed and Mustaqim, 2003)

Parahalosydropsis arabica Wehe, 2006
Intertidal rocks

(Naeini and Rahimian, 2009 from Chahbahar, Mekran coast; Khanum and Mustaqim, 2012 abstract)

Genus *Paralepidonotus* Horst, 1915
Paralepidonotus ampulliferus (Grube, 1878)

Intertidal rocks
(Rasheed and Mustaqim, 2003)



(After Rasheed and Mustaqim, 2003)

Genus *Thormora* Baird, 1865
Thormora jukesii (Baird, 1865) 12 mm.
Intertidal rocks Coral. Stony-coral
(Rasheed and Mustaqim, 2003)



(After Rasheed and Mustaqim, 2003)

Genus *Paradyte* Pettibone, 1969
Paradyte levis (Marenzeller, 1902)
Depth range 20 m.
(Hartman, 1976 as *Scalisetosus levis* Marenzeller)

Family Sigalionidae Kingberg, 1856
Genus *Sthenelais* Kinberg, 1856
Sthenelais boa (Johnston, 1833) 55-73 mm.

Intertidal. Rockysandy, covered with algae. Rockystony with algae
(Rasheed and Mustaqim, 2005).



Genus *Sthenolepis* Willey, 1905

Sthenolepis japonica (McIntosh, 1885).
Fine deposits in the sublittoral zone.
(Hartman, 1974)

Genus *Mustaqimsthenelais* Wehe, 2007
Mustaqimsthenelais dendropapillata
Wehe, 2007
Intertidal sand
(Wehe, 2007)



(After Rasheed and Mustaqim, 2005)

Genus *Fimbriosthenelais* Pettibone, 1971
Fimbriosthenelais longipinnis (Grube, 1870) 127mm.

Intertidal
(Rasheed and Mustaqim, 2005 as *Sthenelais variabilis* Potts)



Prostomium dorsal and ventral views
(After Rasheed and Mustaqim, 2005)

Family Syllidae Grube, 1850
Subfamily Syllinae Grube, 1850
Genus *Syllis* Lamarck, 1818
Syllis variegata Grube, 1860 30-60 mm,
two violet brown bands on segments.
Intertidal, on hard substrate, shallow water

(Aziz, 1938)
Genus *Trypanosyllis* Claparede, 1864
Trypanosyllis zebra (Grube, 1860)
Intertidal to sublittoral, common just below low-water, especially on holdfasts of the brown alga *Ecklonia radiata*.
(Aziz, 1938)



Genus *Branchiosyllis* Ehlers, 1887
Branchiosyllis exilis (Gravier, 1900)
 Shallow waters on sponges, algae,
 gorgonians, and coral rubble
 (Mustaqim, 1997 as *Syllis exilis*)

Family Tomopteridae Johnston, 1865
 Genus *Tomopteris* Eschscholtz, 1825
Tomopteris cavallii Rosa, 1907
 transparent
 1000-0m.
 Holopelagic, deep mesopelagic, or
 twilight zone
 (Munro, 1937)
 Subclass Sedentaria Lamarck, 1818
 Infraclass Canalipalpata Rouse and
 Fauchald, 1997 non Linnaean
 Order Sabellida Fauchald, 1977

Family Sabellariidae Johnston, 1865
 Genus *Idanthyrus* Kinberg, 1867
Idanthyrus pennatus (Peters, 1854)
 70mm.
 In shoals, abundant in intertidal rocks
 (Fauvel, 1932 as *Pallasia
 thenelaispennata*)
 Genus *Sabellaria* Savigny, 1818
Sabellaria ranjhi Hasan, 1960
 Attached to rocks and stones
 (Hasan, 1960 as *Sabellaria spinulosa
 ranjhi*)

Family Sabellidae Malmgren, 1867
 Genus *Laonome* Malmgren, 1866
Laonome sp. 22 mm.
 Benthic
 (Rahana, 1985 unpublished)
 Genus *Branchiomma* Kolliker, 1858
Branchiomma cingulata (Grube, 1870)
 80mm, with dark scattered spots.
 Crevices of rocks
 (Aziz, 1938 as *Dasychone cingulata*)

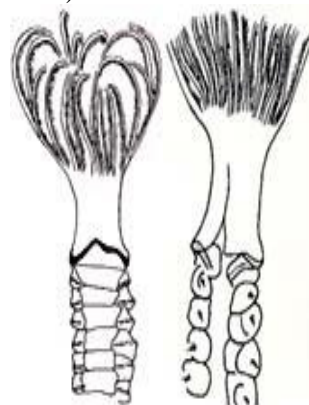


Branchiomma gravelyi (Aziz, 1938) 12-
 35 mm. Brown with scattered black spots
 Rocky, intertidal
 (Aziz, 1938 as *Dasychone gravelyi*)



Branchiomma luctuosum (Grube, 1870)
 Rocky area
 (Collected 2006 GBIF)

Genus *Pseudobranchiomma* Jones, 1962
Pseudobranchiomma orientalis
 (McIntosh, 1885) 20 mm.
 Rocky, intertidal
 (Aziz, 1938 as *Dasychone kumari*)
 Genus *Notaulax* Tauber, 1879
Notaulax phaeotaenia (Schmarda, 1861)
 Intertidal rock to 200m, bathymetric
 (Fauvel, 1953; Rehana and Mustaqim,
 1989 as *Hypsicomus phaeotaenia*
 Schmarda)



Anterior region, dorsal and ventral views
 (After Rehana and Mustaqim, 1989)

Genus *Potamilla* Malmgren, 1866
Potamilla ehlersi Gravier, 1906 10-
 40mm.
 Back waters among pebbles
 (Rehana and Mustaqim, 1989)



Potamilla leptochaeta Southern, 1921 0-
 120mm.

Back waters among pebbles
(Rehana and Mustaqim, 1989)



(After Rehana and Mustaqim, 1989)

Genus *Sabellastarte* Savigny, 1818
Sabellastarte sanctijosephi (Gravier, 1906) 30 cm.
Inhabits sandy and rubble regions along reefs
(Mustaqim, 1997)
Sabellastarte indica (Savigny, 1822)
In tubes on rocks
(Fauvel, 1932).



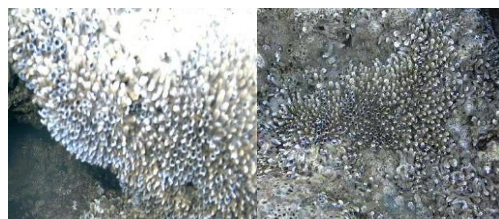
Anterior part. Dorsal view, collar, ventral view

Sabellastarte spectabilis (Grube, 1878)
Rocky area
(Ishaq, and Mustaqim, 1996)
Genus *Bispira* Kroeyer, 1856
Bispira tricylia (Schmarda, 1861)
105mm. white crown with 3 red-brown bands.
Intertidal rocks.
(Ishaq and Mustaqim, 1996 as *Bispira cf. tricylia*)



Genus *Amphiglena* Claparede, 1864
Amphiglena mediterranea (Leydig, 1851) 20-24mm.
Low tide, intertidal zone of back waters
(Mustaqim, 1990)

Family Serpulidae Rafinesque, 1815
Genus *Janita* Saint - Joseph, 1894
Janita fimbriata (Delle Chiaje, 1822)
In calcareous tubes
(Hartman, 1976 as *Omphalopomopsis fimbriata*)
Genus *Spirobranchus* Blainville, 1818
Spirobranchus giganteus (Pallas, 1766)
Subtidal
(Ali, 2006)
Spirobranchus sinuspersicus Pazoki, Rahimian, Struck, Katouzian and Kupriyanova, 2020 5-25mm
Intertidal rock, forms encrustations
(Ishaq and Mustaqim, 1996 as *Pomatoleios kraussii*. under this name from different areas including Pakistan material belongs to *Spirobranchus kraussii* as large complex, required to determine taxonomic status of *S. cf. kraussii* populations from Pakistan. As such, revision of the material needed to determine whether it may belong to *Spirobranchus sinuspersicus* (cf. Simon *et al.*, 2019; Pazoki *et al.*, 2020). May be *S. (Present study).*



(Aggregated animals picture courtesy Moazzam. Line drawing after Ishaq and Mustaqim, 1996)

Spirobranchus tetraceros (Schmarda, 1861) 8-30 mm.

Intertidal

(Ishaq and Mustaqim, 1996)



(After Ishaq and Mustaqim, 1996)

Genus *Serpula* Linnaeus, 1767

Serpula jukesii Baird, 1865 80-

190mm. Red and white streaks on

operculum.

Under side of the rocks in small pools

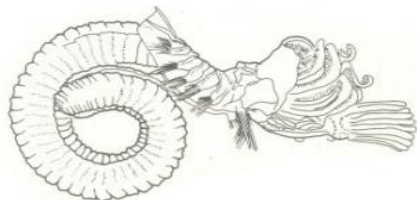
(Ahmad, 1969 as *Serpula vermicularis*)



Within calcareous tubes and extracted from tubes

Serpula sp. 5-42mm

In coiled calcareous tubes that attach to hard surfaces such as intertidal rocks



(Ishaq and Mustaqim, 1996)

Genus *Hydroides* Gunnerus, 1768

Hydroides norvegicus Gunnerus, 1768

Sublittoral on stones, shells and bryozoans

(Ahmad, *et al.*, 1982; very confusing, all Indo-Pacific records appear to belong to

H. elegans, but to be sure every record

needs to be checked; cf. Ten Hove, 1974)

Hydroides albiceps (Grube, 1869)

Intertidal rock

(Ishaq and Mustaqim, 1996)



Hydroides operculata (Treadwell, 1929)

3-17mm.

Intertidal rocks

(Ishaq and Mustaqim, 1996)



(Line drawing after Ishaq and Mustaqim 1996)

Hydroides tuberculatus Imajima, 1976

5-11 mm.

Intertidal rocks.

(Ishaq and Mustaqim, 1996)



(After Ishaq and Mustaqim, 1996)

Hydroides exaltatus (Marenzeller, 1884)

20mm. dull green.

Intertidal rocks

(Mustaqim, 1997)

Hydroides elegans (Haswell, 1883)

7mm.

Intertidal rocks, on shells, bryozoans,

buoy, dock and boat hull, on reef flats, on

chlorophytes, epifauna of mobile substrata (eg.molluscs and crabs) (Ishaq and Mustaqim, 1996)



Hydroides heterocera (Grube, 1868) 40 mm. Gills dark crimson, body dull yellow Intertidal rocks (Ishaq and Mustaqim 1996 as *Hydroides heterocerus* (Grube))



Genus *Vermiliopsis* Saint-Joseph, 1894 ***Vermiliopsis glandigera*** Gravier, 1906 7-18mm. In tubes. Sandy, intertidal. (Mustaqim, 1997 as *Vermiliopsis infundibulum glandigera*)



(After Mustaqim, 1997)

Genus *Salmacina* Claparède, 1870 ***Salmacina*** sp Submerged rocks, reefs, piles and boats (Haq *et al.*, 1978)

Family Sabellidae Latreille, 1825 Genus *Sabella* Linnaeus, 1767 ***Sabella spallanzanii*** (Gmelin, 1791)

Subtidal (Ali, 2006 as *Spirographis spallanzani*) Genus *Parasabella* Bush, 1905

Parasabella sp.

Intertidal (Ishaq and Mustaqim, 1996 as *Demonax* sp) Suborder Spionida Grube, 1850

Family Chaetopteridae Audouin and Milne Edward, 833 Genus *Chaetopterus* Cuvier, 1827 ***Chaetopterus variopedatus*** (Renier, 1804) 150-250mm. buried in sand and mud in long U-shaped tubes with small stone, shells and sand sticking. (Habib and Mustaqim, 1988)



(After Habib and Mustaqim, 1988)

Genus *Mesochaetopterus* Potts, 1914 ***Mesochaetopterus capensis*** McIntosh, 1885

Tubicolous. Tube parchment like or membranous, thin, partly covered by sand grains or encrusted segments; vertical or J-shaped in sand or mud flats (Habib and Mustaqim, 1988)

Mesochaetopterus sagittarius Claparède, 1870 230 mm. Tubicolous, intertidal sand (Mustaqim, 2000)

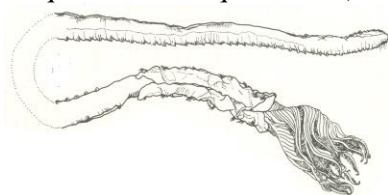


Anterior portion (After Mustaqim, 2000)

Genus *Protula* Risso, 1826 ***Protula tubularia*** (Montagu, 1803) 2.0-5.0mm. Red or orange Intertidal rocks to deep sea. (Mustaqim, 1997, questionable, Ref. Wehe and Feige, 2002)

Protula sp.q 11111111

Intertidal rocks
(Ishaque and Mustaquim, 1996)

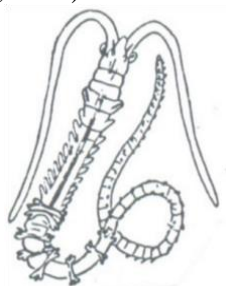


(After Ishaq and Mustaquim, 1996)

Genus *Phyllochaetopterus* Grube, 1863

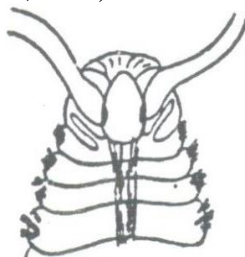
Phyllochaetopterus elioti Crossland,
1903 115-210mm.

Sandy in tubes
(Ahmad, 1969)



Phyllochaetopterus socialis Claparede,
1869

Tubes among zoanthid colonies.
(Hartman, 1974)



Phyllochaetopterus herdmanii (Hornell
in Willey, 1905) 20-60mm.

Rocky
(Mustaquim, 2000)



(After Mustaquim, 2000)

Order Spionida sensu Rouse and
Fauchald, 1997

Family Longosomatidae Hartman, 1944

Genus *Heterospio* Ehlers, 1874

Heterospio longissima Ehlers, 1874

Known from oxygen minimum zones
(Hartman, 1974)

Family Magelonidae Cunningham and
Ramage, 1888

Genus *Magelona* Muller, 1858

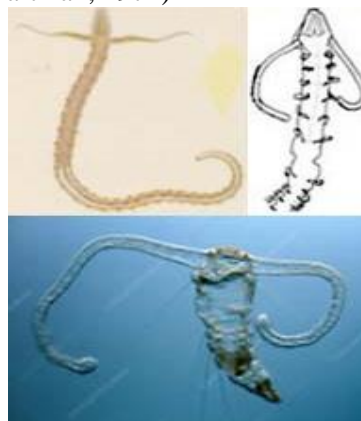
Magelona papillicornis Muller, 1858

170mm. translucent

Upper sandflats, burrows in sand
(Habib and Mustaquim, 1988)

Magelona cornuta Wesenberg-Lund,
1949

In sandy mud and muddy shelly
sediments Depth range 18 – 790 m.
(Hartman, 1974)



larva

Magelona sp.

Near-coastal zone

(Hasan, 1960)

Magelona cincta Ehler, 1908

Sandy beaches

(Arshad *et al.*, 2019)



Anterior region; (After Arshad *et al.*,
2019)

Family Spionidae Grube, 1850
Genus *Paraprionospio* Caullery, 1914
Paraprionospio lamellibranchia

Hartman, 1974.

Muddy sand
(Hartman, 1974)

Paraprionospio pinnata (Ehlers, 1901).
Shallow water, down wards, benthic
(Mustaquim, 1997)



Head (After Lund, 1949)

Genus *Prionospio* Malmgren, 1867
Prionospio ehlersi Fauvel, 1928 26-27mm.

Benthic
(Hartman, 1974)

***Prionospio* sp**
At 800-850 m.
(Levin *et al.*, 2009)

Genus *Pseudopolydora* Czerniavsky, 1881

Pseudopolydora antennata Claparede, 1870 15mm.
Muddy and muddy cum sandy regions in algal holdfast
(Swaleh and Mustaquim, 1993)



Lateral view of anterior region (After Swaleh and Mustaquim, 1993)
Pseudopolydora paucibranchiata
Okuda, 1937

Intertidal, mud-flats or organically rich sands and in polluted environment
(Swaleh and Mustaquim, 1993)



Lateral view of anterior region (After Swaleh and Mustaquim, 1993)

Genus *Scolelepis* Blainville, 1828
Scolelepis squamata (Muller, 1806)

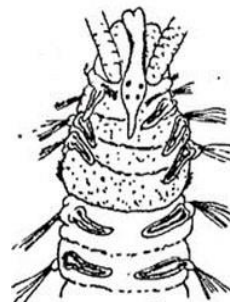
30mm. Yellow orange, red or brown
In thin slimy tubes on muddy sand, under stones and in rock crevices from shallow to deep waters
(Hasan, 1960; Jawed and Khan, 1974, as *Nerine cirratulus*) (Delle Chiaje)



Anterior end

Genus *Boccardia* Carazzia, 1893

Boccardia polybranchia Haswell, 1885
From rocky shores, associated with shells
(Mustaquim, 1997)



(After Carazzi, 1893)

Genus *Polydora* Bosc, 1802

***Polydora* sp.**
Oyster shells
(Hasan, 1960)

Polydora hoplura Claparede, 1870
Variable, dark pigmentation along prostomium and on peristomium, anterior chaetigers and pygidium. Pigmentation may be absent. Palps often with black bars
Sublittoral, on jetty piles
(Mustaquim, 1997)

Polydora spondylana Muhammad, 1973
All marine habitats
(Mustaquim, 1997)

Genus *Dipolydora* Verrill, 1881

Dipolydora flava (Claparède, 1870) 20-45mm.

Sublittoral, boring rocks and old molluscan shells
(Mustaquim, 1997 as *Polydora flava*)

Dipolydora giardi (Mesnil, 1896)
7mm. Colour in life tan

Continental shelf, sublittoral, Down to 160 m depth in coralline algae and molluscan shells
(Mustaquim, 1997 as *Polydora giardi*)



(From Rainer, 1973)

Dipolydora armata (Langerhans, 1880)
2–3 mm.

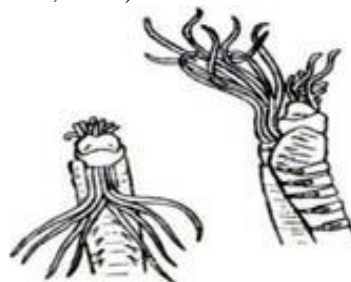
Sublittoral, borer in calcareous substrata
(Mustaquim, 1997)
Order Terebellida sensu Rouse and Fauchald, 1997

Family Acrocirridae Banse, 1969
Genus *Acrocirrus* Grube, 1873

Acrocirrus sp.
800–850 m
(Levin *et al.*, 2009)

Family Ampharetidae Malmgren, 1866
Subfamily Melinninae Chamberlin, 1919
Genus *Melinna* Malmgren, 1867

Melinna aberrans Fauvel, 1932
Mud flats
(Hasan, 1960)



Genus *Neosabellides* Hessle, 1917
Neosabellides makranensis (Reuscher & Fiege, 2016)
Cold seeps
(Reuscher and Fiege, 2016 as *Pavelius makranensis*)

Family Steraspidae Carus, 1863

Genus *Sternaspis* Otto, 1821

Sternaspis thorsoni Sendall and Salazar-Vallejo, 2013

In sandy and muddy substrates in all depths usually around 100-200 m.
(Kazmi and Naushaba, 2010 as *Sternaspis scutata* Ranzani)

Re-examined by first author and submitted for publication in ZRP)

Family Cirratulidae Ryckholdt, 1851

Genus *Timarete* Kinberg, 1866

Timarete anchylochaeta (Schmarda, 1861) 30mm.

Muddy-cum-sandy.

(Aziz, 1938 as *Audouinia anchylochaeta*)

Genus *Cirratulus* Lamarck, 1818

Cirratulus cirratus (O. F. Muller, 1776)

Intertidal and infralittoral

(Mustaquim, 1997)

Subfamily Ctenodrilinae Kennel, 1882

Interstitial

(Present study)

Family Fauveliopsidae Hartman, 1971

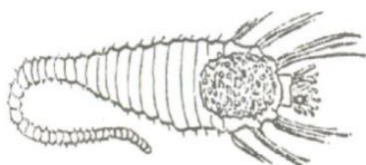
Genus *Riseriopsis* Salazar-Vallejo, Zhadan & Rizzo, 2019

Riseriopsis arabica (Hartman, 1976) 4 65-110 m.

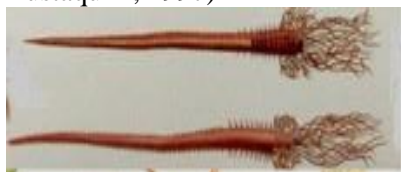
Muddy and clayey sediments, mixed with dead shells

(Hartman, 1976, as *Fauveliopsis arabica*, placed under family Flabeligeridae)

Family Flabelligeridae Saint-Joseph, 1894
 Genus *Semiodera* Chamberlin, 1919
Semiodera curviseta (Caullery, 1944)
 In the upper layers of the bottom; in sand or mud, eulittoral to bathyal
 (Hartman, 1974 as *Pherusa curvisetis*)
 Genus *Pherusa* Oken, 1807
Pherusa bengalensis (Fauvel, 1932)
 60mm.
 Sandy and muddy
 (Ahmad, 1969 as *Stylarioides bengalensis* Fauvel under family Chloraemidae)
Pherusa coronata (Ehlers, 1908)
 Subtidal zone, usually shallowly buried in sand or under rocks
 (Hartman, 1974)
Pherusa eruca indica (Fauvel, 1928)
 Subtidal zone, usually shallowly buried in sand or under rocks (Hartman, 1976)
Pherusa hamocarens (Monro, 1937)
 Muddy
 (Monro, 1937 as *Stylarioides hamocarens* Monro)
 Genus *Daylithos* Salazar-Vallejo, 2012
Daylithos parmatus (Grube, 1877)
 30mm.
 Sandy and muddy
 (Ahmad, 1969 as *Stylarioides parmatus* under Chloraemidae)



Family Pectinariidae Quatrefages, 1866
 Genus *Pectinaria* Savigny, 1818
Pectinaria capensis (Pallas, 1766)
 Shallow sediments, burrows in soft mud
 (Mustaquim, 1997)



Family Terebellidae Grube, 1850
 Genus *Pista* Malmgren, 1866
Pista quadrilobata (Augener, 1918)
 In tubes, shallow waters in sediments or crevices

(Mustaquim, 1997)
 Genus *Streblosoma* Sars, 1872
Streblosoma atos Hutching and Murray, 1984
 Estuarine
 (Mustaquim, 1997)
Streblosoma minutum Hutchings and Glasby, 1987
 Rock reef, under boulders and in rock crevices and pools
 (Mustaquim, 1997)
Streblosoma persica (Fauvel, 1908)
 Benthic
 (Mustaquim, 1997)
Streblosoma cespitosa (Willey, 1905)
 Mangroves
 (Hartman, 1976)
 Genus *Thelepus* Leuckart, 1849
Thelepus plagiostoma Schmarda, 1861
 100-180mm. Brown
 Intertidal
 (Hartman, 1976)
Thelepus setosus (Quatrefages, 1865)
 Tubes under stones
 (Mustaquim, 1997)
 Genus *Loimia* Malmgren, 1866, emended
Loimia medusa (Grube, 1878)
 In tubes attached to rocks. , in tide pools, deep estuarine channels and rubble in bays and seas. Builds tube from sand and gravel or within vertical holes or in reef
 (Aziz, 1938 also as *Loimia annulifilis*)



Genus *Terebella* Linnaeus, 1767
Terebella pterochaeta (McIntosh, 1885)
 Tube forming
 (Mustaquim, 1997)
Terebella ehrenbergi Grube, 1870 30-40mm. Tentacles pink
 In tubes under stones, shallow sub tidal depth
 (Aziz, 1938)



Terebella plagiostoma Schmarda, 1861
 100-180mm. Brown
 Intertidal
 (Hartman, 1976 as *Thelepus plagiostoma* (Schmarda))
 Genus *Eupolymnia* Verrill, 1900
Eupolymnia nebulosa Montagu, 1818
 20 cm.-15 m.
 In sand in long slimy tubes with adhering sand grains and shells
 (Mustaquim, 1997)

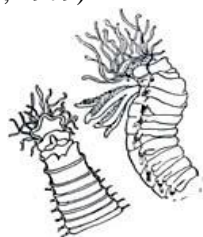


(Picture taken from aphotomarine.com)

Genus *Nicolea* Malmgren, 1866
Nicolea venustula (Montagu, 1818)
 Within tough tubes embedded in fine sandy mud near littoral zone
 (Mustaquim, 1997)

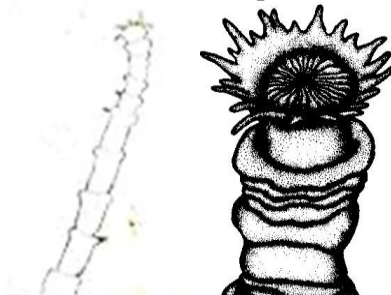


Family Trichobranchidae Malmgren, 1866
 Genus *Terebellides* Sars, 1835
Terebellides stroemii Sars, 1835 48mm.
 Tubicolous, in sandy mud
 (Hartman, 1979)



Terebellides sp
 Oxygen deficient zone
 (Gooday *et al.*, 2009 as Ampharetids)
 Genus *Trichobranchus* Malmgren, 1866
Trichobranchus glacialis Malmgren, 1866
 Encrusted with mud and sand, often fastened to algae or stones
 (Hartman, 1974)
 Infraclass Scolecida Rouse and Fauchald, 1997 non Linnaean

Family Maldanidae Malmgren, 1867
 Genus *Euclymene* Verrill, 1900
Euclymene? africana (Gravier, 1905)?
Euclymene watsoni
 Subtidal
 (Kazmi and Naushaba, 2010 as *Euclymene oestredii* (Claparède))



anterior part

Genus *Micromaldane* Monro, 1939
Micromaldane sp
 Sandy
 (Arshad, 2017 unpublished)
 Genus *Axiothella* Verrill, 1900
Axiothella obockensis (Gravier, 1905)
 Muddy
 (Ashraf, 1973)

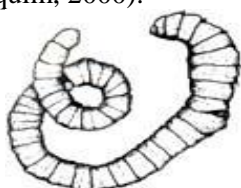
Family Arenicolidae Johnston, 1835
 Genus *Arenicola* Lamarck, 1801
Arenicola brasiliensis Nonato, 1958.
 Eulittoral.
 (Ashraf, 1968)



Habitus (from Ken-ichi Ueda, 2014)
 Egg case

Arenicola cristata Stimpson, 1855
50mm.
Burrowing in sandy mudflats in protected places; near low-tide line and just below (Bhatti and Sufi, 1949)

Family Capitellidae Grube, 1862
Genus *Capitella* Blainville, 1828
Capitella capitata (Fabricius, 1780) 100mm, blood-red in colour
Intertidal mud, in sediment tubes (Mustaquim, 2000).



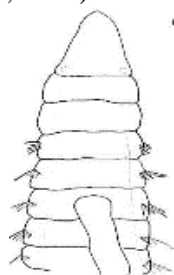
(After Mustaquim, 2000)

Capitella giardi (Mesnil, 1897) Pale pink to red-brown
Mud and muddy sand. From eulittoral to upper sublittoral (Khatoon *et al.*, 2022)



(After Khatoon *et al.*, 2022)

Family Cossuridae Day, 1963
Genus *Cossura* Webster and Benedict, 1887
Cossura dayi Hartman, 1974.
Abyssal
(Hartman, 1976)
Cossura dimorpha (Hartman, 1976)
In 34 to 110 m
(Hartman, 1976)
Cossura coasta Kitamori, 1960
Low tidal mark
(Arshad *et al.*, 2019)



Head, anterior part (after Arshad *et al.*, 2019)

Family Opheliidae Malmgren, 1867
Genus *Ammotrypanella* Rathke, 1843
Ammotrypanella acuminata Orsted, 1849 50mm. Pearly grey
Intertidal region, sandy or muddy substrate
(Hartman, 1976 as *Ophelina aulogaster* Rathke, 1843)

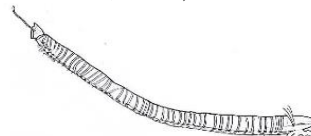


Genus *Ophelina* Örsted, 1843
Ophelina cylindricaudata Hansen, 1878
Fine sediments, sandy beaches
(Arshad *et al.*, 2019)



(After Arshad *et al.*, 2019)

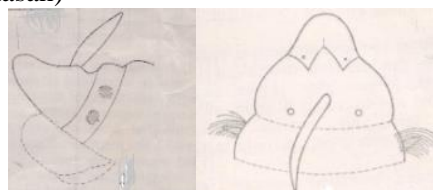
Ophelina norvegica Støp-Bowit, 1945
Fine sediments, sandy beaches
(Arshad *et al.*, 2019)



(After Arshad *et al.*, 2019)

Family Orbiniidae Hartman, 1942
Genus *Phylo* Kinberg, 1866
Phylo foetidae ligustica (Orlandi, 1896)
Benthic, burrows on bottoms of sand and mud
(Hasan, 1960)

Family Paraonidae Cerruti, 1909
Genus *Allia* Strelzov, 1973
Allia alisdairi (Hasan, 1960) 26mm.
From fine sandy ground
(Hasan, 1960 as *Aricidea alisdairi* Hasan)



Anteriorend, dorsal and lateral views
(After Hasan, 1960)

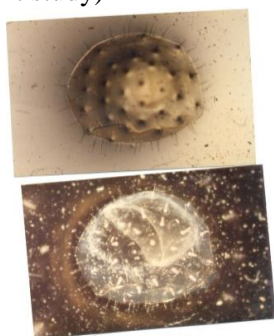
Subclass Polychaeta incertae sedis
Worsaae and, Rouse, 2008

Family Protodrilidae Hatschek, 1888
Genus *Protodrilus* Hatschek, 1881
***Protodrilus* sp**
Interstitial
(Present study)



? Superclass Annelida incertae sedis
? Order Myzostomida von Graff, 1877

? Family Myzostomatidae Benham, 1896
? Genus *Myzostoma* Leuckart, 1836
Myzostoma sp.
(Present study)



? Family Diurodrilidae Kristensen and
Niilonen,
1982
? Genus *Diurodrilus* Remane, 1925
***Diurodrilus* sp.**
(Present study)



Order Sipuncula Stephen, 1965
Class Sipunculidea Cutler and Gibbs,
1985
Order Golfingiida Cutler and Gibbs, 1985

Family Golfingiidae Stephen and
Edmonds 1972

Genus *Golfingia* Lankester 1885
***Golfingia* sp.**
Found in rocky shore
(Ghani, 1996)



Genus *Nephasoma* Pergament, 1946
Nephasoma (Nephasoma) minutum
(Keferstein, 1862)
Mussel bed
(Fatima and Barkati, 1999 as *Golfingia minuta*
(Keferstein)

Genus *Themiste* Gray, 1828
Themiste lageniformis (Baird, 1868)
Under rocks
(Tahera and Ghory, 2009)
Themiste (Themiste) hennahi Gray, 1828
Intertidal
(Ghory and Tahera, 2015)



Infra Order Phascolosomatida

Family Phascolosomatidae Stephen and
Edmonds, 1972
Genus *Phascolosoma* Leuckart, 1828
Phascolosoma (Phascolosoma) scolops
(Selenka and de Man, 1883)
Intertidal
(Ghory and Tahera, 2014)



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Indetermined taxa
Subtidal
(Present study)



Phylum Nemertea

The Nemerteans, in some books they are also referred to as the Rhynchocoela, Nemertinea, Nemertina or Nemertini. They are a quite successful phylum (900 named species) of mostly marine worms that are generally characterised by being extremely long and thin. *Lineus longissimus* has been recorded being 30 metres long while still only a few millimetres wide and some scientists estimate they may reach 60 metres in length, Not all Nemerteans are long thin marine worms, some live in freshwater, a few are even terrestrial in damp habitats, while others are quite chubby.

Phylum Nemertea Schultze, 1851
Class Enopla Schultze, 1851
Order Heteronemertea Bürger, 1892

Family Baseodiscidae Bürger, 1907
Genus *Baseodiscus* Diesing, 1850
Baseodiscus hemprichii (Ehrenberg, 1831) 22 cm. Extendable to 3 feet
Found in shallow rocky area
(Puri, 1924 as *Eupolia hemprichii*; Kazmi and Gibson, 1994.



Genus *Lineus* Sowerby, 1806
Lineus ruber (Muller, 1774)
Rocky area
(Kazmi and Gibson, 1994)
Class Hoplonemertea Hubrecht, 1879

Family Drepanophoridae Verrill 1892
Genus *Drepanophorus* Altherr, 1968
Drepanophorus sp. 15 cm.
Under stones in muddy sand
(Present study)



Order Monostilifera Brinkmann, 1917

Family Emplectonematidae Bürger, 1904
Genus *Nemertopsis* Bürger, 1895
Nemertopsis cf. ***bivittata*** (Delle Chiaje, 1841). Two colour morphs; commonly found sympatrically, one with dorsal stripes that meet anteriorly and the other with lines that do not meet
Intertidal, oyster reef.
(Aslam *et al.*, 2020)
Class Anopla Schultze, 1851
Order Paleonemertea Schultze, 1851

Family Tubulanidae Bürger, 1904 (1874)
Genus *Tubulanus* Renier, 1804
Tubulanus annulatus (Montagu, 1804)
Intertidal under stones, on sand, mud or coralline ground; sublittoral among holdfasts of weeds to depths of about 12m in coarse tubes attached to old bivalve shells
(Ali, 2006)

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Phylum Gnathostomulida

The Gnathostomulida are translucent microscopic, interstitial marine worms, with a muscular pharynx armed with distinctive forceps-like jaws in nearly all species. The elongate body, which is typically less than 2 mm long (range 0.3 to 3.5 mm), usually has distinct head, trunk, and tail regions. Outer epithelial cells each have single cilia which collectively help the animal glide between sand grains. Gnathostomulids are found worldwide. They may occur at high densities in anoxic, sulfide-rich conditions (population densities of more than 6000 individuals per liter of sediment have been reported). They occur from the intertidal zone to depths of hundreds of meters. There are close to 100 described gnathostomulid species, but many more times that number presumably await discovery.

Gnathostomulid sp.1

Interstitial in sand

(Present study)



Gnathostomulid sp.2

Meiobenthic in mangrove sand

(Qureshi *et al.*, 2016)

References:

QURESHI, N.A., F. NAZ AND NOOR US SAHER. 2016. Variations in distribution and abundance of meiobenthos communities in mangrove creek areas along the coast of Karachi, *Pakistan. Indian Jour. Geo-Marine Sc.* 45(4): 546555.

Phylum Gastrotricha

The phylum Gastrotricha, commonly referred to as hairybacks, are a group of microscopic (0.06-3.0 mm), worm-like, pseudocoelomate animals and are widely distributed and abundant in freshwater and marine environments. They are mostly benthic and live within the layer of tiny organisms and detritus that is found on the seabed. The majority live on and between particles of sediment or on other submerged surfaces.

Phylum Gastrotricha Metschnikoff, 1865
Order Macrotrichida Remane, 1925 [Rao and Clausen, 1970]

Family Thaumastodermatidae Remane, 1927
Genus *Tetranchyroderma* Remane, 1926
***Tetranchyroderma* sp.**
Interstitial in sand
(Present study)



Phylum Nematoda

The Nematoda are a diverse animal phylum inhabiting a very broad range of environments. They are arguably the most diverse numerically dominant metazoans in marine habitats. They represent 90% of all animals on the ocean floor. Over 25,000 have been described, of which more than half are parasitic. Apart from their role in ecology, they serve as potential indicators of pollution or general environmental disturbance.

Phylum Nematoda Cobb, 1909
 Class Enoplea Inglis, 1983
 Order Enoplida Filipjev, 1929

Family Anticomidae Filipjev, 1918
 Genus *Anticoma* Bastian, 1865
***Anticoma* sp.**
 Sandy beaches
 (Maqbool and Nasira, 2000a)

Family Enchelidiidae Filipjev, 1918
 Genus *Eurystomina* Filipjev, 1921
Eurystomina indica Yoshimura, 1980
 Meiobenthic
 (Salma *et al.*, 2017)

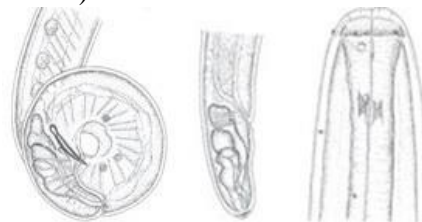
Family Enoplidae Dujardin, 1845
 Genus *Enoplus* Dujardin, 1845
Enoplus mammillatus Timm, 1959
 Rocks and algae at low tide
 (Timm, 1959)



Male head and tail (After Timm, 1959)

Family Leptosomatidae Filipjev, 1916
 Genus *Deontostoma* Filipjev, 1916
Deontostoma karachiense (Timm, 1959)
 7 - 10 mm,
 Algae growing on rocks at low tide
 (Timm, 1959 as *Thoracostoma karachiense*)

Genus *Leptosomatides* Filipjev, 1918
Leptosomatides reducta Timm, 1959
 Algae growing on rocks at low tide,
 meiobenthic
 (Timm, 1959)
 Genus *Orthophallonema* Bongers, 1983
Orthophallonema ranjhahi Bongers, 1983
 Coastal area
 (Timm, 1960 as *Leptosomatum ranjhahi*
 Timm)



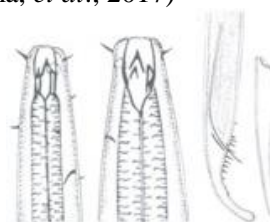
Male Head and tail female
 (After Bongers, 1983)

Family Thoracostomopsidae de Conicck, 1965
 Genus *Enoplolaimus* de Man, 1893
Enoplolaimus karachiensis Maqbool,
 Nasira and Turpeeniemi, 1999
 Subtidal, non-vegetative and beach
 sediment, muddy and silty sand, 10-20 m
 in stagnant water
 (Nasira, 1999; Maqbool *et al.*, 1999)



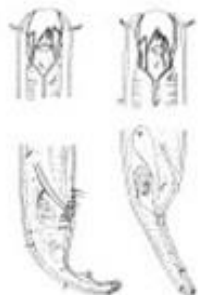
Female anterior region male and female
 tails (AfterMaqbool *et al.*, 1999)

Family Oncholaimidae Filipjev, 1916
 Genus *Metoncholaimus* Filipjev, 1918
Metoncholaimus medispiculatum Salma,
 Nasira, Saima and Shahina, 2017
 Sediments
 (Salma, *et al.*, 2017)

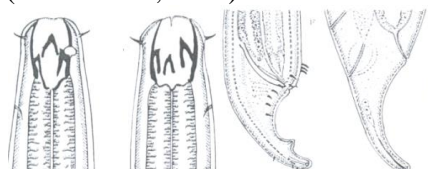


Male female heads; male female tails
 (After Salma *et al.*, 2017)

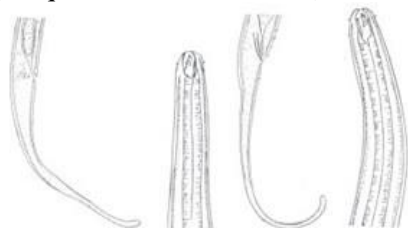
Genus *Oncholaimus* Dujardin, 1845
Oncholaimus oxyuris Ditlevsen, 1911
 In littoral zone, muddy, sandy area
 (Maqbool and Nasira, 1999b)



Male female head and tail (After
 Maqbool and Nasira, 1999)
Oncholaimus paraoxyuris Salma,
 Nasira, Saima and
 Shahina, 2017
 Sediments of low tidal mud
 (Salma *et al.*, 2017)



Heads male and female; Tails male and
 female (After Salma *et al.*, 2017)
 Genus *Viscosia* de Man, 1890
Viscosia elegans (Kreis, 1924)
 Coastal muddy area
 (Maqbool and Nasira, 1999)



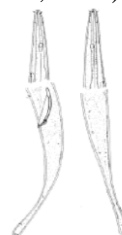
Male tail and anterior region, female tail
 and anterior region
 (After Nasira and Turpeeniemi, 2002)
 Genus *Pontonema* Leidy 1855
Pontonema multisetosum Timm, 1959
 112µ
 Rocks and algae at low tide
 (Timm, 1959 as *Pontonema multisetosus*)

Family Oxystominidae Chitwood, 1935
 Genus *Halalaimus* de Man, 1888.
Halalaimus gidanensis Nasira and
 Turpeenniemi, 2002 565µ in size
 Silty sand and mud bottoms
 (Nasira and Turpeeniemi, 2002)



Female and male, entire, heads and tails
 (After Nasira and Turpeeniemi, 2002)

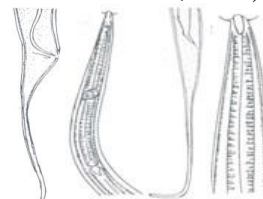
Genus *Oxystomina* Filipjev, 1921
Oxystomina elongata (Butschli, 1874)
 In littoral zone, backwaters, sandy area
 (Maqbool *et al.*, 1999)



Male female head and tail (After
 Maqbool *et al.*, 1999)

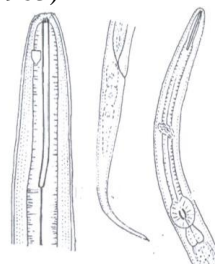
Family Anoplostomatidae Gerlach and
 Riemann, 1974

Genus *Anoplostoma* Butschli, 1874
Anoplostoma sunderbanae Timm, 1967
 size 1108µ.
 In littoral zone
 (Maqbool and Nasira, 1999)



Male tail and head; female tail and head
 (After Nasira and Turpeeniemi, 2002)

Family Rhabdolaimidae Chitwood, 1951
 Genus *Syringolaimus* de Man, 1888
Syringolaimus aff. brevicaudatus
 Micoletzky, 1922
 In littoral zone, mangrove stagnant water
 (Timm, 1963)



Female head and tail (After Timm, 1963)

Genus *Dolicholaimus* de Man, 1888
Dolicholaimus lichenii (Nasira and Turpeenniemi, 2002)
 In littoral zone, from lichens
 (Nasira and Turpeenniemi 2002 as *Trissonchulus lichenii*)



Male head and tail; female head and tail (After Nasira and Turpeenniemi, 2002)

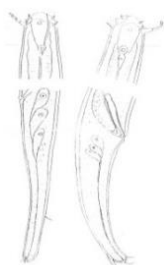
Genus *Trissonchulus* Cobb, 1920
Trissonchulus benepapillosus (Schulz, 1935) Gerlach and Riemann, 1974
 In littoral sandy zone
 (Maqbool and Nasira, 1999)



Male head and tail (After Nasira and Turpeenniemi, 2002)

Trissonchulus oceanus Cobb, 1920
 Sandy beach, brackish
 (Muhammad *et al.*, 2009)
 Order Dorylaimida Pearse, 1942

Family Tripyloididae Filipjev, 1918
 Genus *Bathylaimus* Cobb, 1894
Bathylaimus australis Cobb, 1894
 In littoral zone, brackish
 (Maqbool *et al.*, 1999)



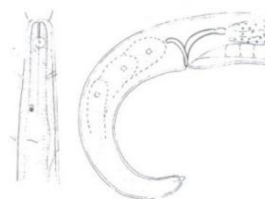
Female and male heads and tails (After Maqbool *et al.*, 1999)

Family Diplopeltidae Filipjev, 1918
 Genus *Araeolaimus* de Man, 1888
Araeolaimus elegans (de Man, 1888)
 In pilling scrapings including crustacean larvae, small polychaete annelids, encrusting protochordates, hydroids and algae.
 (Timm, 1963)



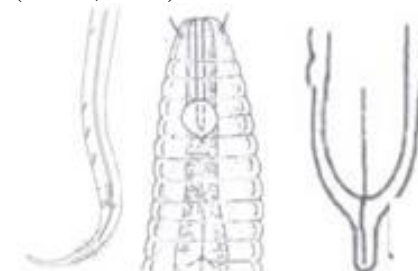
Male head and tail; female tail (After Timm, 1963)

Araeolaimus texianus Chitwood, 1951
 In pilling scrapings including crustacean larvae, small polychaete annelids, encrusting protochordates, hydroids and algae
 (Timm, 1963)



Male head and tail (After Timm, 1963)

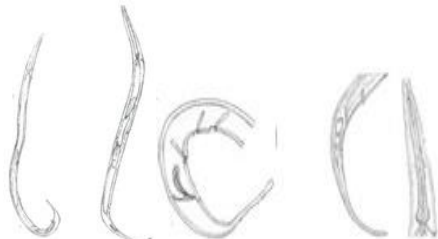
Family Leptolaimidae Orley, 1880
 Genus *Leptolaimus* de Man, 1876
Leptolaimus luridus Timm, 1963
 Littoral, in pilling scrapings including crustacean larvae, small polychaete annelids, encrusting protochordates, hydroids, and algae and bottom mud with organic detritus
 (Timm, 1963)



Male, tail, head and tail tip (After Timm, 1963)

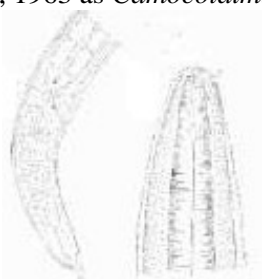
Leptolaimus rivalis (Gagarin and Thanh, 2007)

Holovachov and Boström, 2013
Mangrove backwaters
(Kamran *et al.*, 2010 as
Halaphanoclimus marinus Kamran,
Nasira and Shahina)



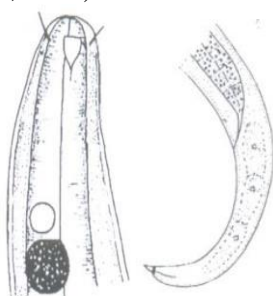
Male whole body head and tail; female
whole body head and tail (After Kamran
et al., 2010)

Family Camoclimidae Micoletzky, 1924
Genus *Deontolaimus* de Man, 1880
Deontolaimus tardus (de Man, 1889)
Holovachov and Boström, 2015
In littoral zone
(Timm, 1963 as *Camocolaimus tardus*)



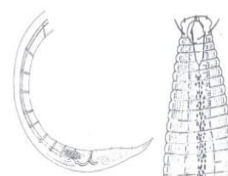
Female tail and head (After Timm, 1963)

Genus *Ionema* Cobb, 1920
Ionema cobbi (Steiner, 1916)
In littoral zone
(Timm, 1963)



Female head and tail (After Timm, 1963)

Genus *Listia* Blome, 1982
Listia granulifera (Timm, 1963)
Holovachov, 2003
In littoral zone
(Timm, 1963 as *Paraphanolaimus
granuliferus* Timm)



Male head; male tail (After Timm, 1963)

Genus *Diodontolaimus* Southern, 1914
Diodontolaimus karachiensis Nasira,
Shahina and Kamran, 2005 1.6 mm.
Intertidal muddy sediments
(Nasira *et al.*, 2005)



Female and male, tails and head (After
Nasira *et al.*, 2005)

Family Chronogastridae Gagarin, 1975
Genus *Chronogaster* Cobb, 1913
Chronogaster typica (de Man, 1921) de
Coninck, 1935
In littoral zone, thick bottom ooze with
little organic detritus
(Timm, 1963 as *Chronogaster typicus*)



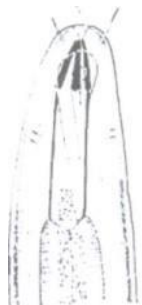
Female tail and head (After Timm, 1963)

Family Axonolaimidae Filipjev, 1918
Genus *Odontophora* Butschli, 1874
Odontophora hawkshiensis
Turpeenniemi, Nasira and Maqbool, 2001
1.4 mm.
In littoral zone, at low tide
(Turpeenniemi *et al.*, 2001 in family
Odontolaimidae)



Male tail and head (After Turpeenniemi
et al., 2001)

Genus *Parodontophora* Timm, 1963
Parodontophora pacifica (Allgen, 1947)
 In littoral zone
 (Timm, 1961 as *Pseudolella pacifica*
 (Allgen)



Female head (After Timm, 1963)

Parodontophora breviseta (Schuurmans
 Stekhoven, 1950)
 In littoral zone
 (Timm, 1963)

Parodontophora diegoensis (Allgen,
 1951)

In littoral zone
 (Timm, 1963)

Parodontophora polita Gerlach, 1955

In littoral zone
 (Timm, 1963)

Genus *Pseudolella* Cobb, 1920

Pseudolella granulifera Cobb, 1920

In littoral zone
 (Timm, 1963)



Male head and tail (After Timm, 1963)

Pseudolella norvegica Allgén, 1947

Littoral
 (Timm, 1963)



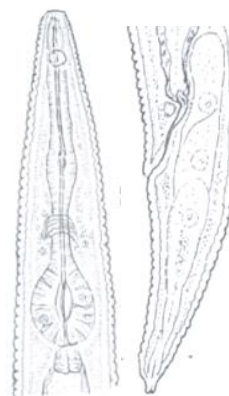
Habitus, head and tail (After Timm, 1963)

Family Haliplectidae Chitwood, 1951
 Genus *Haliplectus* Cobb, 1913
Haliplectus dorsalis Cobb in Chitwood
 1956
 Coastal rocky area
 (Nasira and Turpeenniemi, 2004)



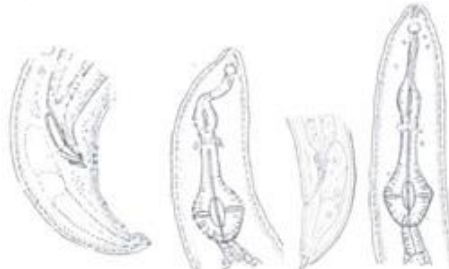
Male head and tail; female head and tail
 (After Nasira and Turpeenniemi, 2004)

Haliplectus monodelphis Shahina,
 Siddiqi and Nasira, 2014
 Mangrove sediments
 (Shahina *et al.*, 2014)



Female head and tail (After Shahina *et al.*, 2014)

Haliplectus pakistanensis Shahina,
 Siddiqi and Nasira, 2014
 Mangroves, sediments
 (Shahina *et al.*, 2014)



Male tail and head; female tail and head
 (After Shahina *et al.*, 2014)

Haliplectus minor Shahina, Siddiqi and
 Nasira, 2014
 Mangroves sediments
 (Shahina *et al.*, 2014)



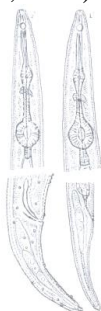
Female head and tail (After Shahina *et al.*, 2014)

Haliplectus robustus Shahina, Siddiqi and Nasira, 2014
Mangroves, sediments
(Shahina *et al.*, 2014)



Male head; Female and male tails (After Shahina *et al.*, 2014)

Haliplectus paradorsalis Shahina, Siddiqi and Nasira, 2014
Mangroves sediments
(Shahina *et al.*, 2014)



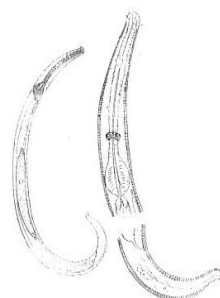
Male female heads and tails (After Shahina *et al.*, 2014)

Haliplectus gracilis Shahina, Siddiqi and Nasira, 2014
Mangroves, sediments
(Shahina *et al.*, 2014)



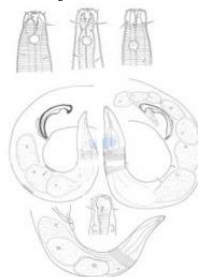
Female tail, entire and head (After Shahina *et al.*, 2014)
Order Desmodorida De Coninck, 1965

Family Microlaimidae Micoletzky, 1922
Genus *Microlaimus* de Man, 1880
Microlaimus arenarius (Blome, 1982)
Kovalyev and Miljutina, 2009
In subtidal sediment
(Nasira *et al.*, 2000 as *Calomicrolaimus arenarius* Blome)



Female, head and tail (After Nasira *et al.*, 2000)

Microlaimus africanensis Furstenberg and Vincx, 1992 Littoral
(Maqbool and Nasira, 1999 as *Microlaimus africanus*)



(After Maqbool and Nasira, 1999)

Microlaimus amphidius Kamran, Nasira and Shahina, 2009
Intertidal region
(Kamran *et al.*, 2009)



Male anterior region and tail; female anterior region and tail (After Kamran *et al.*, 2009)

Microlaimus arenicola Schulz, 1938
In littoral zone
(Nasira *et al.*, 2000)



Female, its head and tail; male, its head and tail (After Nasira *et al.*, 2000)

Microlaimus sonmianensis Nasira, Maqbool, Turpeeniemi and Zarina, 2000
In littoral zone, interstitial in silty sand and mud bottom at depth of 10-30 m. (Nasira *et al.*, 2000)



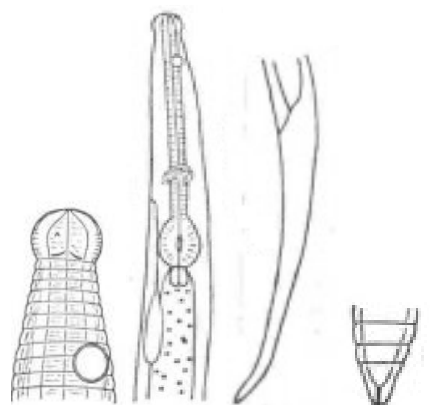
Female male (After Nasira *et al.*, 2000)

Microlaimus karachiensis Kamran, Nasira and Shahina, 2009
Intertidal sediments (Kamran *et al.*, 2009)



Male head and tail; female head and tail (After Kamran *et al.*, 2009)

Genus *Cinctonema* Cobb, 1920
Cinctonema papillatum Timm, 1962
Littoral (Timm, 1962 as *Cinctonema papillata*)



Female anterior region and head tail and tail-tip (After Timm, 1962)

Family Draconematidae Filipjev, 1918
Genus *Dracograllus* Allen and Noffsinger, 1978
Dracograllus demani Allen and Noffsinger, 1978
In littoral zone (Maqbool and Nasira, 1999)



(After Maqbool and Nasira, 1999)
Order Chromadorida Chitwood, 1933

Family Epsilonematidae Steiner, 1927
Genus *Bathyepsilonema* Steiner, 1927
Bathyepsilonema brachycephalum Steiner, 1931
Frequently found with supralittoral or intertidal fauna, but also in the deep sea. (Maqbool and Nasira, 2000 as *Bathyepsilonema dicampteryum* Steiner)



(After Maqbool and Nasira, 2000)

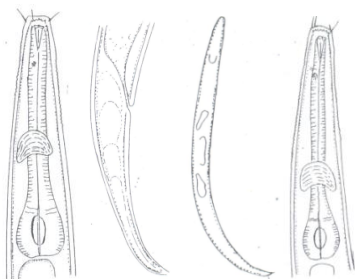
? Genus. *Metepsilonema* Steiner, 1927
Indetermined sp
Interstitial (Present study)



Order Plectida Gadea, 1973.

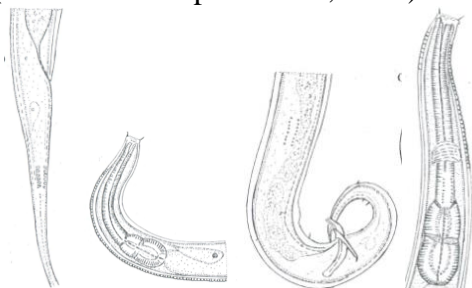
Family Chromadoridae Filipjev, 1927

Genus *Chromadora* Bastian, 1865
Chromadora nudicapitata (Bastian, 1865)
 In littoral muddy zone, mangrove areas back water
 (Turpeenniemi *et al.*, 2001)



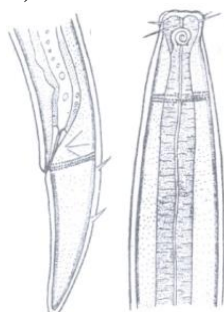
Male head and tail; female head and tail
 (After Turpeenniemi *et al.*, 2001)

Genus *Ptycholaimellus* Cobb, 1920
Ptycholaimellus sindhicus
 Turpeenniemi, Nasira and Maqbool, 2001
 In littoral zone, from lichens
 (Turpeenniemi *et al.*, 2001)
 Genus *Spilophorella* Filipjev, 1917
Spilophorella candida Gerlach, 1951
 0.068 mm.
 Intertidal on drift line
 (Nasira and Turpeenniemi, 2004)



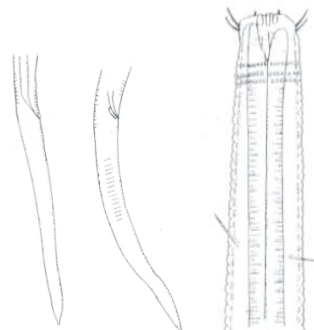
Male head and tail; female head and tail
 (After Nasira and Turpeenniemi, 2004)

Genus *Trichromadorita* Timm, 1961
Trichromadorita marinus Khan, 1991
 Benthic
 (Khan, 1991)



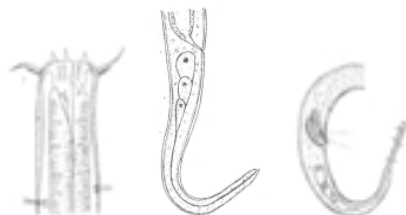
Female heads and tail (After Khan, 1991)

Genus *Endeolophos* Boucher, 1997
Endeolophos minutus (Gerlach, 1967)
 In supralittoral zone, interstitial
 (Maqbool and Nasira, 1999)



Male head, tail female tail (After Turpeenniemi *et al.*, 2001)

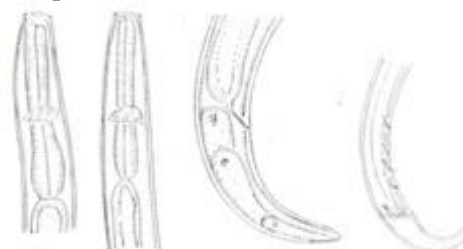
Family Cyatholaimidae Filipjev, 1918
 Genus *Marylynnia* Hopper, 1977
Marylynnia musharafii Nasira, Kamran and Shahina, 2007
 In littoral zone in creeks. Intertidal sediments
 (Nasira *et al.*, 2007)



Male and female tails and head (After Nasira *et al.*, 2007);

Genus *Paraacanthonchus* Micoletzky, 1924

Paraacanthonchus hawaiiensis Allgen, 1951
 In littoral zone
 (Turpeenniemi *et al.*, 2001)



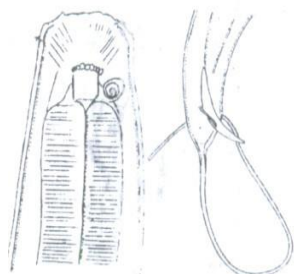
Male head and tail; female head and tail
 (After Turpeenniemi *et al.*, 2001)

Paraacanthonchus sandspitensis Nasira, Kamran and Shahina, 2007
 In littoral zone
 (Nasira *et al.*, 2007)



Male head and tail; female tail (After Nasira *et al.*, 2007)

Family Selachinematidae Cobb, 1915
Genus *Halichoanolaimus* de Man, 1886
Halichoanolaimus balochiensis
Turpeenniemi, Nasira and Maqbool, 2001
In littoral zone, in stagnant water, 100-300 m. depth range
(Turpeenniemi *et al.*, 2001)



Male anterior region and tail (After Turpeenniemi *et al.*, 2001)

Genus *Syonchium* Cobb, 1920
Syonchium pakistanense Kamran, Nasira and Shahina, 2009
Mangrove swamps .Intertidal.
(Kamran *et al.*, 2009)



Male

Female
(After Kamran *et al.*, 2009)

Syonchium oblongus Kamran, Nasira and Shahina, 2009
Intertidal, mangrove swamps
(Kamran *et al.*, 2009)



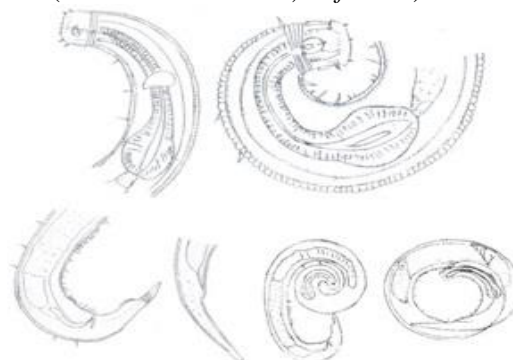
Male tail and head; female tail and head (After Kamran *et al.*, 2009)

Syonchium marina Kamran, Nasira and Shahina, 2009
Mangrove swamps, intertidal
(Kamran *et al.*, 2009)



Male habitus, head and tail (After Kamran *et al.*, 2009)

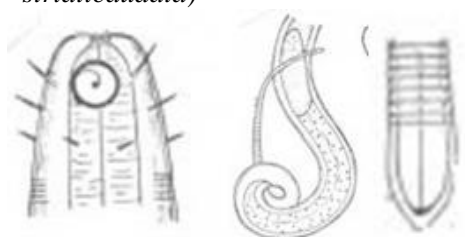
Family Desmodoridae Filipjev, 1922
Genus *Pseudochromadora* Daddy, 1899
Pseudochromadora cliftensis
(Turpeenniemi, Nasira and Maqbool, 2001)
Intertidal sediment of sand and mud of mangroves
(Turpeenniemi *et al.*, 2001 as *Desmodora* (*Pseudochromadora*) *cliftensis*)



Male female habitus, heads and tails (After Turpeenniemi *et al.*, 2001)

Genus *Metachromadoroides* Timm, 1961
Metachromadoroides remanei (Gerlach, 1951)

In littoral sandy zone
 (Maqbool and Nasira, 1999 as
Metachromadora
 (*Metachromadoroides*) *remanei*)
 Genus *Chromaspirinia* Filipjev, 1918
Chromaspirinia sp.
 Mangrove backwaters
 (Nasira and Shahina, 2007)
 Genus *Sprinia* Gerlach, 1963
Sprinia striaticaudata (Timm, 1962)
 Weiser and Hooper, 1967
 Intertidal zone, meiobenthic
 (Timm, 1962 as *Spirinia* (*Perspiria*)
striaticaudata)

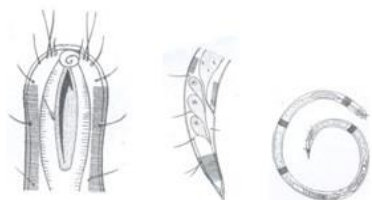


Female head tail and tail-tip (After Timm, 1962)

Genus *Onyx* Cobb, 1891
Onyx balochiensis Nasira, Rehmat and
 Shahina, 2011
 Sediments of sandy beaches
 (Nasira *et al.*, 2011)

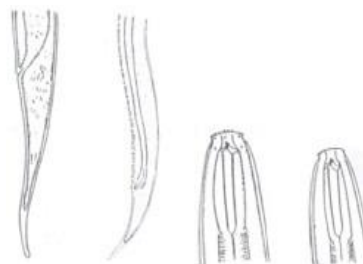


Male head and tail



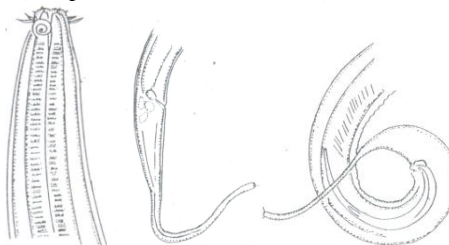
Female, head and tail (After Nasira *et al.*, 2011)

Family Ethmolaimidae Filipjev and
 Stekhoven, 1941
 Genus *Paraethmolaimus* Jensen, 1994
Paraethmolaimus appendixocaudatus
 Jensen, 1994
 Subtidal sediment of sandy beach, in
 creeks
 (Maqbool and Nasira, 1999)



Male anterior region and tail Female
 (After Maqbool and Nasira, 1999)

Family Comesomatidae Filipjev, 1918
 Genus *Paracomesoma* Hope and
 Murphy, 1972
Paracomesoma longispiculum (Timm,
 1961)
 Littoral, sandy zone
 (Turpeenniemi *et al.*, 2001)



Male head and tail; female tail (After
 Turpeenniemi *et al.*, 2001)

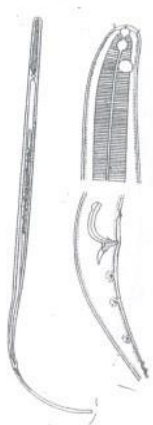
Genus *Sabatieria* Rouville, 1903
Sabatieria microsetosa Timm, 1967
 Littoral, in creeks
 (Mohammad *et al.*, 2009)
 Order Monhysterida Filipjev, 1929

Family Monhysteridae de Man, 1876
 Genus *Monhystera* Bastian, 1865
Monhystera marina Nasira, Kamran and
 Shahina, 2007 in back waters
 (Nasira, *et al.*, 2007)

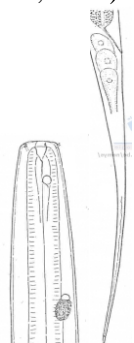


Head and tail (After Nasira *et al.*, 2007)

Genus *Diplolaimella* Allgen, 1929
Diplolaimella dievengatensis Jacobs and
 Vrancken, 1990
 Backwater in mangroves
 (Nasira *et al.*, 2010)

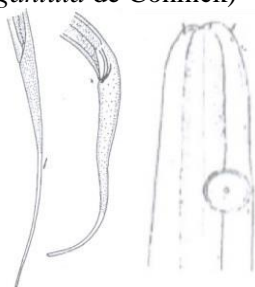


Whole body; head and tail (After Nasira *et al.*, 2010)
Genus *Diplolaimelloides* Meyl, 1954
Diplolaimelloides delyi Andrassy, 1958
Creeks, sediments
(Muhammad *et al.*, 2009)



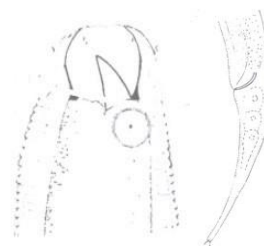
Female head and tail (After Timm, 1966)

Genus *Monhystrella* Cobb, 1918
Monhystrella parelegantula (De Coninck, 1943)
In littoral zone
(Timm, 1963 as *Monhystera parelegantula* de Coninck)



Female and male tails; male head (After Timm, 1963)

Genus *Sphaerotheristus* Timm, 1968
Sphaerotheristus macrostoma (Timm, 1963)
In littoral zone
(Timm, 1963 as *Cobbia macrostoma*)



Male head and tail (After Timm, 1963)

Genus *Trichotheristus* Wieser, 1956
Trichotheristus floridanus (Wieser and Hopper, 1967)
Sandy-cum rocky beaches
(Nasira *et al.*, 2010)



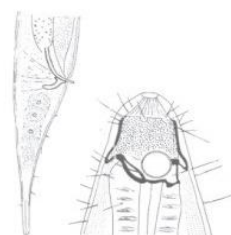
Male whole body head and tail (After Nasira *et al.*, 2010)

Family Sphaerolaimidae Filipjev, 1918
Genus *Sphaerolaimus* Bastian, 1865
Sphaerolaimus gracilis de Man, 1876
In littoral zone
(Maqbool *et al.*, 1999)



Female and male heads and tails (After Maqbool *et al.*, 1999)

Sphaerolaimus maeoticus Filipjev, 1922
In subtidal sediments
(Timm, 1963)



Male head and tail (After Timm, 1963)

Family Linhomoeidae Filipjev, 1922

Genus *Paralinhomoeus* de Man, 1907

Paralinhomoeus dubius Timm, 1961

Mangroves, interstitial

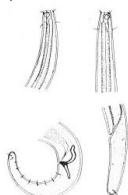
(Timm, 1961)

Genus *Eleutherolaimus* Filipjev, 1922

Eleutherolaimus inglisi Timm, 1967

In littoral sandy zone, estuarine

(Timm, 1967)



Male and female heads and tails (After Maqbool *et al.*, 1999)

Eleutherolaimus longus Filipjev, 1922

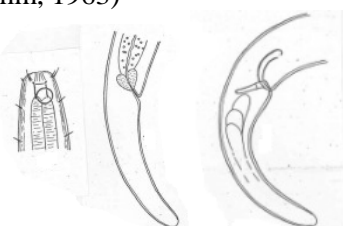
In littoral zone

(Maqbool and Nasira, 1999)

Eleutherolaimus obtusicaudatus Allgen, 1947

In littoral zone

(Timm, 1963)



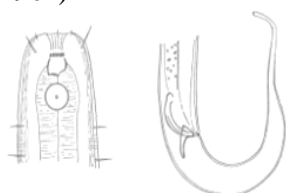
Female head and tail; male tail (After Timm, 1962)

Genus *Megadesmolaimus* Wieser, 1954

Megadesmolaimus contortus Timm, 1962

In littoral sandy zone

(Timm, 1962)



Male head and tail (After Timm, 1962)

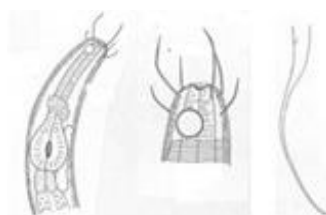
Genus *Metalinhomoeus* de Man, 1907

Metalinhomoeus karachiensis Timm, 1962

In littoral zone

Bottom mud with much organic detritus in littoral zone

(Timm, 1962)



Female anterior, head region and tail (After Timm, 1962)

Genus *Linhomoeus* Bastian, 1865

Linhomoeus sp.

Mangrove areas of back water

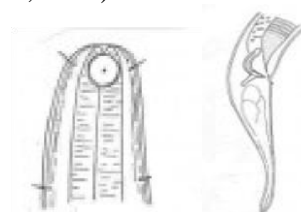
(Nasira and Shahina, 2007)

Genus *Terschellingia* de Man, 1888

Terschellingia magna Timm, 1962

In littoral zone

(Timm, 1963)



Female head; male tail (After Timm, 1962)

Terschellingia lissa Timm, 1962

In littoral muddy zone

(Timm, 1962; Khan *et al.*, 1991)

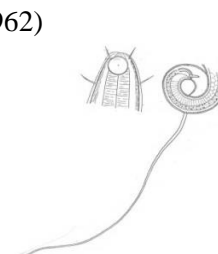


Female tail and head (After Timm, 1962)

Terschellingia longissimicaudata Timm, 1962

In littoral zone

(Timm, 1962)

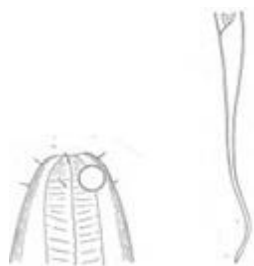


Male head and tail (After Timm, 1962)

Terschellingia magna Timm, 1962

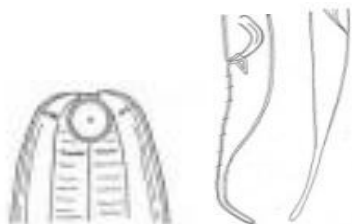
In littoral muddy zone with little organic detritus

(Timm, 1962)



Female head and tail (After Timm, 1962)

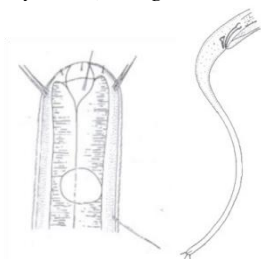
Terschellingia mora Gerlach, 1956
 In littoral zone with thick bottom ooze with little organic detritus and coarse sediments
 (Timm, 1962; Khan *et al.*, 1991)



Male head and tail; female tail (After Timm, 1962)

Terschellingia longicaudata de Man, 1907
 Piling scrapings or with various amounts of organic detritus
 (ZSP, 1959)

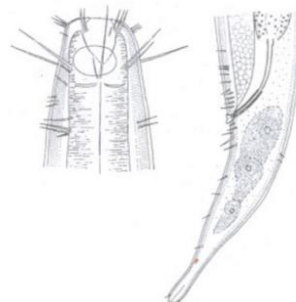
Family Xyalidae Chitwood, 1951
 Genus *Paramonhystera* Steinar, 1916
Paramonhystera longicaudata Timm, 1963
 Bottom mud with much organic detritus
 (Timm, 1963 as *Paramonhystera* (*Paramonhystera*) *longicaudata* Timm)



Male head and tail (After Timm, 1963)

Paramonhystera pellucida (Cobb, 1920)
 In piling scrapings including crustacean larvae, small polychaete annelids, encrusting protochordates, hydroids and algae and bottom mud with organic detritus

(Timm, 1963 as *Paramonhystera* (*Leptogastriclla*) *pellucida*)



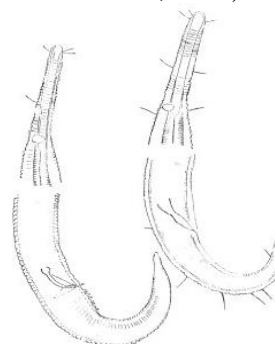
Male head and tail (After Timm, 1963)

Genus *Gonionchus* Cobb, 1920
Gonionchus arabica Nasira and Turpeeniemi, 2003
 In littoral sandy zone
 (Nasira and Turpeeniemi, 2003)



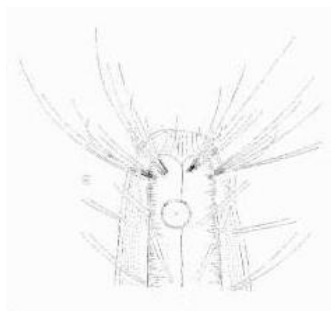
Male head and tail region (After Nasira and Turpeeniemi, 2003)

Genus *Rhynchonema* Cobb, 1920
Rhynchonema scutatatum Lorenzen, 1972
 In littoral zone
 (Turpeeniemi *et al.*, 2001)



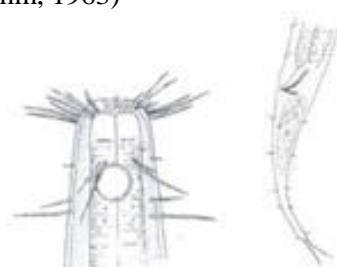
Male female heads and tails (After Turpeeniemi *et al.*, 2001)

Genus *Steineria* Micoletzky, 1922
Steineria pilosa brevisetososa Timm, 1957
 In littoral zone
 (Timm, 1957)



Male head (After Timm, 1957)

Steineria simplex Timm, 1963
In littoral zone
(Timm, 1963)



Male head and tail (After Timm, 1963)

Genus *Theristus* Bastian, 1865
Theristus cylindricus Salma, Saima,
Nasira and Shahina, 2017
Sediments
(Salma *et al.*, 2017)



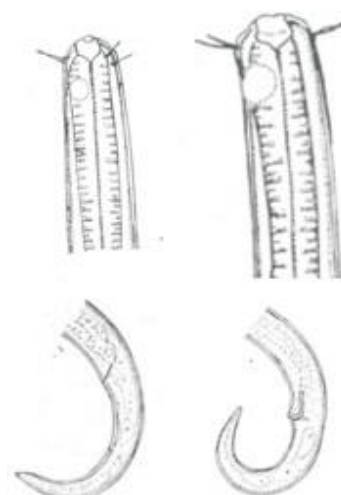
Tails: male and female; Heads male and female (After Salma *et al.*, 2017)

Theristus flevensis Stekhoven, 1935
In littoral zone
(Maqbool and Nasira, 1999)



Male and female heads and tails (After Maqbool and Nasira, 1999)

Theristus otoplanobius Gerlach, 1951
In littoral zone
(Maqbool and Nasira, 1999)



Female head and tail; male head and tail
(After Maqbool and Nasira, 1999)

Theristus paradieusis Maqbool and
Nasira, 1999
In littoral zone
(Maqbool and Nasira, 1999)

Theristus longisetifer Kito and
Aryuthaka, 1998
In clay and mud
(Nasira *et al.*, 2010)



Whole body; head (After Nasira *et al.*,
2010)

Theristus karachiensis (Timm, 1963)
In littoral zone.
(Timm, 1963 as *Monhystera karachiensis*
Timm)



Male tail and female head (After Timm,
1963)

Theristus (P.) karachiense Salma,
Saima, Nasira and Shahina, 2017
Sediments
(Salma *et al.*, 2017)



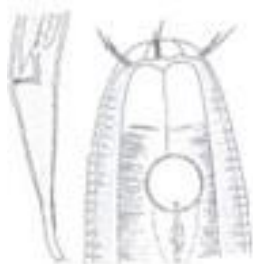
Male and female heads and tails (After Salma *et al.*, 2017)

Genus *Daptonema* Cobb, 1920
Daptonema normandicum (de Man, 1890)
 Thick bottom ooze with little organic detritus
 (Timm, 1963 as *Theristus* (*Cylindrotheristus*) *normandicus* de Man)



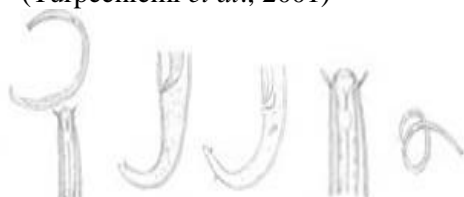
Male tail (After Timm, 1963)

Genus *Cylindrotheristus* Wieser, 1956
Cylindrotheristus polaris (Cobb, 1914) Wieser, 1956
 In littoral zone
 (Timm, 1963 as *Theristus* (*Cylindrotheristus*) *polaris*)



Male tail; female head (After Timm, 1963)

Genus *Arabanema* Turpeeniemi, Nasira and Maqbool, 2001
Arabanema pakistanensis Turpeeniemi, Nasira and Maqbool, 2001
 Sandy beach in shallow sublittoral sand (Turpeeniemi *et al.*, 2001)

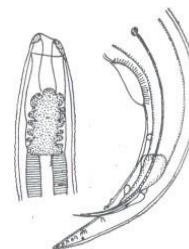


Male and female, heads and tails (After Turpeeniemi *et al.*, 2001)
 Class Chromadorea Park, Sultana, Lee, Kang, Kim, Min, Eom, and Nadler, 2011
 Order Rhabditida Chitwood, 1933
 Suborder Spirurina Railliet and Henry, 1915

Family Anisakidae Railliet and Henry, 1912
 Genus *Anisakis* Dujardin, 1845
Anisakis typical (Diesing, 1860) Baylis, 1920
 Parasitic Host: *Delphinus tropicalis* and *Neophocaena phocaenoides* (Cetaceans)

Family Seuratidae Railliet, 1906
 Genus *Haplonema* Ward and Magath, 1917
Haplonema immutatum (Ward et Magath, 1917)
 Parasitic, Host: *Arius arius* (Fish) (Sattar *et al.*, 2016)

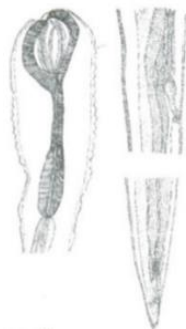
Family Kathlaniidae Travassos, 1918
 Genus *Falcaustra* Lane, 1995
Falcaustra stromateii (Bilqees and Khanum, 1971)
 Parasitic. Host: *Stromateus sinensis* (Fish) (Bilqees and Khanum, 1971 as *Kathlania stromateii*)



(After Bilqees and Khanum, 1971)

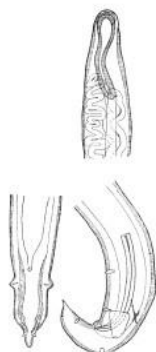
Family Cucullanidae Cobbold, 1864
 Genus *Cucullanus* Mueller, 1777
Cucullanus quadrii Bilqees and Fatima, 1980
 Parasitic. Host: *Netuma thalassina* (Fish) (Bilqees and Fatima, 1980)
Cucullanus sp.
 Parasitic. Host: *Pomadasys argenteus* (Fish) (Akram, 1999)
Cucullanus bilqeesi Petter, 1974
 Parasitic. Host: *Ilisha elongata* (Fish)

(Bilqees, *et al.*, 1971 as *Cucullanus elongatus*; Akram and Khatoon)



Cucullanus calcariferii (Zaidi and Khan, 1975)

Parasitic. Host: *Lates calcarifer* (Fish) (Zaidi and Khan, 1975 as *Indocucullanus calcariferii*; Soota, 1983 as *Cucullanus jaiswali* (Ali) Petter, 1974)



Cucullanus longispiculum diacanthi (Bilqees, Fatima and Rehana, 1977)

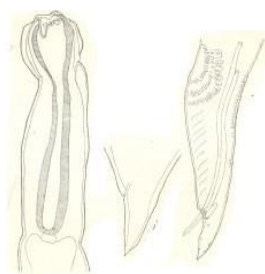
Parasitic. Host: *Protonibea diacanthus* (Fish) (Bilqees *et al.*, 1977 as *Indocucullanus longispiculum diacanthi*; Akram, 1992)



Heads and tails (After Bilqees *et al.*, 1977)

Cucullanus dorabi (Ashraf, Farooq and Khanum, 1977)

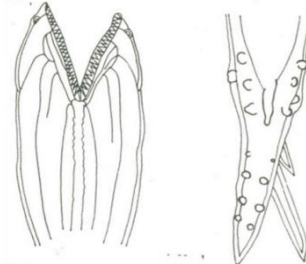
Parasitic. Host: *Chirocentrus dorab* (Fish) (Ashraf *et al.*, 1977 as *Indocucullanus dorabi*)



Female anterior and tail ;male tail (After Ashraf *et al.*, 1977)

Cucullanus hians Dujardin, 1845

Rasheed, 1968, 12-17 mm
Parasitic. Hosts: *Lates calcarifer*, *Eleutheronema tetradactylum*, *Pomadasys olivaceus* *Acanthopagurus berda* and *Pomadasys kakaan.* (Fish) (Rasheed, 1968, also as *Cucullanus indentatus*)



(After Rasheed, 1968)

Cucullanus karachii (Zaidi and Khan, 1975).

Parasitic. Host: *Stolephorus indicus* (Fish) (Zaidi and Khan, 1975 as *Indocucullanus karachii*)



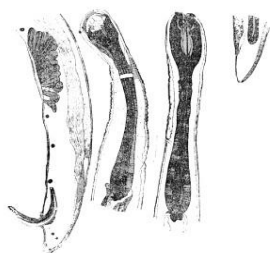
Head and tail (After Zaidi and Khan, 1975)

Cucullanus olivoceus Akram, 1976

Parasitic. Hosts: *Netuma thalassina*, *Pomadasys olivaceus* (Fish) (Akram, 1975)

Cucullanus armatus Yamaguti, 1954
7.95-13.35 mm.

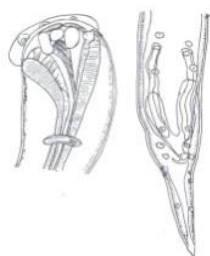
Parasitic. Host: *Netuma thalassina* (Fish) (Rasheed, 1968)



Male tail and anterior end, female anterior end and tail (After Bilqees and Fatima, 1980)

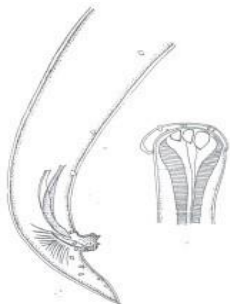
Cucullanus sparus Akram, 1975
Parasitic. Hosts: *Argyrops spinifer*,
Plicofollis dussumieri (Fish)
(Akram, 1975)

Cucullanus arabianse (Ali and Kalyankar, 1967) Petter, 1974
Parasitic. Host: *Arius maculatus* (Fish)
(Akram, 1976 as *Cucullanus tachysurus* Akram)



(After Akram, 1976)

Cucullanus theraponi Rasheed, 1968
Parasitic. Host: *Terapon* sp. (Fish)
(Rasheed, 1968)



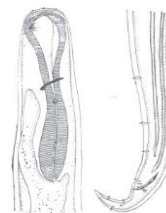
Tail and head (After Rasheed, 1968)

Cucullanus aliyai Akhtar, 2008
Parasitic. Host: *Otolithes ruber* (Fish)
(Akhtar, 2008, unpublished; Akhtar and Mujeeb, 2012)



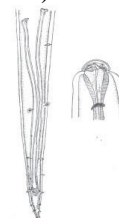
Female head and tail; male head and tail
(After Akhtar and Mujeeb, 2012)

Cucullanus diminutus Rasheed, 1968
Parasitic. Host: *Parastromateus niger*
(Fish)
(Rasheed, 1968; Soota, 1983 as
Dichelyne (Dichelyne) diminutus Petter,
1974)



Head and tail (After Rasheed, 1968)

Cucullanus exiguus (Yamaguti, 1954)
Rasheed, 1968
Parasitic. Hosts: *Lates calcarifer*,
Protonibea sp. (Fish)
(Rasheed, 1968)



(After Rasheed, 1968)

Cucullanus haemulus (Akram, 1992)
Parasitic. Host: *Pomadasys argenteus*
(Fish)
(Akram, 1992)

Cucullanus pakistanensis Bilqees,
Khalil, Akhtar, and Kakar, 2005
Parasitic. Host: *Protonibea diacanthus*
(Fish)
(Bilqees *et al.*, 2005)



(After Bilqees *et al.*, 2005)

Cucullanus mujibi Bilqees, Akhtar,
Haseeb and Khalil, 2005
Parasitic. Host: *Netuma thalassina* (Fish)
(Bilqees *et al.*, 2005)



(After Bilqees *et al.*, 2005)

Cucullanus olivaceus (Bilqees, 1976)
Parasitic. Host: *Otolithes ruber* (Fish)
(Bilqees, 1976 as *Indocucullanus olivaceus* Bilqees)

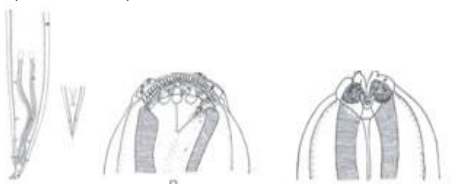
Cucullanus longispiculum De Oliveira Rodrigues, Carvalho Varela, Sodre' Rodrigues and Cristofaro, 1973
Parasitic. Hosts: *Lates calcarifer*; *Protonibea diacanthus* (Fish)
(Khan, 1969 as *Indocucullanus longispiculum*; Bilqees, 1971 as *Oceanicucullanus diacanthi* Bilqees)



Male head; male and female tails (After Khan, 1969)

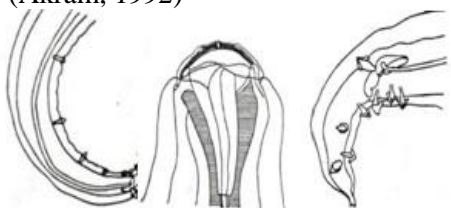
Cucullanus khalili Khan, Bilqees and Ghazi, 1991
Parasitic. Host: *Labeo rohita* (Fish)
(Khan, *et al.*, 1991)
Genus *Dichelyne* (*Dichelyne*)
Jägerskiöld, 1902

Dichelyne (Dic) rasheedae Petter, 1974
helyne
Parasitic. Host: *Pomadasys kakaan* (Fish)
(Rasheed, 1968 as *Cucullanus fastigatus* (Chandler))



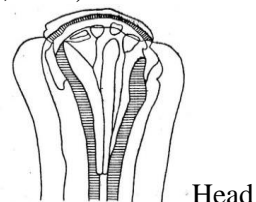
Male female tails and heads (After Rasheed, 1968)

Dichelyne sindensis Akram, 1992.
Parasitic. Hosts: *Lutjanus johni*, *Rachycentron canadum* (Fish)
(Akram, 1992)



Male tail and head; female tail (After Akram, 1992)

Dichelyne haemulus Akram, 1992
Parasitic. Host: *Pomadasys argenteus* (Fish)
(Akram, 1992)



Head

Family Heterocheilidae Railliet and Henry, 1915

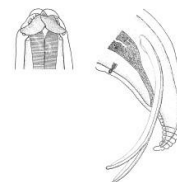
Genus *Dujardinascaris* Baylis, 1947
Dujardinascaris karachiensis Bilqees, Shabbir and Haseeb, 2004

Parasitic. Host: *Pomadasys olivaceus* (Fish)
(Bilqees *et al.*, 2004)



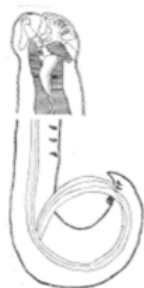
Habitus, head and tail (After Bilqees *et al.*, 2004)

Dujardinascaris magna Khan and Begum, 1971
Parasitic. Host: *Johnius* sp. (Fish)
(Khan and Begum, 1971)



Male head and tail (After Khan and Begum, 1971)

Dujardinascaris quadrii Zubairi and Farooq, 1976
Parasitic. Host: *Johnius* sp (Fish)
(Zubairi and Farooq, 1976)



Head and tail (After Zubairi and Farooq, 1976)

Dujardinascaris sciaenae Bilquees, Fatima and Rehana, 1977
Parasitic. Host: *Protonibea diacanthus* (Fish)
(Bilquees *et al.*, 1977)

Dujardinascaris sciaena Bilquees, Shabbir and Haseeb, 2004
Parasitic. Host: *Scomberoides lysan* (Fish)
(Bilquees *et al.*, 2004)

Dujardinascaris mujibi Akhtar and Bilquees, 2009
Parasitic. Hosts: *Sphyaena forsteri*, *Argyrops spinifer* (Fish)
(Akhtar and Bilquees, 2009)

Dujardinascaris jello Akhtar and Bilquees, 2008
Parasitic. Host: *Sphyaena jello* (Fish)
(Akhtar and Bilquees, 2008)



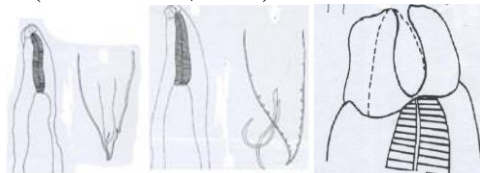
Male and female heads and tails (After Akhtar and Bilquees, 2008)

Dujardinascaris sinjarii Akhtar, Bilquees, Khatoon and Perven, 2011
Parasitic. Host: *Otolithes ruber* (Fish)
(Akhtar *et al.*, 2011)



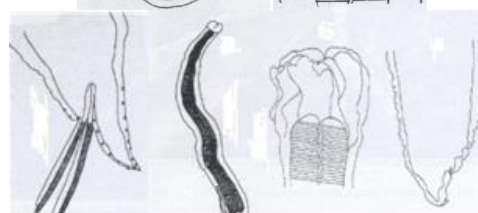
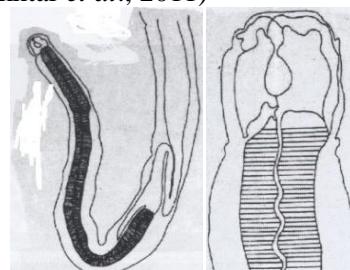
Male head and tail; female head and tail

Dujardinascaris multiporous Akhtar, Bilquees, Khatoon and Perven, 2011
Parasitic. Host: *Pomadasys olivaceus* (Fish)
(Akhtar *et al.*, 2011)



Male and female, heads and tails (After Akhtar *et al.*, 2011)

Dujardinascaris dentatus Akhtar, Bilquees, Khatoon and Perven, 2011
Parasitic. Host: *Sillago sihama* (Fish)
(Akhtar *et al.*, 2011)



Male and female, heads and tails (After Akhtar *et al.*, 2011)

Dujardinascaris sphyaenaii Akhtar, Bilquees, Khatoon and Perven, 2011
Parasitic. Host: *Sphyaena jello* (Fish)
(Akhtar *et al.*, 2011)



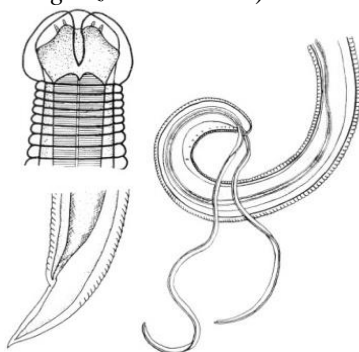
Female head and tail; male tail (After Akhtar *et al.*, 2011)

Dujardinascaris maculatum Akhtar and Bilquees, 2011
Parasitic. Host: *Pomadasys maculatum* (Fish)
(Akhtar and Bilquees, 2011)



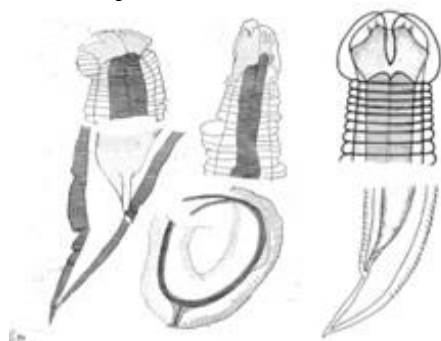
Head and tail (After Akhtar and Bilqees, 2011)

Family Raphidascarididae Hartwich, 1954
 Genus *Iheringascaris* Pereira, 1935
Iheringascaris iniquies (Linton, 1901)
 Parasitic. Host: *Rachycentron canadum* (Fish)
 (Rasheed, 1965; Khan and Begum, 1971 as *Neogoezia elacateiae*)



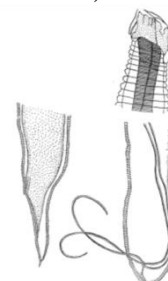
Male and female head and tail (After Khan and Begum, 1971)

Genus *Raphidascaris* Raillet and Henry, 1915
Raphidascaris acus (Bloch, 1779), larvae
 Parasitic. Host: *Netuma thalassina* (Fish)
 (Sattar *et al.*, 2016)
Raphidascaris alaetocephala (Bilqees and Khanum, 1972) taxon inquirendum
 Parasitic. Host: *Mustelus mosis* (Fish)
 (Bilqees and Khanum, 1972 as *Neogoezia alaetocephala*)



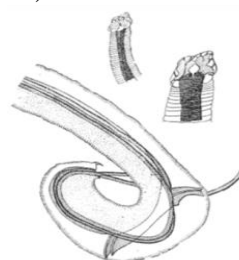
(Heads and tails after Bilqees and Khanum, 1972)

Rhaphidascaris aspinosa (Bilqees and Khanum, 1972) taxon inquirendum
 Parasitic. Host: *Mustelus mosis* (Fish)
 (Bilqees and Khanum, 1972 as *Neogoezia aspinosa*
 Bilqees and Khanum)



(After Bilqees and Khanum, 1972)

Rhaphidascaris karachiensis (Bilqees and Khanum, 1972) taxon inquirendum
 Parasitic. Hosts: *Mustelus mosis*,
Parastromateus niger (Fish)
 (Bilqees and Khanum, 1972 as *Neogoezia karachiensis*)



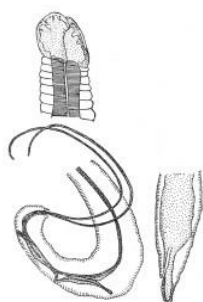
(After Bilqees and Khanum, 1972)

Rhaphidascaris manazi (Bilqees and Khanum, 1972) taxon inquirendum
 Parasitic. Host: *Mustelus mosis* (Fish)
 (Bilqees and Khanum, 1972 as *Neogoezia manazi*)



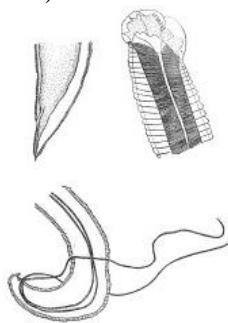
(After Bilqees and Khanum, 1972)

Rhaphidascaris mangra (Bilqees and Khanum, 1972) taxon inquirendum
 Parasitic. Host: *Mustelus mosis* (Fish)
 (Bilqees and Khanum, 1972 as *Neogoezia mangra*)



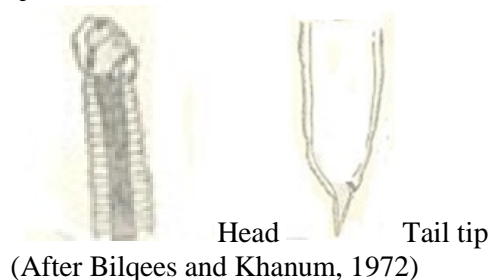
Head and tails (After Bilqees and Khanum, 1972)

Rhabdascaris multipapilla (Bilqees and Khanum, 1972) taxon inquirendum
Parasitic. Hosts: *Mustelus mosis*; *Parastromateus niger* (Fish)
(Bilqees and Khanum, 1972 as *Neogoezia multipapilla*)

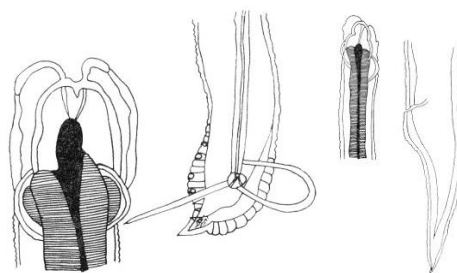


(After Bilqees and Khanum, 1972)

Rhabdascaris spirocaudata (Bilqees and Khanum, 1972) taxon inquirendum
Parasitic. Host: *Mustelus mosis* (Fish)
(Bilqees and Khanum, 1972 as *Neogoezia spirocaudata*)



Rhabdascaris larvae
Parasitic. Host *Mugil cephalus*
(Saleem *et al.*, 2022)
Genus *Rhabdascaroides* Yamaguti, 1941
Rhabdascaroides blochii Bilqees and Khanum, 1974
Parasitic. Host: *Sphyrna blochii* (Fish)
(Bilqees and Khanum, 1974)



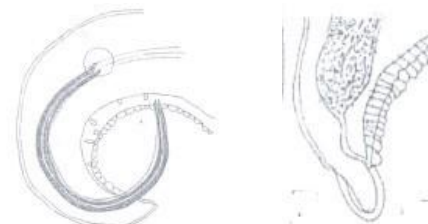
Female head and tail; male head and tail (After Bilqees and Khanum, 1974)

Rhabdascaroides elongatus Bilqees, Shaukat, Naqvi and Muti-ur -Rehman, 2005 uncertain > taxon inquirendum
Parasitic. Host: *Pellona elongata* (Fish)
(Bilqees *et al.*, 2005)



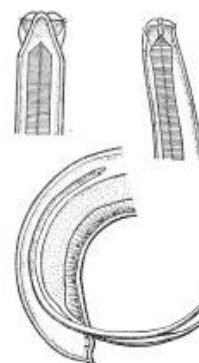
Male head

Male tail



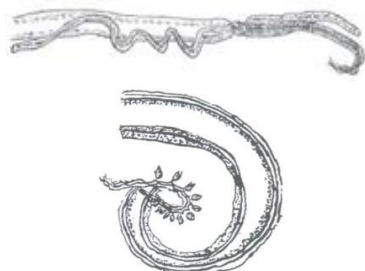
Female tail (After Bilqees *et al.*, 2005)

Genus *Paranisakis* Baylis, 1923
Paranisakis sciaenae (Khan and Begum, 1971)
Parasitic. Host: *Protonibea dicanthus* (Fish)
(Khan and Begum, 1971 as *Ortoanisaki sciaenae*)



Female head, male tail (After Khan and Begum, 1971)

Family Anisakidae Skrjabin and Karokhin, 1945
 Genus *Lappetascaris* Rasheed, 1965
Lappetascaris lutjani Rasheed, 1965
 Parasitic. Host: *Lutjanus johni* (Fish)
 (Rasheed, 1965)

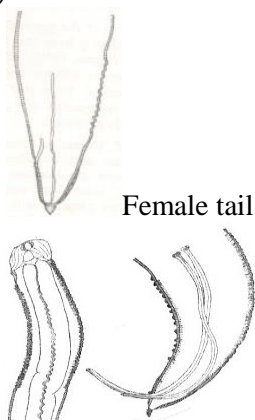


Anterior end and tail (After Rasheed, 1965)

Genus *Thynnascaris* Dollfus, 1933
Thynnascaris inequies (Linton, 1901)
 Parasitic. Host: *Rachycentron canadum* (Fish)
 (Rasheed, 1965)

Genus *Hysterothylacium* Ward and Magath, 1917
Hysterothylacium synpapillus (Bilqees, Khanum and Jehan, 1971) 44-56.9 mm.
 Parasitic. Host: *Muraenesox cinereus* (Fish)
 (Bilqees *et al.*, 1971 as *Contraecaecum synpapillus*)

Hysterothylacium otolithii (Bilqees and Rashid, 1982)
 Parasitic. Host: *Otolithes ruber* (Fish)
 (Bilqees and Rashid, 1982 as *Contraecaecum otolithii* Bilqees and Rashid)



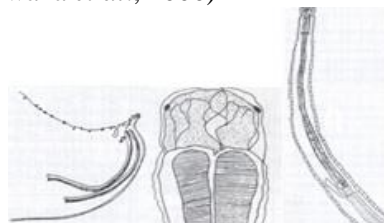
Male head and tail (After Bilqees and Rashid, 1982)

Genus *Goezia* Zeder, 1800

Goezia pakistanica Bilqees, Fatima and Rehana, 1977

Parasitic. Host: *Parastromataeus niger* (Fish)
 (Bilqees *et al.*, 1977)

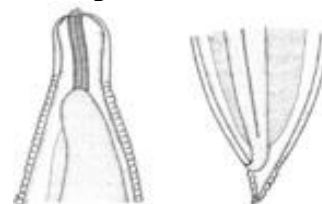
Goezia argenticaculatii Rizwana, Ghazi, Khatoon and Bilqees, 2000
 Parasitic. Host: *Lutjanus argenticaculatus* (Fish)
 (Rizwana *et al.*, 2000)



Male tail tip, head, anterior part (After Rizwana *et al.*, 2000)

Genus *Contraecaecum* Railliet and Henry, 1912

Contraecaecum collieri Chandler, 1935
 Parasitic. Host: *Planiliza parsia* (Fish)
 (Khan and Begum, 1971)



Female anterior end and tail (After Khan and Begum, 1971)

Contraecaecum vittati Khan and Begum, 1971

Parasitic. Host: *Upeneus vittatus* (Fish)
 (Khan and Begum, 1971)



Female head and tail (After Khan and Begum, 1971)

Contraecaecum sp. (larva)

Parasitic. Host: *Muraenesox cinereus* (Fish)

(Bilqees, 1992)

Family Ascarididae Baird, 1853

Genus *Porrocaecum* Railliet and Henry, 1912

Porrocaecum ruberum Bilqees, Khanum and Jehan, 1971 17.8 mm.

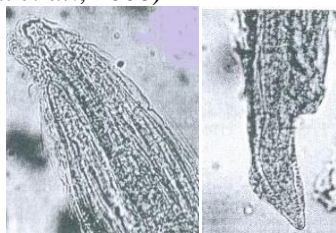
Parasitic. Host: *Otholithus ruber* (Fish) (Bilqees *et al.*, 1971)

Genus *Ascaris* Linnaeus, 1758

Ascaris sp

Parasitic. Host: *Ellochelon vaigiensis* (Fish)

(Azmat *et al.*, 2008)



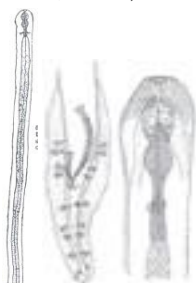
Head and tail (Azmat *et al.*, 2008)

Family Physalopteridae (Railliet, 1893) Leiper, 1908

Genus *Bulbocephalus* Rasheed, 1966

Bulbocephalus inglisi Rasheed, 1966.

Parasitic. Hosts: *Eleuthronema tetradactylum*, *Psettodes erumei* (Fish) (Rasheed, 1966 and as *Cestocephalus serratus* Rasheed, 1966)



Anterior end posterior end (After Rasheed, 1966)

Genus *Heliconema* Travassos, 1919

Heliconema hamiltonii Bilqees and Khanum, 1970

Parasitic. Host: *Minimugil cascasia* (Fish)

(Bilqees and Khanum, 1970)



Female head and tail tip (After Bilqees and Khanum, 1970)

Heliconema heliconema Travassos, 1919

Parasitic. Host: *Muraenesox cinereus* (Fish)

(Khan and Begum, 1971)

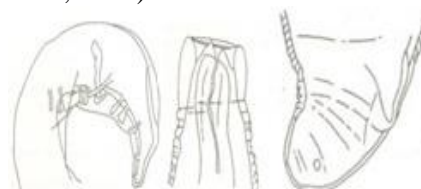


Female anterior region and tail; male posterior and anterior regions (After Khan and Begum, 1971)

Heliconema savala Akram, 1996

Parasitic. Host: *Lepturacanthus savala* (Fish)

(Akram, 1996)



Male anterior end and tail
Female tail (After Akram, 1996)

Family Gnathostomatidae Lane, 1923

Genus *Echinocephalus* Molin, 1958

Echinocephalus uncinatus Molin, 1858

Parasitic. Hosts: *Cynoglossus bilineatus*, *Lates calcarifer*, *Muraenesox cinereus* (Fish)

(Bilqees *et al.*, 1971 as *Echinocephalus muraenesocis*; species of *Echinocephalus* described solely from larvae should also be considered as species inquirendae or species dubiae, because the morphology of larvae considerably differs from that of conspecific adults. cf WoRMS)

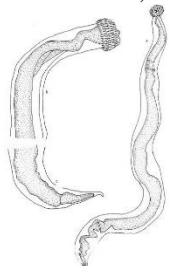


Male and female heads and tails (After Khan and Begum, 1971)

Echinocephalus sp.

Parasitic. Host: *Scapharca natalensis* (Bivalvia)

(Moazzam and Moazzam, 2014)



***Ehinoccephalus* sp.**
Parasitic, Host: *Ellochelon vaigiensis*
(Fish)
(Azmat *et al.*, 2008)



Tail tip and head (After Azmat *et al.*, 2008)

Family Rhabdochonidae Skrjabin, 1946
Genus *Rhabdochona* Railliet, 1916

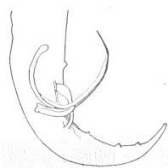
***Rhabdochona* sp.**
Parasitic. Host: *Macrobrachium rosenbergii* (Crustacea)
(Khan *et al.*, 2015)

Family Spiruridae Oerley, 1885
Genus *Heptochona* Rasheed, 1965
Heptochona rivdica Akram, 1988,
invalid name

Parasitic. Host: *Parastromateus niger*
(Fish)
(Akram, 1988)

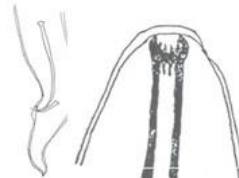
Heptochona sindica (Akram and Pie de
Imprenta, 1988) 32 mm.

Parasitic. Host: *Parastromateus niger*
(Fish)
(Akram, 1988; invalid (Moravec *et al.*,
2007)



Head and tailtip (After Akram, 1988)
Heptochona stromatei Rasheed, 1965

Parasitic. Hosts: *Parastromateus niger*;
Otolithes ruber (Fish)
(Rasheed, 1965; Bilqees, 1979 as
Rhabdochona parastromatei Bilqees)



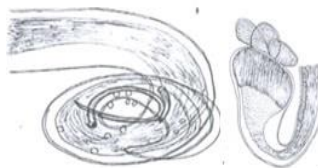
Male tail and head (After Rasheed, 1965)



Head and tail (After Bilqees, 1979)

Genus *Pseudomazzia* Bilqees, Ghazi and
Haseeb, 2005

Pseudomazzia macrolabiata Bilqees,
Ghazi and Haseeb, 2005 uncertain
Parasitic. Host: *Pamadasys olivaceus*
(Fish)
(Bilqees *et al.*, 2005)



Male tail and head



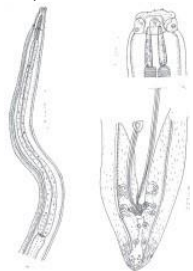
Female
(After Bilqees *et al.*, 2005)

Family Thelaziidae Raillirt, 1916
Genus *Hepatinema* Rasheed, 1964
Hepatinema karachiensis Rasheed, 1964
Parasitic. Host: *Scomberoides tala* (Fish)
(Rasheed, 1964)



Male tail and head (After Rasheed, 1964)

Family Habronematoidae Ivaschkin, 1961
 Genus *Cyrnea* Seurat, 1914
Cyrnea (Procyrnea) chabaudi Rasheed, 1965
 Parasitic. Host: *Parastrotmateusniger* (Fish)
 (Rasheed, 1965)



Anterior part, head and tail (After Rasheed, 1965)

Family Hedruridae Railliet, 1916
 Genus *Hedruris* Nitzsch in Ersch and Gruber, 1821
Hedruris bryttosi Yamaguti, 1935
 Parasitic. Host: *Netuma thalassina* (Fish)
 (Sattar *et al.*, 2016)



(After Sattar *et al.*, 2016)

Family Cystidicolidae Skrjabin, 1946
 Genus *Metabronema* Yorke and Maplestone, 1926
Metabronema magnum (Taylor, 1925)
 17.50 mm. Parasitic. Host: *Arius arius* (Fish)
 (Sattar *et al.*, 2016)

Family Camallanidae Railliet and Henry, 1915
 Genus *Procamallanus* Baylis, 1923
 Subgenus *Spirocamallanus* Olsen, 1952
Procamallanus (Spirocamallanus) incognitus Yooyen, Moravec and Wongsawad, 2011
 Parasitic. Host: *Otolithes ruber* (Fish)
 (Akhtar and Bilqees, 2007 as *Spirocamallanus otolithi*, nec Bilqees and Kazmi, 1974)

Procamallanus (Spirocamallanus) pakistanensis Ashraf, Farooq and Khanum, 1977, Yooyen, Moravec, Wongsawadm, 2011.
 Parasitic. Host: *Otolithes ruber* (Fish)
 (Ashraf *et al.*, 1977 as *Procamallanus (S.) otolithi* Ashraf, Farooq and Khanum)



Female head and tail tip (After Ashraf *et al.*, 1977)

Procamallanus (Spirocamallanus) pereirai (Annereaux, 1946)
 Parasitic. Hosts: *Osteomugil speigleri*, *Pomadasyys argenteus* and *Otolithes ruber* (Fish)
 (Rasheed, 1970)
Procamallanus (Spirocamallanus) pakistanensis Yooyen, Moravec, Wongsawadm, 2011
 Parasitic. Host: *Otolithes ruber* (Fish)
 (Ashraf, Farooq and Khanum, 1977 as *Procamallanus (Spirocamallanus) otolithi* nec Bilqees and Kazmi, 1974)



(After Bilqees and Kazmi, 1974)

Procamallanus (Spirocamallanus) dussumieri (Bilqees, Khanum and Jehan, 1971) (taxon inquirendum) 14.4 mm.
 Parasitic. Host: *Johnius dussumieri* (Fish)
 (Bilqees *et al.*, 1971 as *Spirocamallanus dussumieri*)



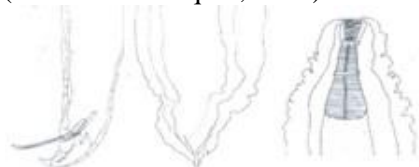
Male tail tip (After Bilqees *et al.*, 1971)

Procamallanus (Spirocamallanus) neobuccalaris (Bilqees, Fatima and Rehana, 1977) (taxon inquirendum)
Parasitic. Host: *Protonibea dicanthus* (Fish)
(Bilqees *et al.*, 1977 as *Spirocamallanus neobuccalaris*)



(After Khan and Begum, 1971)

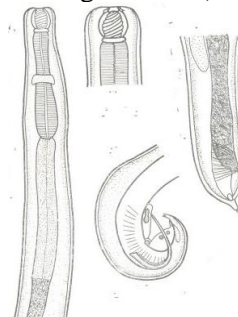
Procamallanus (Spirocamallanus) ruberii Akhtar and Bilqees, 2011
Parasitic. Host: *Otolithes ruber* (Fish)
(Akhtar and Bilqees, 2011)



Male female tails .Male head (After Akhtar and Bilqees, 2011)

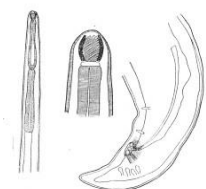
Procamallanus karachiensis Rasheed, 1970
Parasitic.Host: *Grammoplites scaber* (Fish)
(Rasheed, 1970)

Procamallanus (Spirocamallanus) sihamai Khan and Begum, 1971
Parasitic.Host: *Sillago sihama* (Fish)
(Khan and Begum, 1971)



Female (After Khan and Begum, 1971)

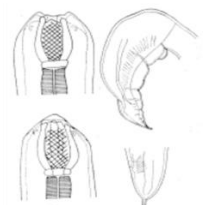
Procamallanus (Spirocamallanus) crossorhombi (Zaidi and Khan, 1975)
Parasitic.Host: *Crossorhombus azureus* (Fish)
(Zaidi and Khan, 1975 as *Spirocamallanus crossorhombi* Zaidi and Khan)



Anterior region, head and tailtip (After Zaidi and Khan, 1975)

Procamallanus (Spirocamallanus) riaziaii Akhtar and Mujeeb, 2010
Parasitic.Host: *Otolithes ruber* (Fish)
(Akhtar and Mujeeb, 2010)
Sub genus *Procamallanus* Baylis, 1923

Procamallanus (Spirocamallanus) sparus (Akram 1975) 22.84 mm.
Parasitic.Host: *Argyrops spinifer* (Fish)
(Akram, 1975 as *Spirocamallanus sparus* Akram)



(After Akram, 1975)

Procamallanus (Procamallanus) singhi (Ali, 1956)
Parasitic.Hosts: *Trachinotus blochii*, *Scomberomorus guttatus*, *Lagocephalus lunaris* (Fish)
(Zaidi and Khan, 1975, Akram, 1976 as *Spirocamallanus sindensis*)



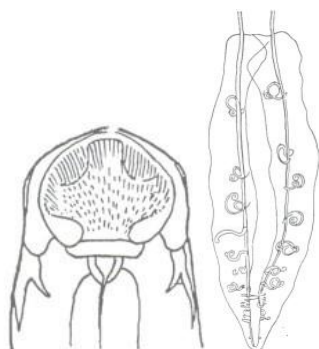
Head and tail (After Akram, 1976)

Procamallanus (Spirocamallanus) spiralis (Baylis, 1923)
Parasitic. Hosts: *Lagocephalus lunaris*, *Nemapteryx caelata* (Fish)
(Khan and Begum, 1971)

Spirocamallanus sindensis Soofia, Birmania, Abbasi and Bhutto, 2022
Parasitic. Host: *Rita rita* (fish)
(Soofia *et al.*, 2022)

Genus *Camallanus* Railliet and Henry, 1915

Camallanus chorinemi Rasheed, 1970
14 mm.
Parasitic. Hosts: *Scomberoides tala*,
Chirocentrus dorab (Fish)
(Rasheed, 1970)



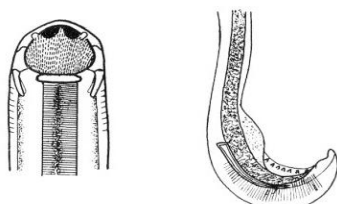
Head and tail (After Rasheed, 1970)

Camallanus farooqii Akram, 1993
14.5mm. Parasitic. Hosts: *Scomberoides commersonianus*, *Scomberoides lysan*
and *Scomberoides tol* (Fish)
(Akram, 1993)



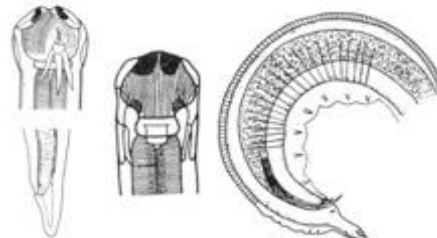
Male and female tails (After Akram, 1993)

Camallanus guttatii Khan and Begum, 1971 Unverified Name 8. 63 mm.
Parasitic. Host: *Scomberomorus guttatus*
(Fish)
(Khan and Begum, 1971)



Male head and tail (After Khan and Begum, 1971)

Camallanus karachiensis Khan and Begum, 1971 14.32 mm.
Parasitic. Host: *Euthynnus affinis* (Fish)
(Khan and Begum, 1971)



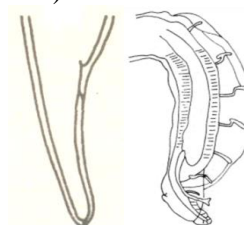
Female, Male head and tail (After Khan and Begum, 1971)

Camallanus cinereus Bilqees, Khanum and Jehan, 1971 29.2 mm.
Parasitic. Host: *Muraenesox cinereus*
(Fish)
(Bilqees *et al.*, 1971 as *C. magnavaginus*.
Ref. to change: Akram, 1992)



(After Bilqees *et al.*, 1971)

Camallanus monospiculatus Akram, 1993
Parasitic. Hosts: *Scomberomorus commerson*, *Rastrelliger kanagurta*
(Fish)
(Akram, 1993)



Male female tails (After Akram, 1993)

Camallanus qadrii Ashraf, Farooq and Khanum, 1977 24.35 mm.
Parasitic. Host: *Protonibea diacanthus*
(Fish)
(Akram, 1976 as *Camallanus olivaceus*
Akram)



(After Akram, 1976)

Camallanus surmai Rasheed, 1970 45 mm.
Parasitic. Host: *Scomberomorus guttatus* (Fish)
(Rasheed, 1970)



Anterior end (After Rasheed, 1970)

Family Philometridae Baylis and Daubney, 1926

Genus *Buckleyella* Rasheed, 1963

Buckleyella buckleyi Rasheed, 1963
Parasitic. Host: *Scomberoides tala* (Fish)
(Rasheed, 1963)



Female Head and tail (After Rasheed, 1963)

Genus *Philometra* Costa, 1845
Philometra lateolabraxis (Yamaguti, 1935)
Parasitic. Hosts: *Otolithes ruber*, *Netuma thalassina*, *Muraenesox cinereus* (Fish)
(Rasheed, 1963)
Philometra polynemii Rasheed, 1963
Parasitic. Host: *Eleutheronema tetradactylum* (Fish)
(Rasheed, 1963 as *Philometra (Ranjhinema) polynemii*)



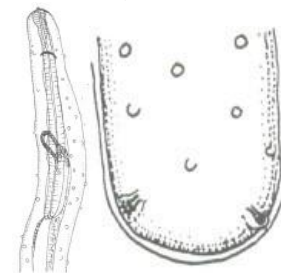
Female tail and head (After Rasheed, 1963)

Philometra balistii (Rasheed, 1963)
Parasitic. Hosts: *Balistes* sp. (Fish)
(Rasheed, 1963 as *Thwaitia balistii*)



Female tail and head (After Rasheed, 1963)

Genus *Philometroides* Yamaguti, 1935
Philometroides denticulatus Rasheed, 1965
Parasitic. Hosts: *Otolithes ruber*, *Pomadasys kakaan* (Fish)
(Rasheed, 1965)



Anterior end female tail (After Rasheed, 1965)

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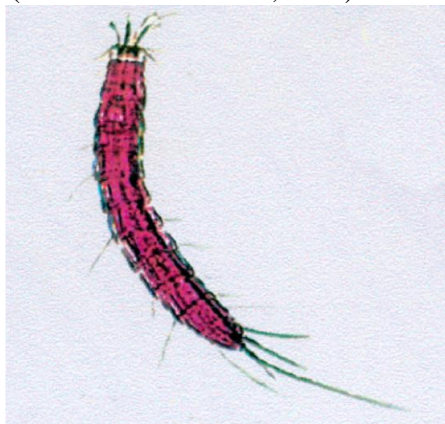
Phylum Kinorhyncha

Phylum Kinorhyncha are microscopic, marine animals. Body length of Kinorhyncha is less than 1 mm. The body divided into 13 segments (zonites) of which 1st segment is the eversible head, 2nd segment is the neck and the trunk includes the rest of 11 segments. The head is retractable into the neck.

Kinorhyncha is a group of marine and sometimes brackish water meiofaunal animals living on algae, kelp, on or in other invertebrates, or in sediments from the intertidal to abyssal depths. Species may occupy the surface of muddy or sandy habitats or dwell up to about one meter deep in the sediment. The Kinorhynchans are a smallish phylum (315 species) of marine worms. The evolutionary relationships within phylum Kinorhyncha are still poorly resolved.

Phylum Kinorhyncha Reinhard, 1881
Order Cyclorhagida (Zelinka, 1896)
Higgins, 1964

Family Cateriidae Gerlach, 1956
Genus *Cateria* Gerlach, 1956
Cateria gerlachi Higgins, 1968 38 μ
Midtidal, psammonic
(Kazmi and Naushaba, 2013).



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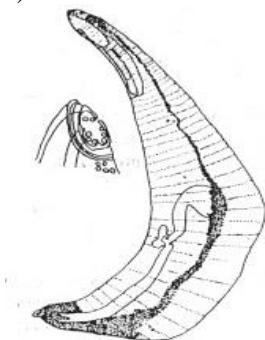
KAZMI, Q.B. and R. NAUSHABA. 2013. Checklist of marine worms reported from Pakistani marine waters. *Pakistan Journ. Nemat.*, 31 (2): 187-280.

Phylum Acanthocephala

Phylum Acanthocephala is a medium sized phylum (1 000 species) of usually small and always Parasitic in the guts of vertebrates worms, though juvenile acanthocephalans have been recorded in various marine crustaceans such as shore crabs, hermit crabs, amphipods and harpacticoid copepods. Most are less than 25mm or 1 inch long, though some species may attain a length of nearly a meter. They get their name from their proboscis which possesses several rings of backwardly curving spines which they use to attach themselves to the walls of their hosts digestive system.

Phylum Acanthocephala Kohltreuther, 1771
 Class Eoacanthocephala Van Cleve, 1936
 Order Gyraacanthocephala Van Cleve, 1936

Family Quadrigyridae Van Cleve, 1920
 Genus *Acanthogyrus* Thapar, 1927.
Acanthogyrus (Acanthosentis) arii (Bilqees, 1971)
 Parasitic. Host: *Netuma thalassina* (Fish) (Bilqees, 1971 as *Acanthosentis arii* Bilqees)



Female and anterior end (After Bilqees, 1971)

Acanthogyrus sp.
 Parasitic. Host: *Macrobrachium rosenbergi* (Crustacea) (Khan *et al.*, 2015)
Acanthogyrus (Acanthosentis) bilaspurensis Chowhan, Gupta and Khera, 1987
 Parasitic. Host: *Cypris carpinus* (Ru *et al.*, 2022)
 Order Neoechinorhynchida Southwell and Macfie, 1929

Family Arhythmacanthidae Yamaguti, 1935
 Genus *Acanthocephaloides* Meyer, 1932
Acanthocephaloides neobythitis Yamaguti, 1939
 Parasitic. Host: *Pampus argenteus* (Fish) (Gupta and Naqvi, 1982 as *Pseudorhadinorhynchus mujibi*)

Family Neoechinorhynchidae Ward, 1917
 Genus *Neoechinorhynchus* Stiles and Hassall, 1905
Neoechinorhynchus (Neoechinorhynchus) johnii Yamaguti, 1939
 Parasitic. Host: *Protonibea diacanthus* (Fish) (Bilqees, 1972, not accepted fide Amin *et al.*, 2011).



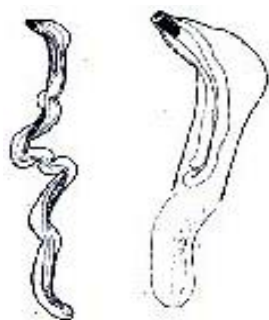
Anterior region and tail (After Bilqees, 1972)

Neoechinorhynchus (Neoechinorhynchus) karachiensis Bilqees, 1972 6-8mm
 Parasitic. Host: *Osteomugil speigleri* (Fish) (Bilqees, 1972)



(After Bilqees, 1972)

Neoechinorhynchus longiorchis Khatoon and Bilqees, 2007
 Parasitic. Host: *Otolithes ruber* (Fish) (Khatoon and Bilqees, 2007)

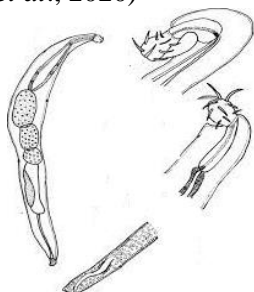


(After Khatoon and Bilqees, 2007)

Neoechinorhynchus daleri

Khan, Saleem, Khatoon, Waheed and Nirmaldas, 2020.

Parasitic. Host: *Crenimugil cephalus* (Fish)
(Khan *et al.*, 2020)



Male, proboscis, female end (After Khan *et al.*, 2020).

Neoechinorhynchus cribbi Ibrahim,

Khan and Khatoon, 2020

Parasitic. Host: *Paraliza subviridis* (Fish)
(Ibrahim *et al.*, 2020).



(After Ibrahim *et al.*, 2020)

Neoechinorhynchus mohiuddini Khan,

Khatoon, Waheed and Naqvi, 2020

Parasitic. Host: *Crenimugil cephalus*
(Fish)

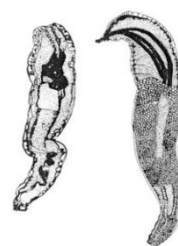
(Khan *et al.*, 2020)

Genus *Dispiron* Bilqees, 1970

Dispiron mugili Bilqees, 1970

Parasitic. Host: *Crenimugil buehanani*
(Fish)

(Bilqees, 1970)



Male and female (After Bilqees, 1970)

Class Palaeacanthocephala Meyer, 1031
Order Echinorhynchida Southwell and
Macfie, 1925

Family Rhadinorhynchidae Travassos,
1923

Genus *Cleaveius* Subrahmanian, 1927

Cleaveius thapari (Gupta and Naqvi,
1980) Amin, 2013

Parasitic. Host: *Mugil cephalus* (Fish)
(Gupta and Naqvi, 1980 as

Mehrarhynchus thapari)

Subfamily Serrasentinae Petrochenko,
1956

Genus *Serrasentis* VanCleave, 1923

Serrasentis manazo Bilqees and Khan,
2005

Parasitic Host: *Mustelus mosis* (Fish)
(Bilqees and Khan, 2005)

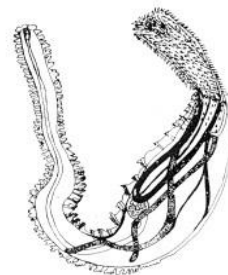


Male (After Bilqees and Khan, 2005)

Serrasentis mujibi Bilqees, 1972

Parasitic. Host: Labrid Fish

(Bilqees, 1972c)



(After Bilqees, 1972)

Serrasentis sagittifer (Linton, 1889)
Parasitic. Hosts: *Netuma thalassina*,
Rhyncobatus djiddensis, *Otolithes ruber*,
Psettodes erumei, *Muraenesox cinereus*,
Scomberomorus guttatus, and
Parastromateus niger, *Rhachycentron*
canadum, *Protonibea diacanthus*(Fish)
(Bilqees, 1971 as *Serrasentis longiformis*
Bilqees; Bilqees, 1972, Khatoon *et al.*,
2008 as *Serrasentis giganticus* Bilqees;
Bilqees and Kazmi, 1974 as *Serrasentis*
longus (Tripathi)



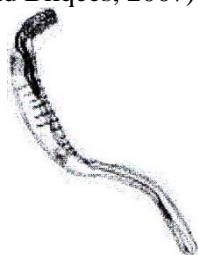
(After Bilqees, 1971)

Serrasentis sciaenus Bilqees, 1972
uncertain species
Parasitic. Host: *Johnius dussumieri* (Fish)
(Bilqees, 1972)



(After Bilqees, 1972)

Serrasentis niger Khatoon and Bilqees,
2007
Parasitic. Host: *Parastromateus niger*
(Fish)
(Khatoon and Bilqees, 2007)



(After Khatoon and Bilqees, 2007)

Genus *Pseudorhadinorhynchus*
Achmerov and Dombrowskaja, 1941
Pseudorhadinorhynchus cinereus Gupta
and Naqvi, 1982
Parasitic. Host: *Pampus agrgenteus*
(Fish)
(Gupta and Naqvi, 1982)
Genus *Cleaveius* Subrahmanian, 1927

Cleaveius fotedari (Gupta and Naqvi,
1980) Kumar, 1992
Parasitic. Host: *Arius arius*
(Gupta and Naqvi, 1980 as
Mehrarhybchus fotedari)

Family Cavisomidae Meyer, 1932
Genus *Filisoma* Van Cleave, 1928
Filisoma indicum Van Cleave, 1928
Parasitic. Host(s) *Netuma thalassina*
(Fish)
(Gupta and Naqvi, 1982, Khatoon and
Bilqees, 2011).
Class Palaeacanthocephala Meyer, 1931
Order Polymorphida Petrochenko, 1956

Family Polymorphidae Meyer, 1931
Genus *Polymorphus* Luhe, 1910
Polymorphus ariusis (Bilqees, 1971).
Parasitic. Host: *Netuma thalassina* (Fish)
(Bilqees, 1971 as *Hexaglandula ariusis*
Bilqees)



Male and female (After Bilqees, 1971)

Polymorphus karachiensis (Bilqees,
1971) 8.6 mm.
Parasitic. Host: *Netuma thalassina* (Fish)
(Bilqees, 1971 as *Hexaglandula*
karachiensis Bilqees)



Male anterior and posterior ends (After
Bilqees, 1971)

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Phylum Entoprocta

Phylum Entoprocta, sometimes called Goblet Worms because they look a lot like drinking goblets, are small to minute (0.5 mm to 5.0 mm) aquatic animals. Of the approximately 150 known species most are marine, living primarily sedentary and, either colonial or solitary, lives in coastal marine environments.

Phylum Entoprocta Nitsche, 1869
Order Coloniales Emschermann 1972

Family Barentsiidae Emschermann, 1972
Genus *Barentsia* Hincks, 1880
Barentsia discreta (Busk, 1886)
Demersal .Creeping on sea weeds
(Javed and Mustaquim, 1995)



References:

JAVED, M, and MUSTAQUIM, J. 1995. The occurrence of fouling organisms on navigational buoys in the Manora Channel, Pakistan / Thompson, M.F., Tirmizi, N.M. The Arabian Sea Living Marine Resources and the Environment. Rotterdam: A A Balkema, : 99-100.

Phylum Bryozoa

Phylum Bryozoa is known to be an important component of cryptic reef communities worldwide,, a few occur in oceanic trenches, and others are found in polar waters. Over 4,000 living species are known. One class lives only in a variety of freshwater environments, and a few members of a mostly marine class prefer brackish water. One genus is solitary and the rest colonial, their colonies consisting of clones called zooids that are typically about 0.5 millimeters (0.020 in) long. The great majority are sessile. Encrusting forms are much the commonest of these in shallow seas, but erect forms become more common as the depth increases.

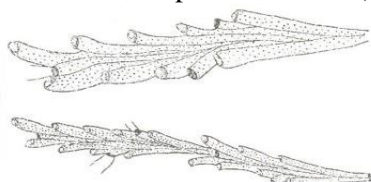
Phylum Bryozoa Ehrenberg, 1831
 Class Stenolaemata Borg, 1926
 Order Cyclostomatida Busk, 1852
 Suborder Articulata Busk, 1859

Family Crisiidae Johnston, 1838
 Genus *Crisia* Lamouroux, 1812

Crisia

Growing on weeds, shells and rocks, bushy up to 2.5 cm. high, from middle shore to deeper waters also in brackish water.

(Javed, 1990, Unpublished thesis)

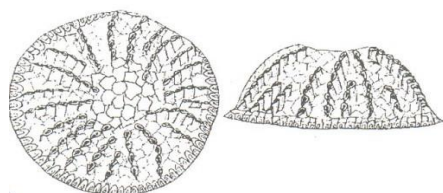


After Javed, 1990 unpublished thesis)
 Suborder Rectangulata Waters, 1887

Family Lichenopodidae Smitt, 1867
 Genus *Lichenopora* DeFrance, 1823

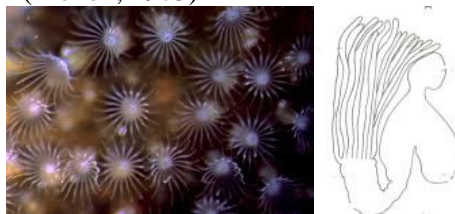
Lichenopora radiata Audouin, 1826

Attached to corals, shells and rocks
 (Javed, 1990 unpublished thesis)



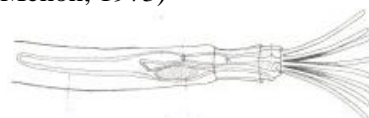
Class Gymnolaemata Allman, 1856
 Order Ctenostomata, Busk, 1852

Sub order Alcyonidiina d’Hondt, 1985
 Family Alcyonidiidae Johnston, 1838
 Genus *Alcyonidium* Lomouroux, 1813
Alcyonidium polyoum (Hassall, 1841)
 Epizoic, fucoid, littoral.
 (Menon, 1973)



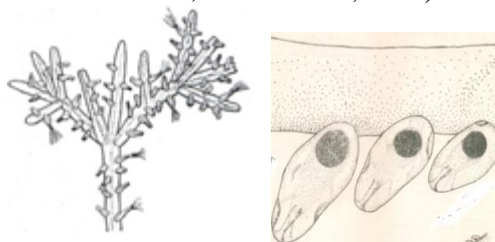
Sub order Victorellina Jebram, 1973

Family Victorelloidae Hincks, 1880
 Genus *Victorilla* Kent, 1870
Victorilla pavida Kent, 1870
 Brackish water
 (Menon, 1973)

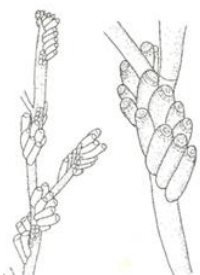


Polypide
 Suborder Vesicularina Hincks, 1880

Family Vesiculariidae Hincks, 1880
 Genus *Amathia* Lamouroux, 1812
Amathia verticillata (delle Chiaje, 1822)
 Creeping on wood, rock, vegetation, shells, and manmade Rivermouth
 (Javed and Tirmizi, 1993 as *Zoobotryon verticillatum*; Aslam *et al.*, 2019)



Amathia distans Busk, 1886
 Attached to sea weed and stones in polluted water
 (Javed and Trimizi, 1993)



Part of colony and stolon showing a group of zooids (After Javed, 1990 unpublished thesis)

Amathia imbricata (Adams, 1798)
Middle shore to sublittoral zone on gastropods and stones
(Javed and Mustaqim, 1995 as *Bowerbankia imbricata* (Adams))
Amathia gracilis (Leidy, 1855)
Attached to sea weed, Stones and shells
(Javed and Tirmizi, 1993 as *Bowerbankia gracilis*)



Part of colony, single zooid (After Javed, 1990 unpublished thesis)

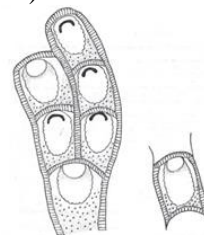
Order Cheilostatida Busk, 1852

Family Petraliidae Levinsen, 1909
Genus *Petraliella* Canu and Bassler, 1927
Petraliella magna (d'Orbigny, 1852)
Benthic
(Tilbrook and Cook, 2005)

Family Flustridae Fleming, 1828
Genus *Flustra* Linnaeus, 1761
Flustra foliacea (Linnaeus, 1758)
Occurs in shallow waters of less than 50 m. to depths of 200 m., in areas of silt to fine sand
(BMNH, (NHMUK) an Atlantic species, possibly attached to a ship rather than actually being from Karachi, Ref. Mary Spencer Jones)

Family Membraniporidae Busk, 1854

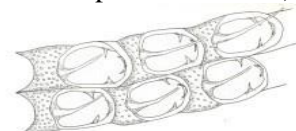
Genus *Membranipora* Blainville, 1830
Membranipora tenuis Desor, 1848.
Brackish water, covering algal fronds
(Menon, 1973)



Membranipora villosa Hincks, 1880
Intertidal to 20 m. encrusting on algae
(Ahmed *et al.*, 1978)



Family Electridae d'Orbigny, 1851
Genus *Electra* Lamouroux, 1816
Electra pilosa (Linnaeus, 1767)
Attached to weeds, stones, shells and hydroids as stellate patches
(Javed, 1990 unpublished thesis)



(After Javed, 1990 unpublished thesis)

Electra sp.
Encrustation on *Chelonia mydas*
(Frazier *et al.*, 1992)
Genus *Einhornia* Nikulina, 2007
Einhornia crustulenta (Pallas, 1766)
Zooids white and the operculum opaque white. Limited to estuarine habitats. Found on various substrata from low shore to shallow water, including fronds of fucoids
(Ahmed *et al.*, 1978 as *Electra crustulenta*)

Family Eucrateidae Hincks, 1880
Genus *Vittaticella* Maplestone, 1901
Vittaticella contei (Audouin, 1828) invalid Attached to rocks and shells, sponges, in the roots of hydroids
(Javed, 1990 unpublished thesis)



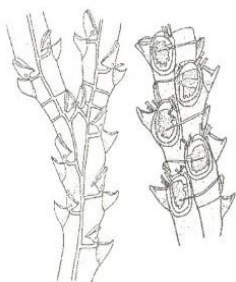
Part of colony, single zooid (After Javed, 1990 unpublished thesis)
Sub order Inovicellina Jullien, 1888

Family Aeteidae Smitt, 1868
Genus *Aetea* Lamouroux, 1812
Aetea ligulata Busk, 1852
Benthic; depth range 33-73 m.
(Ahmed *et al.*, 1978)



Suborder Flustrina Smitt, 1868

Family Candidae d'Orbigny, 1851
Genus *Scrupocaberea* Vieira, Spencer Jones, Winston, Migotto and Marques, 2014
Scrupocaberea maderensis (Busk, 1860)
Attached to stones, shells, seaweeds coastal installations
(Javed, 1990, unpublished thesis as *Scrupocellaria maderensis* Busk)

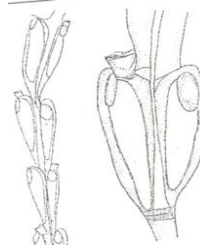


Basal view and frontal view (After Javed, 1990 unpublished thesis)
Genus *Scrupocellaria* Van Beneden, 1845
Scrupocellaria muricata (Lamouroux, 1816)
Attached to stones, shells, seaweeds
(Javed, 1990 unpublished thesis as *Scrupocellaria spatulata* (D'Orbigny)



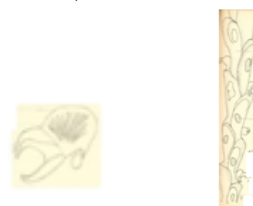
Basal and frontal views (After Javed, 1990 unpublished thesis)

Family Epistomiidae Gregory, 1893
Genus *Synnotum* Pieper, 1881
Synnotum aegyptiacum (Audouin, 1826)
In rock pools, on shells and weeds
(Javed, 1990, unpublished thesis)



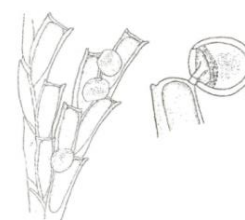
Zooid, part of colony
(After Javed, 1990, unpublished thesis)

Family Bugulidae Gray, 1848
Genus *Bugula* Oken, 1815
Bugula minima Waters, 1909
Reefs, 54 m. or less
(Karim, 1971)



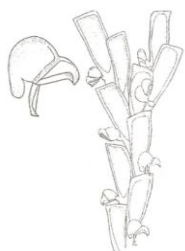
Avicularium (After Karim, 1971)

Bugula niritina (Linnaeus, 1758)
Attached to floating seaweeds and rocks in pools in debris among shells and corals
(Karim, 1970; Javed and Tirmizi, 1993)



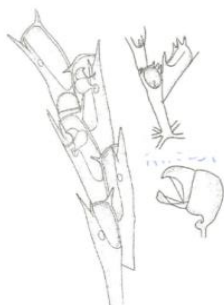
Part of colony, ovicell (After Javed and Tirmizi, 1993)

Bugula robusta MacGillivray, 1869
Attached to stones
(Karim, 1970 as *Bugula neritinarobusta*)



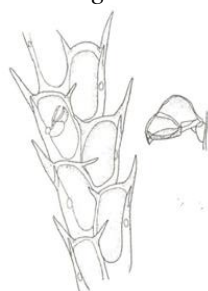
Avicularium, colony (After Javed and Tirmizi, 1993)

Genus *Bugulina* Gray, 1848
Bugulina stolonifera (Ryland, 1960)
On submerged structures in ports and harbours, stones seaweeds, intertidal pools
(Karim, 1971 as *Bugula stolonifera* Ryland)



Colony, ancestrula, avicularium (After Javed and Tirmizi, 1993)

Bugulina avicularia (Linnaeus, 1758)
Attached to ascidians shells
(Karim, 1971 as *Bugula avicularia*)

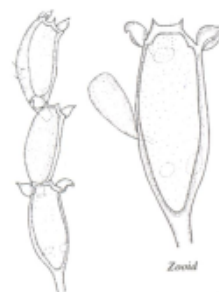


Part of colony, Avicularium (After Javed and Tirmizi, 1993)

Bugulina turbinata (Alder, 1857)
Colony about 3-6 cm. in height and orange to brown in colour.
Under boulders on the lower shore and on bedrock, boulders, stones and shells in the shallow subtidal

(Karim, 1970 as *Bugula turbinata* Alder)
Bugulina flabellata (Thompson, in Gray, 1848) 2-5 cm. in height, buff colour when living, grey when dried
Occurs in the lower shore and shallow sublittoral rocky shore. Usually attached to other bryozoans
(Ahmed *et al.*, 1978 as *Bugula flabellata* (Thompson))

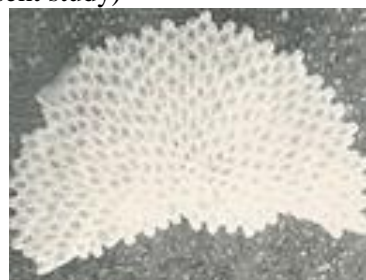
Family Beaniidae Canu and Bassler, 1927
Genus *Beania* Johnston, 1840
Beania intermedia (Hincks, 1881)
Over stones
(Javed, 1990 unpublished thesis)



Part of colony, single zooid (After Javed, 1990 unpublished thesis)

Family Phidoloporidae Gabb and Horn, 1862
Genus *Reteporella* Busk, 1884
Reteporella graffeii (Kirchenpauer, 1869)
Coral boulder undersurfaces, intertidal to 16 m.
(Ali, 2006)

? ***Reteporella sp.*** builds white or pink colonies with the shape of a cup, a tree or a folded sheet. rarely grow larger than 3 cm of height and 5 cm wide.
Off shore
(Present study)



Genus *Triphyllozoon* Canu and Bassler, 1917
Triphyllozoon inornatum Harmer, 1934
Found on walls in areas of high current
(Harmer, 1934)



Family Bitectiporidae MacGillivray,
1895

Genus *Pentapora* Fischer, 1807

***Pentapora* sp.**

Weed associated

(Baig, 2014)

References:

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RYLAND, J.S. 1982. Bryozoa. In: Parker, S.P., (editor), Synopsis and classification of living organisms: 743-769. McGraw.

TILBROOK, K.V.J. AND P.L. Cook. 2005. Petraliellidae Harmer, 1957 (Bryozoa: Cheilostomata) from Queensland, Australia. *Systematics and Biodiversity* 2 (3): 319-339.

Phylum Brachiopoda

The Phylum Brachiopoda contains marine animals that, upon first glance, look like clams. There are about 300 living species of brachiopods. They are small animals with the largest living species having a shell length of about 10 cm (4 in) and most species being much smaller than this.

Phylum Brachiopoda Duméril, 1805
Subphylum Linguliformea Williams, Carlson, Brunton, Holmer and Popov, 1996
Class Lingulata Goryanskij et Popov, 1985
Order Lingulida Waagen, 1885
Superfamily Linguloidea Menke, 1828

Family Lingulidae Menke, 1828
Genus *Lingula* Bruguiere, 1791
Lingula anatine Lamark, 1801
Sandy coast, littoral, mudflats below MHLW
(Bhatti *et al.*, 1949; Muir-Wood, 1970; Javed and Khan 1970 as *Lingula murphiana* Reeve, Cooper, 1973).



(After Qureshi and Hashmi, 1963)

Lingula translucida Dall, 1921
Lives in vertical burrows in soft substrates, generally close to the shore in a vertical position
(USNM 332782; Dall, 1921; Cooper, 1973; Emig, 1982)



Lingula rostrum (Shaw, 1798)
Muddy shores, littoral
(Qureshi and Hashmi, 1963 as *Lingula hians* (Swainson) and *Lingula jaspidae* (Adam))



(After Qureshi and Hashmi, 1963)

Lingula reevei Davidson, 1880
Muddy shores, littoral
(Qureshi and Hashmi, 1963)



(After Qureshi and Hashmi, 1963)

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Chapter 17

Phylum Mollusca

The Molluscs have more varied forms than any other animal phylum. The phylum is typically divided into nine or ten taxonomic classes, of which two are entirely extinct. The extant classes are: Aplacophora, Polyplacophora, Monoplacophora, Gastropoda, Cephalopoda, Bivalvia and Scaphopoda. Monoplacophora are generally in the very deep sea; there is a sole record of a monoplacophoran from the Indian Ocean.

Classification into higher taxa for these groups has been and remains problematic. The marine species live in the oceans, from the seashores to the abyssal zone. They also exhibit an enormous range in size, from species which are almost microscopic to the largest of all invertebrates- the giant squid which can weigh 270 kg and measures up to 12 meters long in the body, with tentacles as much as another 50 meters in length. The Mollusca is a large phylum of invertebrates. About 93,000 named species are estimated, which include 23% of all named marine organisms (Haszprunar, 2020)

The molluscs with an exoskeleton of a hard protective shell are mostly illustrated here not showing the soft body parts.

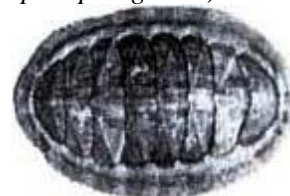
Phylum Mollusca Linnaeus, 1758
Class Polyplacophora Blainville, 1816
Order Chitonida Thiele, 1909

Family Schizochitonidae Dall, 1889
Genus *Schizochiton* Gray, 1847
Schizochiton incisus (G.B. Sowerby II, 1841)

Low tidal to shallow subtidal species, preferably living on dead coral or under stones embedded in coral sand (NMNH)

Family Chitonidae Rafinesque, 1815
Genus *Rhyssoplax* Thiele, 1893
Rhyssoplax peregrina (Thiele, 1909)
30mm., reddish brown, consisting of dark red markings on a yellowish fawn ground; the dark red predominates on the margins and in three bands across the centre and sides of the jugum, rest of the surface finely mottled. Under surface of the shell bluish green.
Rocky shores

(Winckworth, 1930 as *Chiton latricus*; Ranjha, 1951; Kaas, 1954 as *Chiton latricus winckworthi*; Naushaba and Kazmi, 2004 as *Chiton (Chiton) peregrinus*; WMSDB, 2013 as *Rhyssoplax peregrinus*)



(After Winckworth, 1930)

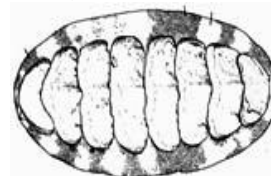
Genus *Craspedochiton* Shuttleworth, 1853

Craspedochiton sp.

Under rocks, below mid tide level, to depth of 15 m. found under rocks in shallow water to depths of 52 m. found it under large boulders in 1 m of water (Steiner, 1973 CAS: INVERT)

Genus *Acanthopleura* Guilding, 1829
Acanthopleura gemmata (Blainville, 1825) 11 cm.

Rocky, upper littoral rocks and cliffs (Kaas, 1954; Tirmizi and Zehra, 1982)



(After Tirmizi and Zehra, 1982)

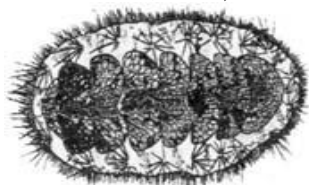
Acanthopleura vaillantii Rochebrune, 1882

Intertidal, rocky (Sadeghi and Loghmani 2010 from Chahbahar, presumably to occur in Pakistan)

Genus *Lucilina* Dall, 1882
Lucilina fortilirata (Reeve, 1847)
Low tide (0.5 ft) rocks/sand, weed-covered (Steiner, 1973 as *Tonicia fortilirata* CAS: INVERT 19906.0)

Family Acanthochitonidae Pilsbry, 1893
Genus *Acanthochitona* Gray, 1821
Acanthochitona mahensis Winckworth, 1927 65 mm. Brown
Rocky shores

(Kazmi and Khan, 2014)



Genus *Notoplax* H. Adams, 1862
Notoplax arabica Kaas and Van Belle, 1988

Found on rocky coasts, usually under the larger boulders encrusted in sessile animals such as bryozoans, small barnacles and ascidians.

(Kaas and Van Belle, 1988 as *Notoplax (Notoplax) arabica*)

Family Ischnochitonidae Dall, 1889

Genus *Ischnochiton* Gray, 1847

Ischnochiton yerburyi (E.A. Smith, 1891)

Deep crimson

From coarse sand and shells. Under small stones, 0 to 3-12.5 m.

(Kaas, 1954 as *Ischnochiton haersoltei*; Biggs, 1971)



(After Femorale)

Ischnochiton bouryi Dupuis, 1917. white 13x5.8 mm.

On rocks

(Kaas, 1954 as *Ischnochiton karachiensis* Kaas; Dell'Angelo, 2011)

Ischnochiton comptus (Gould, 1859)

Intertidal to shallow subtidal, on rocks covered with profuse vegetation

(Kaas, 1954 as *Ischnochiton ranjhai* Kaas, 1954)



(Photo courtesy WoRMS)

Ischnochiton feliduensis Smith, 1903

Intertidal

(Angello *et al.*, 2011)

Class Scaphopoda Bronn, 1862

Order Dentaliida De Costa, 1776

Family Calliodentaliidae Chistikov, 1975

Genus *Calliodentalium* Habe, 1964

Calliodentalium crocinum (Dall, 1907)

Offshore

(Foster, RV Anton Bruun 04b, 1963)

Family Dentaliidae Children, 1834

Genus *Coccodentalium* Sacco, 1896

Coccodentalium carduus (Dall, 1889)

Sandy beaches

(Gwannon.com as *Dentalium floridense* Henderson)



Genus *Dentalium* Linnaeus, 1758

Dentalium aprinum Linnaeus, 1767 5-

123 mm. Greenish

Living partly buried obliquely in the mud and sand

(USNM Invertebrate Zoology Mollusca Collection, 2014)

Dentalium tomlini Melvill, 1918.. 28mm.

Shallow water to off shore

(Melvill, 1918; Ludbrook, 1970 as *Dentalium (Dentalium) tomlini*)

Dentalium octangulatum Donovan, 1804 24-30 mm.

Shallow water to bathyal, 5-15m on sand and muddy sand

(Melvill and Standen, 1901)



Dentalium decemcostatum Brazier, 1877

19-22 mm.

Shelf, sandy mud

(Zehra, 1976)



(After Zehra, 1976)

Dentalium bisexangulaum Sowerby,

1860 18-20 mm.

Shallow and deep sand

(Zehra, 1976)



(After Zehra, 1976)
Dentalium javanum Sowerby, 1860 23-46 mm.
 Shelf, 10-18 m.
 (Melvill and Standen, 1901)



(After Zehra, 1976)

Dentalium buccinulum Gould, 1859
 Mangrove areas in the estuary
 (Girod, pers.correspondance QBK)



(After Femorale)

Genus *Paradentalium* Cotton and Godfrey, 1933

Paradentalium hexagonum (Gould, 1859) 25mm.
 Shelf. 16-296 m.
 (Zehra, 1976 as *Dentalium* (*Paradentalium*) *hexagonum*)



(After Zehra, 1976)

Genus *Tesseracme* Pilsbry and Sharp, 1898

Tesseracme tesseragona (Sowerby in Broderip and Sowerby, 1832) 22mm.
 Littoral, shelf.
 (Zehra, 1976 as *Dentalium* (*Tesseracme*) *tesseragonum*)



(After Zehra, 1976)

Tesseracme quadrapicalis (Hanley in Sowerby, 1860) 24-29mm. milky-white
 Supratidal in sand, mesopelagic
 (Melville, 1897 as *Dentalium conspicuum*; WMSDB)



(After Zehra, 1976)
Tesseracme quadrangularis (Sowerby 1, 1832) 18 mm
 Littoral
 (Zehra, 1976)



(After Zehra, 1976)

Genus *Antalis* H. Adams and A. Adams, 1854

Antalis longitrorsa (Reeve, 1842) 7.3-18 mm.

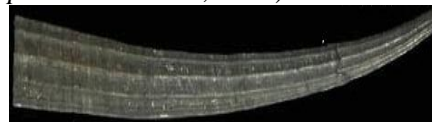
Muddy sand, 10-20 m.

(Moazzam and Moazzam, 2007 as *Laevidentalium longitrorsum* (Reeve))

Antalis porcata (Gould, 1859)

Demersal; depth range 75 - 90 m.

(Melvill and Standen as *Dentalium porcatum* Gould, 1859)



(After Hardy's Internet Guide to Marine Gastropods)

Antalis pilsbryi (Rehder, 1942)

At 3-499 m.depth

(Melvill and Standen, 1901 as *Dentalium pseudohexagonum* Henderson, 1920)



Genus *Graptacme* Pilsbry and Sharp, 1897

Graptacme acutissima (Watson, 1879)

Lives in 1100-2350 m., mostly below 1800 m., shells from 700 m.

(Scarabino, 2008)

Order Gadilida Starobogatov, 1974

Suborder Gadilimorpha Steiner, 1992

Family Gadilidae Stoliczka, 1868

Subfamily Gadilinae Stoliczka, 1868

Genus *Cadulus* Philippe, 1844

Cadulus euloides Melvill and Standen, 1901

Bathyal 183-630 m, in mud

(Melvill and Standen, 1901; Ludbrook, 1954 as *Dentalium* (*Gadila*) *euloides*; Steiner and Kabat, 2004)



Cadulus sp.
Offshore
(R.W. Foster, RV Anton Bruun 04b
1963)
Genus *Episiphon* Pilsbry and Sharp, 1897
Episiphon subtorquatum (P. Fischer,
1871)
At 604 m depth
(Harvard: MCZ, [date unknown] prior to
2003-01-06)
Class Gastropoda Cuvier, 1797
Subclass Patellogastropoda Lindberg,
1986 (Clade Patellogastropoda Bouchet
and Rocroi, 2005)

Family Acmaeidae Forbes, 1850
Genus *Acmaea* Eschscholtz, 1833
Acmaea sp.
On coastal rocks
(Atta et al, 2014)

Family Patellidae Rafinesque, 1815
Genus *Scutellastra* H. Adams and A.
Adams, 1854
Scutellastra granularis (Linnaeus, 1758)
On rocks
(Ahmed and Hameed, 1999 as *Patella*
granularis)
Superfamily Lottioidea Gray, 1840

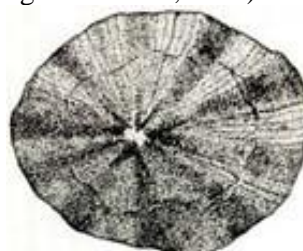
Family Lottiidae Gray, 1840
Genus *Patelloida* Quoy and Gaimard,
1834
Patelloida saccharina (Linnaeus, 1758)
15-60mm.
Intertidal, on rocks. Benthic; depth range
0 - 6 m.
(Dance, 1992)



(Photo source MNHN)

Family Nacellidae Thiele, 1891

Genus *Cellana* Adams, 1889
Cellana toreuma (Reeve, 1854)
Rocky shores, intertidal
(Dastagir and Khan, 1971)



(After Dastagir and Khan, 1971)

Cellana karachiensis (Winckworth,
1930) Pale white with glaze, with
prominent blood red streaks
Rocky bottoms in inter-tidal and mid-
littoral reef-associated coastal waters
(Gmelin, 1791 as *Patella rota*;
Winckworth, 1930 as *Patella capensis*
karachiensis; Khan and Dastagir, 1971 as
Cellana radiata (Born, 1778); Zafar et al.,
2015 different morphs as *Cellana radiata*
(Born, 1778) and *Cellana rota* (Gmelin,
1791))



Cellana ornata (Dillwyn, 1817)
Rocky shores
(Rehman and Barkati, 2012)
Cellana testudinaria (Linnaeus, 1758)
Benthic; depth range 2 - 7 m.
(Melvill and Standen, 1901 as
Helcioniscus testudinarius)



Subclass Neritimorpha Golikov and
Starobogatov, 1975
Order Cycloneritida Bouchet, Rocroi,
Hausdorf, Kano, Nützel, Parkhaev,
Schrödl and Strong, 2017
Superfamily Neritoidea Rafinesque, 1815

Family Neritidae Rafinesque, 1815
 Subfamily Neritinae Rafinesque, 1815
Smaragdia souverbiana (Montrouzier in Souverbie and Montrouzier, 1863)

Manfgrove forest
 (Muradi *et al.*, 2020)

Genus *Clithon* Montfort, 1810

Clithon bicolor (Récluz, 1843)

On rocks
 (PSF unpublished report, 1977 as *Nerita bicolor*, seems a misidentification since a freshwater species)

Genus *Nerita* Linnaeus, 1758

Nerita balteata Reeve, 1855, 40mm.

On rocks at low tide mark
 (Khan and Dastagir, 1971 as *Nerita lineata*)



(After Khan and Dastagir, 1971)

Nerita costata Gmelin, 1791 3.5 cm

Benthic, high intertidal
 (Khan and Dastagir, 1971)



(After han and Dastagir, 1971)

Nerita adenensis Mienis, 1978, 10-16 mm.

On intertidal rocks
 (malacos.chez.com/htm/E30.HTM;2001)



Nerita polita Linnaeus, 1758. Height: 23.5mm. Colour variable, mottled grey, red or cream, sometimes with axial bands
 On littoral rocks and wet fine sandy shore and breakwaters directly facing surf
 (Khan and Dastagir, 1971)



(After Khan and Dastagir, 1971)

Nerita litterata Gmelin, 1791

On rocks
 (Khan and Dastagir, 1971 as *Nerita rumphii* Recluz)



(After Khan and Dastagir, 1971)

Nerita planospira Anton, 1838

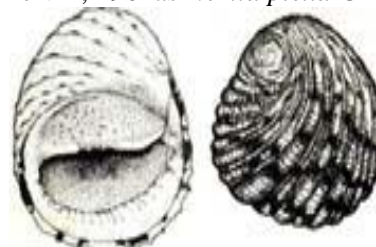
Intertidal, mangroves; lower littoral
 (Melissa in Neritopsine Gastropods Life Desk)



(From Tom Eichhorst's work on Recent Neritidae)

Nerita textilis Gmelin, 1791, 40mm. dirty white with irregular black spots arranged in spiral rows

On intertidal rocks with algae
 (Melvill, 1901 as *Nerita plexa* Chemnitz)



(After Tirmizi and Zehra, 1984)

Nerita undata Linnaeus, 1758, 23x20 mm.

On rocks
 (Telford, 1975; Tirmizi and Zehra, 1984)



(After Tirmizi and Zehra, 1984)

Nerita chamaeleon Linnaeus, 1758 .20 mm.

On rocks, gravel, intertidal (Ali, 2006)

Nerita albicilla Linnaeus, 1758 30mm.with white and black longitudinal bands

Congregates on rocks and sand, on the reef flat hiding under stones at low tide (Melvill and Standen, 1901 as *Theliostyla albicilla*)



(Shell, after Tirmizi and Zehra, 1984; egg mass, after Barkati and Rahman, 2005)

Nerita longii Récluz, 1842

Living intertidally on rocks and stones. Often on and under pebbles influenced by strong waves during lowering of the tide (Melvill, 1901)

Nerita dombeyi Récluz, 1841

Intertidal (Ajazuddin and Barkati, 2013 as *Nerita domby*)

Nerita striata Burrow, 1815

At half-tide (Melvill, 1901 as *Nerita chrysostoma* Récluz)

Genus *Neritina* Lamarck, 1816

Neritina communis Quoy and Gaimard, 1832, 20 mm. May be red, pink, black or yellow usually arranged in zigzag or banded patterns

Mangrove Swamps (Tirmizi and Zehra, 1984)



(After Tirmizi and Zehra, 1984)

Genus *Mienerita* Dekker, 2000
Mienerita debilis (Dufo, 1840) 15cm
Intertidal rocks
(Melvill, 1898 as *Nerita (Heminerita) anodonta*)



Genus *Neripteron* Lesson, 1831
Neripteron violaceum (Gmelin, 1791)
Brackish waters, mangroves, in upper mudflat, attached to pillars or in crevices of the bricks or rocks
(Melvill, 1901 as *Neritia (Dostia) crepidularia* L)



Neripteron neglectum (Pease, 1861)
Height: ½ inch yellowish black with white crooked lines, dots and mottling
Intertidal, coral reef and rocks, under stones in brackish water along the shoreline, usually submerged
(Khan and Dastagir, 1971 as *Neritina neglecta* Pease)



(After Khan and Dastagir, 1971)
Subclass Vetigastropoda Salvini-Plawen, 1989
Superfamily Haliotoidea Rafinesque, 1815

Family Haliotidae Rafinesque, 1815

Genus *Haliotis* Linnaeus, 1758

Haliotis asinina Linnaeus, 1758, 120mm. iridescent nacre that lines the inside of the shell varies in colour from silvery white, to pink, red and green-red, to deep blue, green to purple

On rocks, low tide marks down to a depth of few meters
(Dance, 1992)



Super family Fissurelloidea J. Fleming, 1822

Family Fissurellidae Fleming, 1822

Subfamily Diodorinae Odhner, 1932

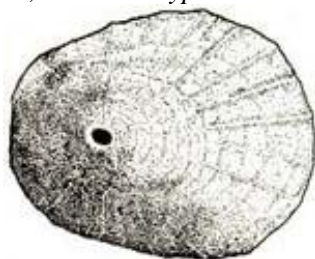
Genus *Diodora* Gray, 1821

Diodora funiculata (Reeve, 1850)

Height: 15mm. Greenish white with olive green rays.

Delta, Creeks, coral reefs, rocky and sandy shores below low tide

(Reeve, 1850 as *Glyphis indusica* Reeve)



(After Tirmizi and Zehra, 1984)

Diodora ticaonica (Reeve, 1850) Height: 9.50mm.

Creeks, rocky and sandy shores at low tide marks

(Khan and Dastagir, 1971)



(After Khan and Dastagir, 1971)

Diodora ruppellii (G. B. Sowerby I, 1835)

On rocky intertidal zone; also on gravel bottoms dredged 20-70 m.

(Kazmi *et al.*, 2018)



Diodora singaporensis (Reeve, 1850)

On rocky intertidal zone

(Melvill, 1928 as *Diodora bombayana*

(G. B. Sowerby II)



(From WMSDB)

Diodora jukesii (Reeve, 1850) 20 - 60 mm

Dead shells form shallow marine sediments.

(Reeve, 1849 as *Fissurella jukesii*)

Diodora townsendi (Melvill, 1897)

Surface of rocks

(Melvill, 1897 as *Fissurella townsendi* Melvill)

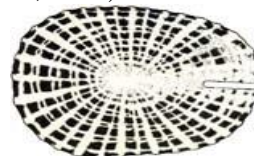
Subfamily Emarginulinae Children, 1834

Genus *Emarginula* Lamarck, 1801

Emarginula sp.

Offshore, from stony bottom

(PSF Report, 1977)



(After Tirmizi and Zehra, 1984)

Subfamily Fissurellinae J. Fleming, 1822

Genus *Fissurella* Bruguiere, 1791

Fissurella virescens Sowerby, 1835

Attached to rocks

(PARC Report, 1986)

Genus *Medusafissurella* McLean and Kilburn, 1986

Medusafissurella salebrosa (Reeve, 1850) 30mm.

Intertidal stones and rocks

(Reeve, 1850 as *Fissurella salebrosa*

Reeve; Tirmizi and Zehra, 1984 as

Lucapinella salebrosa)



(After Tirmizi and Zehra, 1984)

Subfamily Hemitominae Kuroda, Habe and Oyama, 1971

Genus *Clypidina* Gray, 1847

Clypidina notata (Linnaeus, 1785)

Rocky shores

(Rahman and Barkati, 2012)

Order Trochida Rafinesque, 1815
 Superfamily Trochoidea Rafinesque,
 1815

Family Colloniidae Cossmann, 1917
 Genus *Neocollonia* Kuroda and Habe,
 1954

Neocollonia pilula pilula (Dunker, 1860)
 Lives on rocks and other surfaces
 (Melvill, 1901 as *Leptothyea pilula*
 Dunker)



Neocollonia astolensis (Melvill, 1897)
 whorls painted below sutures and in the
 middle of last whorl with square brown
 spots, the surface between being mottled
 with lighter ochraceous-brown painting,
 also the case at the base.

Lives on rocks and other surfaces
 (Melvill, 1897 as *Monilea astrolabensis*,
 Melvill, 1897 as *Bothropoma astolensis*;
 Melvill, 1901 as *Mitrella (Risso)*
astolensis)

Family Trochidae Rafinesque, 1815
 Subfamily Umboniinae H. Adams and A.
 Adams, 1854

Genus *Monilea* Swainson, 1840
Monilea astrolabensis Melvill, 1897
 diameter 4mm

Intertidal and subtidal zones
 (Melvill, 1897)

Genus *Umbonium* Link, 1807
Umbonium moniliferum (Lamarck,
 1822), 20 mm.

Intertidal rocks
 (Ahmed *et al.*, 1982)
Umbonium vestiarium (Linnaeus, 1758)
 12mm. polished and brightly coloured
 Sandy beaches, intertidal
 (Melvill and Standen, 1901)



Genus *Conotalopia* Iredale, 1929

Conotalopia musiva (Gould, 1861) 10
 mm.

Sub tidal mud
 (Melvill and Standen, 1901 as *Minolia*
 (*Conotrochus*)*oldworthiana*, Wikipedia
 as *Vanitrochus holdsworthiana* Nevill;
 Melvill, 1918 as *Minolia charmosyne*;
 Wikipedia as *Pseudominolia musiva*, as)



Genus *Pseudominolia* Herbert, 1992
Pseudominolia nedyma (Melvill, 1897)
 Mangrove
 (Melvill, 1897 as *Minolia nedyma*;))



Pseudominolia climacota (J.C. Melvill,
 1897) lirae with triangular blotches of
 black-brown. Below periphery ornated
 with brown to ashy gray flames.

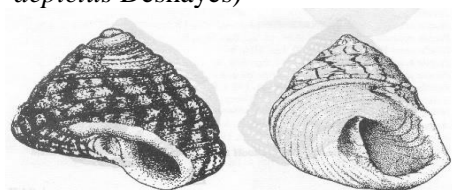
Benthic
 (Melvill, 1897 as *Minolia climacota*
 Melvill)



Pseudominolia biangulosa (A. Adams,
 1855) 2mm, brown, closely painted with
 longitudinal undulating lines
 On soft bottoms (sand and mud)
 (Harvard, MCZ)



Genus *Monilia* A. Adams, 1860
Minolia eudeli (Deshayes, 1863)
 Sea mounts and knolls
 (Melvill, 1928; OBIS, 2004)
 Subfamily Cantharidinae Gray, 1857
 Genus *Calthalotia* Iredale, 1929
Calthalotia fragum (Philippi, 1848)
 Rock and sandy mud at 3 fathoms
 (Melvill, 1901 as *Calliostoma fragum*
 (Philippi)
 Genus *Gibbula* Risso, 1826
Gibbula cineraria (Linnaeus, 1758)
 Under rocks at low tide zone
 (PARC Report, 1986 as *Trochus lineatus*
 Gmelin)
Gibbula Phaedra Melvill, 1897
 Under rocks at low tide zone
 (Melvill, 1897 as *Gibbula*
 (*Cantharidella*) *phaedra*)
 Genus *Jujubinus* Monterosato, 1884
Jujubinus striatus (Linnaeus, 1758)
 13x10mm.
 Rocky shores, weedy rocks.
 (Tirmizi and Zehra, 1984 as *Trochus*
depictus Deshayes)



(After Tirmizi and Zehra, 1984)

Genus *Thalotia* Gray, 1847
Thalotia beluchistana Melvill, 1897
 On rocks
 (Melvill, 1897)
 Genus *Priotrochus* P. Fischer, 1879
Priotrochus kotschy (Philippi, 1849)
 On rocks
 (Melvill and Standen, 1901 as
Cantharidus kotschy)



Genus *Pagodatrochus* Herbert, 1989
Pagodatrochus variabilis (H. Adams,
 1873)
 In mud, 3 to 7 fathoms
 (Melvill, 1928 as *Minolia variabilis*)

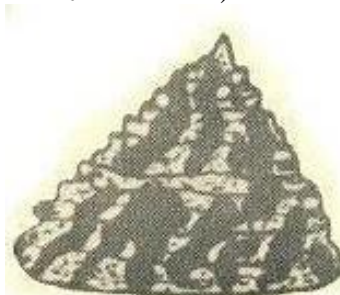


Genus *Agagus* Jousseaume, 1894
Agagus agagus Jousseaume, 1894
 On rocks, among sea weeds
 (Sowerby, 1895 as *Gibbula* (*Enida*)
townsendi Sowerby)
 Subfamily Trochinae Rafinesque, 1815
 Genus *Trochus* Linnaeus, 1758
Trochus erithreus Brocchi, 1821 33-35
 mm., cinereous grayish or pinkish, striped
 and maculated above with reddish;
 unicolor pinkish or radiately marked
 below
 In algal beds.
 (Ghani *et al*, 2017)
Trochus maculatus Linnaeus, 1758 65
 mm. whitish with oblique purple red rays
 Rocky shores at low tide
 (Khan and Dastagir, 1971)



(After Khan and Dastagir, 1971)

Trochus radiatus Gmelin, 1791
 Rocky shores, at low tides
 (Melvill 1901 as *Turbo radiatus*
chemnitzianus Reeve)



(After Khan and Dastagir, 1971)

Trochus stellatus Gmelin, 1791
 Rocky and sandy shores
 (Khan *et al*, 1973)
 Genus *Clanculus* Montfort, 1810

Clanculus ceylanicus Nevill and Nevill, 1869

Intertidal

(Rehman and Barkati, 2012)

Clanculus pharaonius (Linnaeus, 1758)

13-25 mm.

Intertidal

(Rehman and Barkati, 2012)



Clanculus depictus Adams, 1854

Attached to the rocks at low tide.

(Melvill, 1910)

Clanculus scabrosus (Philippi, 1850).

22-20 mm.

Rocky shores, intertidal

(Harvard: MCZ; Tirmizi and Zehra, 1984 as *Trochus scabrosus*)



(After Tirmizi and Zehra, 1984)

Clanculus microdon Adams, 1853

Attached to the rocks

(Khan and Dastagir, 1971)



Clanculus tonnerrei (G. Nevill and H. Nevill, 1874)

Sheltered intertidal and shallow sub tidal coral reef/ lagoonal habitats, on/under coral blocks and boulders

(Biggs, 1973 as *Euchelus bicinctus*

(Philippi); Herbert, 1996, 2012)



Subfamily Monodontinae Cossman, 1916

Genus *Monodonta* Lamarck, 1822

Monodonta australis (Lamarck, 1822) 32 x 30mm.

On rocks and stones and weeds at low tide

(Ahmed *et al.*, 1982)



(After Tirmizi and Zehra, 1984)

Monodonta canalifera (Lamarck, 1801)

8-30mm.

On rocks, at low tide, littoral-supralittoral (Khan and Dastagir, 1971)



(After Khan and Dastagir, 1971)

Monodonta neritoides (Philippi, 1849)

On rocks

(PARC Report, 1986)

Monodonta cf *nebulosa* (Forsskal in Niebuhr, 1775)

Intertidal and 82.shallow sub tidal on or under rocks

(Kazmi *et al.*, 2018)



Monodonta canalifera Lamarck, 1816 to 35.6 mm.

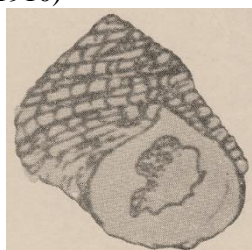
Dead shells form shallow marine sediments.

(Afsar *et al.*, 2012)

Monodonta labio (Linnaeus, 1758)

Dark to pale brown, with spiralled dashes of cream or pink, aperture pearly.

On or under rocks and coral in the lower eulittoral zone.
(Melvill, 1910)



(After Khan and Dastagir, 1971)

Monodonta vermiculata (P. Fischer, 1874)

Abundant on
(Melvill, 1910)

Family Calliostomatidae Thiele, 1924

Genus *Calliostoma* Swainson, 1840

Calliostoma scobinatum (Adams in Reeve, 1863)

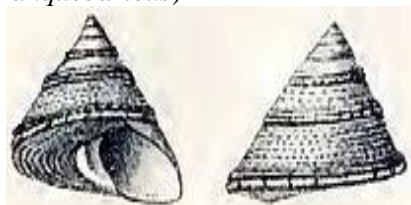
On rocks with algae
(Ahmed *et al.*, 1982)

Calliostoma ocellatum (Reeve, 1863)

Sea mounts
(Horst and Schepman, 1908)



Calliostoma tranquebaricum (Roding, 1798) 10-18mm. pale coloured, almost white, minutely tessellated on the ribs with light brown
Dredged from unknown depth
(Femorale as *Calliostoma tranquebaricum*)



Family Solariellidae Powell, 1951

Genus *Minolia* A. Adams, 1860

Minolia eudeli (Deshayes, 1863) 3mm.

Rocks at half-tide
(Melvill, 1928; OBIS, 2004)



(After Femorale)

Family Skeneidae Clark, 1851

Genus *Conradia* Adams, 1860

Conradia eutornisca (Melvill, 1918)

Sand between coral patches and seagrass
(Melvill, 1918 as *Fossarus eutorniscus*;
Saba and Moazzam, 2012 in Trochidae)



(From Amgueddfa Cymru - National Museum Wales, Cardiff)

Family Tegulidae Kuroda, Habe and Oyama, 1971

Genus *Tectus* Montfort, 1810

Tectus niloticus (Linnaeus, 1767) 150 mm.

Shallow water of tidal pools
(Khan and Dastagir, 1971 as *Trochus niloticus*)



(After Khan and Dastagir, 1971)

Tectus virgatus (Gmelin, 1791)

Rocky shores, attached to hard objects
(Khan and Dastagir, 1971 as *Trochus virgatus* Gmelin)



(After Khan and Dastagir, 1971)

Tectus conus (Gmelin, 1791) 60mm.
Near coral reefs
(Dance, 1992)



Tectus pyramis (Born, 1778) 70 mm.
Littoral and shallow sub littoral
(Oliver, 2004)



Tectus fenestratus (Gmelin, 1791)
Rocky shore
(Rahman and Barkati, 2012 as *Tectus crenulatus* Reeve)

Tectus dentatus (Forskal, 1775). 80 mm.
Between algae and on dead corals, in the intertidal and shallow sub tidal zone
(Oliver, 2004)

Genus *Tegula* Lesson, 1832

***Tegula* sp.**

Usually encrusted with bryozoa or *Serpula*. Found in tidepools and on rocks in the middle intertidal zone in protected coastal areas

(Tirmizi and Zehra, 1982)



(After Tirmizi and Zehra, 1982)

Family Liotiidae Gray, 1850
Genus *Cyclostrema* Marrayat, 1818
Cyclostrema solariellum Melvill, 1893
Sandy
(Melvill and Standen, 1901)

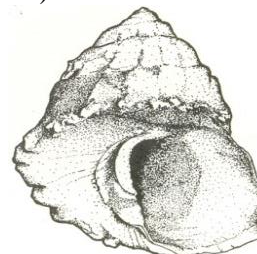


Genus *Pseudoliotia* Tate, 1898
Pseudoliotia micans (A. Adams, 1850)
3.5mm
Lives subtidally under rocks and stones
(Melvill, 1910, as *Cyclostrema micans*)



Pseudoliotia ocrinium (Melvill and Standen, 1901)
Mangrove forest
(Muradi *et al.*, 2021)

Family Turbinidae Rafinesque, 1815
Subfamily Turbininae Rafinesque, 1815
Genus *Astraliium* Link, 1807
Astraliium semicostatum (Kiener, 1850)
27 x 20mm.
Underside of rocks at low tide mark
(Khan and Dastagir, 1971 as *Astraea semicosta*)



(After Tirmizi and Zehra, 1984)

Astraliium stellare (Gmelin, 1791) 45 x 30 mm. columella white and generally rosy margined, rarely bluish.
Rocky
(Ahmed and Hameed, 1999 as *Astraea stellar* Gmelin)



Drawing with animal and shell

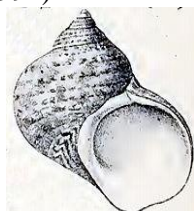
Genus *Guildfordia* Gray, 1850
Guildfordia triumphans (Philippi, 1841).
 50 mm.
 Offshore, Deep water
 (Dance, 1992)



(Photo after Wikipedia)
 Genus *Bolma* Risso, 1826
Bolma girgyllus (Reeve, 1843) 50 mm.
 Deep water
 (Dance, 1992)



(Photo Source JoJan)
 Genus *Turbo* Linnaeus, 1758
Turbo petholatus Linnaeus, 1758. 60 mm. shining outer surface, bright green on the center, the margins brown on one side, white upon the other
 Shallow reefs
 (Dance, 1992)



Turbo chrysostomus Linnaeus, 1758 70 x 60 mm.
 On rocks in weeds of sub tidal zone
 (Tirmizi and Zehra, 1984 as *Turbo* (*M.*) *chrysostomus*)



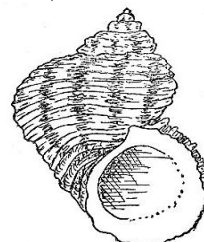
(After Tirmizi and Zehra, 1984)

Turbo intercostalis Menke, 1846
 25x15mm.
 At low tide. Attached to the rocks or other substratum in shallow water
 (Melvill, 1901)



(After Tirmizi and Zehra, 1984)

Turbo argyrostomus Linnaeus, 1758, 750 mm.
 Intertidal near coral reef
 (Dance, 1992)



(After Hornell, 1951)

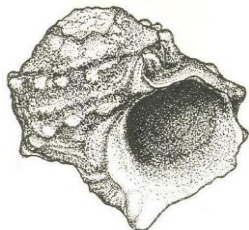
Turbo bruneus (Röding, 1798)
 On rocks
 (Roding, 1789; Melvill, 1901 as *Turbo ticaonicus* Reeve)



Genus *Lunella* Roding, 1798
Lunella cinerea (Bron, 1778) 30 x 40 mm.
 Intertidal shallow water in reef or with seaweeds
 (PARC Report, 1986)

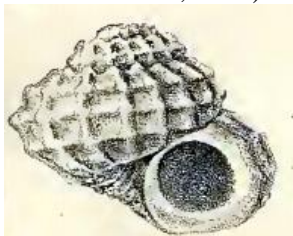
Lunella coronata (Gmelin, 1791), 31 x 34mm. Outer colour of shell variable, pale dull green to orange-yellow and flecked with brown or reddish grey, the apex frequently eroded and red; interior of aperture iridescent; exterior of operculum greenish
 Attached on rocks in supra littoral zone with algae between tidal marks

(Melvill, 1901; Khan and Dastagir, 1971 as *Turbo coronatus*)



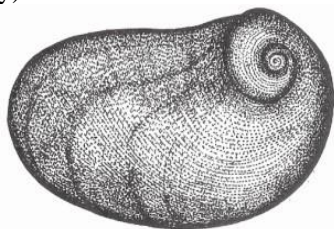
(After Tirmizi and Zehra, 1982)

Genus *Liotia* Gray, 1842
Liotia romalea Melvill and Standen, 1903 5mm length and diameter 5mm
In shell- sand, 10fathoms - 156 fathoms
(Melvill and Standen, 1903)



Superfamily Seguenzioidea Verrill, 1884

Family Chilodontidae Wenz, 1938
Genus *Granata* Cotton, 1957
Granata elegans (Gray, 1847) 30 x 18mm.
Under turnable rocks at low tide
(Melvill, 1850 as *Stomatella elegans* Gray)



(After Tirmizi and Zehra, 1984)

Granata sulcifera (Lamarck, 1922)
Initially whitish, with dark purplish or greyish brown spots appearing on cords during third whorl; subsequent whorls spotted, blotched or washed with similar shades, last whorl sometimes heavily so
Shallow water in coral reef and sand
(Melvill, 1901 as *Stomatella sulcifera*)
Granata imbricata (Lamarck, 1816)
19 mm and 43 mm.
Benthic
(Melvill, 1901 as *Stomatella imbricata* Lamarck)

Genus *Euchelus* Philippi, 1847
Euchelus sp
Coastal
(Collector: Bashiruddin, 1957)
Euchelus asper (Gmelin, 1791) Height: 28.05mm, reddish brown
Intertidal, under rocks or in sand. amongst muddy rocks at low tide. Mangroves
(Melvill and Standen, 1901)



(After Khan and Dastagir, 1971)
Euchelus atratus (Gmelin, 1791) 5 - 21 mm. black, brown or grayish-pink Larger specimens (16–23mm. alt.) paler, Estuarine
(Melvill, 1901)



(Source G.Poppe)
Euchelus bicinctus (Philippi, 1849)
Rocky habitat
(Biggs, 1973)
Euchelus horridus (Philippi, 1846)
Dead shells form shallow marine sediments
(Melvill, 1901)
Euchelus persicus (E. von Martens, 1874)
Reef
(Melvill, 1901)



(After WMSD)

Euchelus circulates (Anton, 1849)
Benthic
(Melvill, 1901 as *Euchelus proximus* A. Adams)
Genus *Vaceuchelus* Iredale, 1929

Vaceuchelus foveolatus (A. Adams, 1853)
Rocky shores
(Melvill and Standen, 1901 as
Vaceuchelus angulatus (Pease, 1867))



Vaceuchelus clathratus (A. Adams, 1853) height of shell 3-8mm. dull white, Associated with hard substrata
(Melvill and Standen, 1901 as *Euchelus clathratus*)



Genus *Perrinia* H. Adams and A. Adams, 1854

Perrinia stellata (A. Adams, 1864)
Initially whitish, with dark purplish or grayish brown spots appearing on cords during third whorl; subsequent whorls spotted, blotched or washed with similar shades Shell milky-white, fresh specimens with a cream to dirty buff intritacalx deposit, often with broad, dark greyish axial bands, particularly in juveniles.

In the low intertidal and shallow sub tidal down to -18 m. most often found under stones and dead coral blocks, in both sheltered and somewhat exposed habitats; often where the rock rests on muddy sand and in anoxic conditions

(Winckworth (NHMUK); Herbert, 2012)



Perrinia angulifera (A. Adams, 1853)
Sandy mud, 6 fathoms [11 m]
(Melvill, 1928)

Superfamily Phasianelloidea Swainson, 1840

Family Phasianellidae Swainson, 1840
Genus *Phasianella* Lamarck, 1804
Phasianella variegata Lamarck, 1822
20mm.

Shallow water among weeds
(Melvill, 1901 as)



(After Wikipedia)

Phasianella nivosa Reeve, 1862
Intertidal depths generally, from 3 to 7 fathoms, mud
(Melvill and Standen, 1901 as
Phasianella variegata nivosa)



Genus *Tricolia* Risso, 1826
Tricolia fordiana (Pilsbry, 1888)
Found amongst muddy stones in Shoal-water.
(Melvill, 1896 as *Phasianella minima* Melvill)

Superfamily Angarioidea Williams, Karube and Ozawa, 2008

Family Angariidae Gray, 1857
Genus *Angaria* Röding, 1798
Angaria sphaerula (Kiener, 1839), 60mm.

Coral reefs in deeper water
(Dance, 1992)



Angaria vicdani Kosuge, 1980, 70 mm.

Shallow corals
(Dance, 1992)



Family Areneidae McLean, 2012
Genus *Arene* H. Adams and A. Adams, 1854

Arene sp.
Weed associated
(Baig, 2014)

Arene echinacantha (Melvill and Standen, 1903) pale straw
Deep sea
(Melvill and Standen, 1903 as *Liotia echinacantha* Melvill and Standen, 1903)



Subclass Caenogastropoda Cox, 1960
Order Littorinimorpha Golikov and Starobogatov, 1975

Family Rissoidae Gray, 1847
Genus *Alvania* Risso, 1826

Alvania sp.
Mangrove forest
(Moradi *et al.*, 2019)



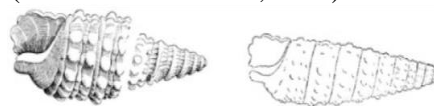
Family Assimineidae H. Adams and A. Adams, 1856

Genus *Austropilula* Thiele, 1927
Austropilula beddomeana (G. Nevill, 1880)

Mangrove forest, in brackish water and salt marshes, at beaches, in water and at land

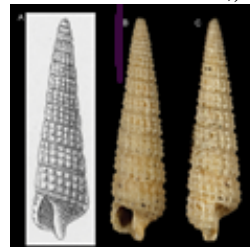
(Moradi *et al.*, 2019)
Genus *Assimineia* Fleming, 1828
Assimineia sp.
Intertidal oyster reefs
(Aslam *et al.*, 2019)
Superfamily Triphoroidea Gray, 1847.

Family Triphoridae Gray, 1847
Genus *Triphora* Blainville, 1828
Triphora acuta (Kiener, 1841) 2.5-5.6mm. dark brown spiral zone
Sea mounts and knolls
(Melvill and Standen, 1901)



(After Tirmizi and Zehra, 1984)
Triphora idonea Melvill and Standen, 1901 Height 10 mm, width 2.50 mm., whitish to yellowish

Benthic
(Melvill and Standen, 1901 as *Triforis idoneus* Melvill and Standen,)



Triphora perversa persica Melvill, 1918
Benthic
(Melvill, 1918)

Triphora interpres Melvill, 1918
Benthic
(Melvill, 1918)

Genus *Viriola* Jousseau, 1884
Viriola corrugata (Hinds, 1843)
Swamps and inundated forests
(Melvill and Standen, 1901 as *Triphora corrugata* Hinds, 1843)



Family Cerithiopsidae H. Adams and A. Adams, 1853

Genus *Seila* A. Adams, 1861
Seila hinduorum (Melvill, 1898)

Offshore in shell sand
(Melvill, 1898 as *Cerithiopsis* (*Seila*)
hinduorum Melvill)



(After Tirmizi and Zehra, 1982)

Genus *Cerithiopsis* Forbes and Hanley,
1850

Cerithiopsis spp.

Lagoon area

(Gondal *et al.*, 2012)

Superfamily Cerithioidea Férussac, 1819

Family Thiariidae Gill, 1871 (1823)

Genus *Melanoides* Olivier, 1804.

Melanoides tuberculata (O.F. Müller,
1774)

Predominantly found in freshwater
springs, streams, lakes and swamps, but
occasionally inhabits brackish and marine
habitats, especially mangroves

(Benson, 1836 as *Melanoides pyramis*;
Ahmed and Hameed, 1999 as *Tiara*
tuberculata; Khanum *et al.*, 2020)



Family Litiopidae Gray, 1847

Genus *Gibborissoia* Sacco, 1895

Gibborissoia. 3.5mm.

Sandy bottom, deposited probably in the
shallow sub-tidal zone

(Melvill and Standen, 1901 as *Fenella*
virgata (Philippi))



(After WMSDB)

Family Scaliolidae Jousseaume, 1912

Genus *Finella* A. Adams, 1860

Finella tanyspira Melvill and Standen,
1901 2.5mm.

Sandy beaches, lower sublittoral-bathyal,
bathymetric range of 39-285 m. range of
162 meters

(Melvill, 1910 as *Fenella tanyspira*
Melvill and Standen; OBIS, 2006)



(Taken by Raymond Huet)

Finella pupoides A. Adams, 1860 shell
size 2mm - 4 mm. colours varies from
white to pale yellow, a few times even
dark brown. Typically two indistinct
brown bands below the suture and at the
base.

Mangrove forest

(Muradi *et al.*, 2021)

Genus *Scaliola* A. Adams, 1860

Scaliola arenosa A. Adams, 1862 2-
5mm.

Intertidal and shallow, sub tidal sandy-
mud-type substrates

(Melvill and Standen, 1901)



(Picture taken from Raymond Huet)

Family Cerithiidae Fleming, 1822

Subfamily Cerithiinae Fleming, 1822

Genus *Clypeomorus* Jousseaume, 1888

Clypeomorus subbrevicula (Oostingh,
1925)

Mangroves

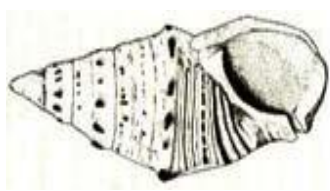
(Nazim *et al.*, 2015 in Potamididae)

Genus *Cerithium* Bruguiere, 1789

Cerithium caeruleum Sowerby, 1855, 30-
40mm.

Under rocks, tide pools, intertidal, dead
shells frequently inhabited by hermit crabs
and encrusted by coralline red algae,
forming rhodoliths.

(Tirmizi and Zehra, 1984 as *Clypeomorus*
caeruleum)



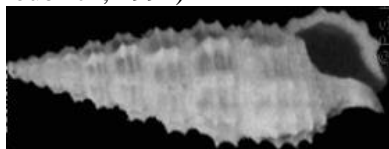
(Apertural view, after Tirmizi and Zehra, 1984)

Cerithium column Sowerby, 1834, 31mm. colour citron
Intertidal to subtidal reef environments, generally occurs in sand-rubble habitats behind off-shore reefs and in well-oxygenated lagoons.
(Khan and Dastagir, 1971 as *Cerithium citrinum* Sowerby)



Cerithium punctatum Bruguière, 1792
Rocky shores with weeds or in sand.
(PARC Report, 1986 as *Cerithium pipatritum* Sowerby)

Cerithium scabridum Philippi, 1848 10-25mm.
3 m, intertidal, oyster rocks
(Houbrick, 1992)



Cerithium echinatum Lamarck, 1822
Coral patches, rock bottoms and reef slopes at 15-30m of water.
(Nasreen *et al.*, 2000 as *Cerithium rubus*)

Genus *Colina* Adams and Adams, 1854

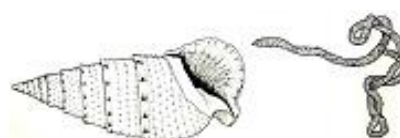
Colina pinguis (Adams, 1855)
Intertidal zone at the water's edge at a mean distance from sea level of -308 meters, in coral and sand with algae.
(Melvill, 1903 as *Cerithium pingue* Adams; OBIS, 2004)

Genus *Rhinoclavis* Swainson, 1840

Rhinoclavis (Rhinoclavis) sinensis (Gmelin, 1791) 38 x 13mm.

Eulittoral and sub tidal zone in sand, weedy rocks.

(Gmelin, 1791; Khan and Dastagir, 1971 as *Cerithium sinensis*)



Shell (After Tirmizi and Zehra, 1984).
Egg ribbon (After Barkati and Ahmed, 1984)

Rhinoclavis (Rhinoclavis) aspera (Linnaeus, 1758), 60mm.
Sandy areas
(Dance, 1992)



Rhinoclavis (Rhinoclavis) articulata (Adams and Reeve, 1850)

Rocky shores with weeds or in sand
(PARC Report, 1986 as *Cerithium articulatus* Adams and Reeve)

Genus *Varicopeza* Gründel, 1976

Varicopeza pauxilla (A. Adams, 1855)

At 40 fathoms

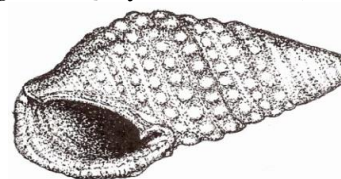
(Melvill, 1910 as *Cerithium trigonostomum*)

Genus *Clypeomorus* Jousseaume, 1888

Clypeomorus nymphe Houbrick, 1985, 16 x 09mm.

Rocky shores, sub tidal zone

(Tirmizi and Zehra, 1984 as *Clypeomorus variegatum* Quoy and Gaimard)



(After Tirmizi and Zehra, 1984)

Clypeomorus bifasciata (Sowerby II, 1855), 27mm.

Rocky shore with weeds

(Khan and Dastagir, 1971 as *Cerithium morus* Lamarck)



Genus *Bittium* Gray, 1847

Bittium atramentarium Melvill and Standen, 1901 Shell reddish-brown to light chestnut-brown in colour Sandy and muddy shores, often with *Zostera* and other seagrasses, to depths up to 250 m. (Melvill and Standen, 1901; Kobelt, 1905)

Family Batillariidae Thiele, 1929

Genus *Batillaria* Benson, 1842

Batillaria sordida (Gmelin, 1791)

Rocky shores with weeds or in sand, salt marsh, mud flats

(Ahmed and Hameed, 1999 as *Cerithium carbonarium* Philippi)

Family Potamididae Adams and Adams, 1854

Genus *Pirenella* Gray, 1847

Pirenella conica (Blainville, 1829)

Intertidal lagoon, on mudflats, soft mud and may sometimes climb mangrove pneumatophores or shelter under loose flaps of the black mats of cyanobacteria in the uppermost intertidal zone (Wikipedia)

Pirenella cingulata (Gmelin, 1791) 40 mm.

Mangrove swamps, mud intertidal sand (Gmelin, 1791; Khan and Dastagir 1971 as *Cerithidea fluviatilis* Potiez and Michaud, 1838 as *Cerithidea cingulata* (Gmelin)



(After Khan and Dastagir, 1971)

Genus *Telescopium* Montfort, 1810

Telescopium telescopium (Linnaeus, 1758), 100mm. black at first look but reddish-brown. Ribs alternately dark brown and light brown.

Mangrove swamp, near river mouth (Khan and Dastagir, 1971)



(After S. Aslam, 2022; apertural view after Tirmizi and Zehra, 1982)

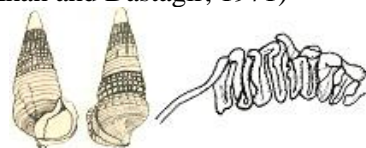
Genus *Terebralia* Swainson, 1840

Terebralia palustris (Linnaeus, 1767)

120 mm. dark brown

Salt marshes. Rocky

(Khan and Dastagir, 1971)



Shell and Egg ribbon

Shell (After Khan and Dastagir, 1971)

Terebralia semistriata (Mörch, 1852)

Mangroves

(Nazim *et al.*, 2025)

Genus *Cerithidea* Swainson, 1840

Cerithidea decollata Linnaeus, 1758

Salt marsh vegetation and mangroves on the fringes of salt pans and along creeks and rivers, in fully marine and brackish conditions, climb up to 2 m on trunks, sometimes occurring in clusters of hundreds per tree.

(Nazim *et al.*, 2015; Fish Base Map)

Cerithidea obtusa (Lamarck, 1822)

50mm.

Muddy coastal area

(Oliver, 2004)



Family Planaxidae Gray, 1850

Genus *Planaxis* Lamarck, 1822

Planaxis sulcatus (Born, 1778) 13 mm and 35 mm. Colour purplish-brown with a white pattern

Intertidal rocks, mangroves

(Barkati and Ahmed, 1982)



(After Tirmizi and Zehra, 1982)

Family Turritellidae Lovén, 1847

Genus *Turritella* Lamarck, 1799

Turritella cochlea Reeve, 1849. 5mm.

On rocks and sand at low-tide marks

(Tirmizi and Zehra, 1984)



(After Tirmizi and Zehra, 1984)

Turritella terebra (Linnaeus, 1758) 140 mm.

On rocks on sandy mud at low tide
(Tirmizi and Zehra, 1984)



(After Tirmizi and Zehra, 1984)

Turritella duplicata (Linnaeus, 1758) 150 mm.

Sandy mud
(Khan and Dastagir, 1971)



(After Tirmizi and Zehra, 1984)

Turritella trisulcata Lamarck, 1822
Whitish, tinged with violet towards apex,
obliquely painted with a very few
irregular-brown flames

Rocky cum sandy
(Reeve, 1849; Khan and Dastagir, 1971)



Turritella torulosa Kiener, 1843

On rocks below low-tide line
(Melvill and Standen, 1910)



(From Femorale)

Turritella columnaris Kiener, 1843

On muddy cum sandy, rocks below low-tide line

(Moazzam and Moazzam, 2007)



(From Femorale)

Turritella fultoni Melvill and Standen, 1901 taxon inquirendum

Sublittorally, down to 220 m., on soft bottoms

(Melvill, 1898 as *Trochus radiatusfultoni* Melvill)



Turritella bicingulata Lamarck, 1822
39mm. ornamented with profusely
flamed, variegated with reddish brown
markings

Sublittoral
(Reeve, 1860)



Turritella vermicularis (Brocchi, 1814)

Rocky cum sandy
(Reeve, 1849; Khan *et al.*, 1973 as
Turritella trisulcata Lamarck)



Genus *Archimediella* Sacco, 1895

Archimediella maculata (Reeve, 1849)

On rocks at low-tide marks; in coral sand,
muddy sand with sea grass and coral
patches

(Reeve, 1849; Ahmed *et al.*, 1982 as
Turritella maculata Reeve)



Order Meloinmorpha Golikov and
Starobogatov, 1975

Superfamily Vermetoidea Rafinesque,
1815.

Family Vermetidae Rafinesque, 1815

Genus *Vermetus* Daudin, 1800

***Vermetus* sp.**

On rocks and flat surface
(Kazmi *et al.*, 2018)

Superfamily Rissooidea Gray, 1847.

Family Rissoinidae Stimpson, 1865

Genus *Rissoina* d'Orbigny, 1840

Rissoina applanata Melvill, 1893

Littoral

(Melvill, 1883 as *Rissoina (Zebina) applanata* Melvill)



Rissoina distans (Anton, 1839) 5-8 mm.

Benthic

(Melvill and Standen, 1901 as *Rissoina clathrata* A. Adams)



(After WMSDB)

Rissoina crassa Angas, 1871

Subtidal down to 18 m.

(Fulton in Horst and Schepman, 1908)

Genus *Phosinella* Mörch, 1876

Phosinella clathrata (A. Adams, 1853).

.8 - 12 mm.

Intertidal and subtidal occurring on sandy gravel

(Melvill and Standen, 1901 as *Rissoina clathrata* A. Adams)



Genus *Moerchiella* G. Nevill, 1885

Moerchiella artensis (Montrouzier in Souverbie and Montrouzier, 1872)

Benthic, hard substrate or soft substrate (muds, sands, clays)

Minimum recorded depth 0 m. Maximum recorded depth 4.5 m.

(Sleurs, 1993; Rao and Rao, 2000)

Rissoina laeta Preston)



Family Barleeiidae Gray, 1857

Genus *Barleeia* Gray, 1857

Barleeia sp.

Weed associated

(Baig, 2014)

Superfamily Littorinoidea Children, 1834

Family Littorinidae Children, 1834

Subfamily Littorininae Anon, 1834

Genus *Littoraria* Gray, 1833

Littoraria angulifera (Lamarck, 1822)

Height 1". whitish, orange, red brown to black with darker wavy vertical oblique strips

On rocks, mangroves, between tidal marks

(Khan and Dastagir, 1971 as *Littorina angulifera* Lamarck and as *Littorina angulifera lineata* Gmelin)



(After Khan and Dastagir, 1971)

Littoraria strigata (Philippi, 1846)

Mangroves, rocks

(Reid, 1986; OBIS, 2004)

Littoraria melanostoma (Gray, 1839)

30mm.

Mangroves

(Tirmizi and Barkati, 1985 as *Littorina melanostoma*)



Littoraria scabra (Linnaeus, 1758)

35mm. outer surface with a pattern of irregular dark stripes, brown shell colour matches bark

Mangrove leaves and bark

(Dance, 1992 as *Littorina scabra*

Linnaeus)



Littoraria undulata (Gray, 1839) 25mm.

On rocks

(PSF Report, 1977 as *Littorina undulata*)
Littoraria carinifera (Menke, 1830)
 Back of mangrove forest
 (Rosewater, 1973)



Genus *Echinolittorina* Habe, 1956
Echinolittorina ziczac (Gmelin, 1791)
 On rocks, upper tidal marks
 (PSF Report, 1977 as *Littorina ziczac*
 Gmelin)



Echinolittorina omanensis Reid, 2007
 Exposed coast to sedimentary or
 estuarine
 (Reid, 2007)

Echinolittorina leucosticta (Philippi,
 1847) 9mm .,blackish brown, paler at
 suture and on base; ribs and suture marked
 by prominent white dashes or spots, rarely
 fusing to form axial flames of brown and
 white or a finely marbled pattern; aperture
 dark brown, pale band at base; columella
 dark purple-brown, inner lip purplish
 Benthic, rocky cum sandy shores
 (Barkati and Ahmed, 1984 as
Nodilittorina leucosticta leucosticta
 Reeve, 1857; misidentification, perhaps of
Littoraria intermedia (Philippi), fide Reid,
 2007)

Echinolittorina vidua (Gould, 1859) 10
 mm.

Shore rocks, above high tide
 (Barkati and Ahmed, 1984 as
Nodilittorina picta Philippi, may be a
 misidentification perhaps of
Echinolittorina vidua (Gould, 1859), fide
 Reid, 2007)

Echinolittorina pascua (Rosewater,
 1970)

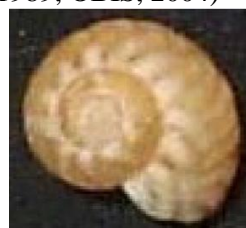
Abundant on basalt rocks in the littoral
 fringe, on both strongly exposed shores

and in moderately sheltered inlets. On
 raised coral islands it occurs on limestone
 (Reid, 1992 as *Nodilittorina*
(Nodilittorina) trochoides)
 Genus *Nodilittorina* Martens, 1897
Nodilittorina pyramidalis (Quoy and
 Gaimard, 1833)
 Shore rocks, above high tide
 (Rajagopal and Mookherjee, 1982)



(After FAO)

Genus *Peasiella* Nevill, 1885
Peasiella infracostata (Issel, 1869)
 1mm.Suture and periphery with
 alternating brown and opaque white spots;
 sutural and peripheral spots sometimes
 connected by oblique brown lines; spiral
 brown line sometimes placed just above
 suture on spire whorls; base unmarked or
 with peripheral brown line
 Upper tidal rocks among barnacles, tide
 pools in sand between coral patches and in
 the mangrove
 (Reid, 1989; OBIS, 2004)



(After WMSDB)

Peasiella isseli (Semper in Issel, 1869)
 Mostly at higher tide levels on rocky
 shores on rocks, or on concrete and wood
 in bays, sometimes in salt marshes
 (Reid, 1989)



Family Modulidae Fischer, 1884

Genus *Indomodulus* Landau, Vermeij and Reich, 2014

Indomodulus tectum (Gmelin, 1791) 250 mm.

Sand with weeds

(Dance, 1992 as *Modulus tectum* (Gmelin))



Superfamily Truncatelloidea Gray, 1840

Family Vitrinellidae Bush, 1897

Genus *Circulus* Jeffreys, 1865

Circulus cingulifera (Adams, 1850)

55mm.

Coral reef

(Melvill, 1916 as *Cyclostrema cinguliferum*)



(After WMSDB)

Circulus cinguliferus (A. Adams, 1850)

Diameter 4.5mm

Crustaceans burrows

(Melvill, 1901

Genus *Vitrinella* Adams, 1850

Vitrinella sp.

Shallow marine sediments

(Rehman and Barkati, 2011)



Superfamily Velutinoidea Gray, 1840

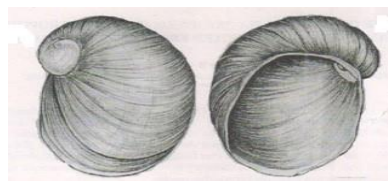
Family Velutinidae Gray, 1840

Genus *Lamellaria* Montagu, 1815

Lamellaria perspicua (Linnaeus, 1758)

Prefers muddy bottom, in shell sand, uncommon in rocks, associated with coelenterates

(Kazmi, 1995 in Lamellariidae)



Shell



Rachidian and lateral tooth



Ventral and dorsal views

Superfamily Capuloidea Fleming, 1822

Family Capulidae Fleming, 1822

Genus *Lippistes* Montfort, 1810

Lippistes cornu (Gmelin, 1791) 12mm.

Intertidal pools and shell sand

(Melvill and Standen, 1895 as *Lippistes grayi* A. Adams)



Genus *Separatista* Gray, 1847

Separatista separatista (Dillwyn, 1817)

Lives on fan worms in intertidal, rocky area

(Melvill, 1901 as *Separatista chemnitzii* (A. Adams)

Superfamily Rissosoidea J.E. Gray, 1847.

Family Zebinidae Coan, 1964

Genus *Zebina* H. Adams and A. Adams, 1854

Zebina sp

In *Sargassum* weed

(Beg and Zehra, 2006)

Genus *Stosicia* Brusina, 1870

Stosicia paschalis (Melvill and Standen, 1901)

Intertidal pools and shell sand.

(Melvill and Standen, 1901 as *Rissoina (Phosinella) paschalis*)

Stosicia annulata (Dunker, 1859)

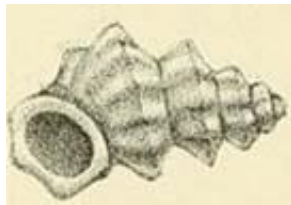
Intertidal pools and shell sand
(Melvill, 1898 as *Iravadia trochlearis*)



Genus *Schwartziella* G. Nevill, 1881
Schwartziella triticea (Pease, 1861)
Live and dead coral, weed, sand and rocks
(Moazzam and Moazzam, 2007 as *Rissoina rissoi* Weinkauff)



Genus *Merelina* Iredale, 1915
Merelina petronella (Melvill and Standen, 1901)
Intertidal
(Melvill and Standen, 1901 as *Rissoa petronella* Melvill and Standen)



Superfamily Stromboidea Rafinesque, 1815

Family Strombidae Rafinesque, 1815
Genus *Gibberulus* Jousseaume, 1888
Gibberulus gibberulus (Linnaeus, 1758)
70 mm.
Intertidal shallow water in sand or mud.
(Abbott, 1960 as *Strombus (Gibberulus) gibberulus gibberulus*; Khan and Dastagir, 1971 as *Strombus gibberulus* Linnaeus)



(After Khan and Dastagir, 1971)

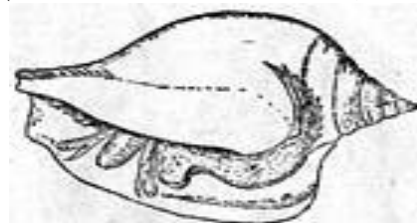


(From Mookherjee)

Genus *Canarium* Schumacher, 1817
Canarium mutabile (Swainson, 1821)
At 40m.depth.
(Rao, 1970 as *Strombus (Canarium) mutabilis* Swainson)



Canarium klineorum (Abbott, 1960)
outer border of columella and the inner narrow border of the outer lip bright carmine to yellowish red, entire inner half of the columella very dark blackish purple. Deep within the aperture whitish to cream. Inside of body whorl with numerous, raised, fine, black or gray spiral lirae. Operculum light-brown
(Abbott, 1960 as *Canarium klineorum*)
Genus *Laevistrombus* Abbott, 1960
Laevistrombus canarium (Linnaeus, 1758)
Subtidal down to 18 m. On muddy sand bottoms among algae and sea
(Fulton in Horst and Scheman, 1908)



(After Hornell, 1951)

Genus *Conomurex* Bayle in P. Fischer, 1884

Conomurex fasciatus (Born, 1778) 25 mm - 50 mm.
Benthic on algae
(Samaie, 1997; Kazmi *et al.*, 2018)

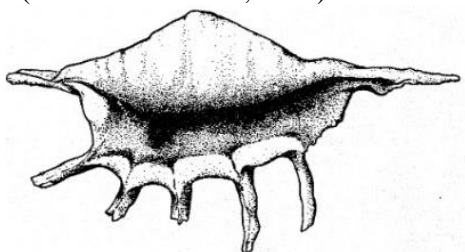


Conomurex persicus (Swainson, W.A., 1821)
On rocks.
(Melvill, 1898 as *Strombus belutschiensis*)



(From William Swainson)

Genus *Lambis* Röding, 1798
Lambis sp
(Tirmizi and Zehra, 1982)



(Tirmizi and Zehra, 1982)

Genus *Margistrombus* Bandel, 2007
Margistrombus succinctus (Linnaeus, 1767) 33mm. yellowish-brown with fine reticulated and arrow-shaped lines, body Whorle with spiral white bands.
Rocky shore, found close to the low tide mark on sandy beach with algal vegetation
(Abbot, 1960 as *Strombus (Dolomena) marginatus succinctus*)



(Figure Source William Swainson)

Genus *Dolomena* Wenz, 1940
(G.B. Sowerby II, 1842)
Dolomena plicata siboldi (G.B.I Sowerby, 1842)
Reef flats and coral-rubble bottoms in shallow water from low tide levels to depths of 5m
(Florida Museum of Natural History (UF) Catalog #: 59732-Mollusca)



Dolomena yerburyi (E. A. Smith, 1891)
Shallow marine sediment
(<http://mczbase.mcz.harvard.edu/guid/> as *Dolomena plicata yerburyi* (E. A. Smith))



Family Rostellariidae Gabb, 1868
Genus *Tibia* Röding, 1798
Tibia insulaechorab Röding, 1798 Length 4 inches 3 lines, diam. 1 inch 3 lines aperture golden yellow, deepest on the lower portion of the columella."
Benthic
(Angas, 1878 as *Rostellaria luteostoma*; Ghani *et al.*, 2019)



Tibia curta (Sowerby, 1842) Brown
On rocks
(Sowerby, 1842; Khan and Dastagir, 1971)



Tibia fusus (Linnaeus, 1758)
Intertidal
(Reeve, 1851 as *Tibia unicornis* Dillwyn, 1817)



Genus *Rostellariella* Thiele, 1929
Rostellariella delicatula (Nevill, 1881)
 45-110mm.
 Oxygen minimum zone.
 (Ramirez-Llodra and Olabarria, 2005 as
Tibia delicatula Nevill)



Superfamily Xenophoroidea Troschel, 1852

Family Xenophoridae Troschel, 1852 (1840)

Genus *Xenophora* Waldheim, 1807
Xenophora corrugata (Reeve, 1842)
 50mm. pale yellowish-brown to yellowish-white, sometimes with a few pale brown spots or collabral streaks on base

Intertidal muddy cum sandy
 (Reeve, 1842)



(Photo courtesy: Moazzam)

Xenophora pallidulla (Reeve, 1842)
 75mm.
 Deep water
 (Dance, 1992)



Xenophora konoi Habe, 1953
 Individuals may be up to 82.4 mm.
 white dorsally, creamy white to white ventrally
 collects shells, rocks, and other debris from its environment in shallow waters

(Rao and Rao, 2000 as *Xenophora*
(Xenophora) mekranensis konoi Hab)



Genus *Stellaria* Möller, 1832
Stellaria solaris (Linnaeus, 1764)
 90mm. yellow
 Muddy-cum sandy, deep water, on the continental shelf in 18-200 m.
 (Melvill, 1901 as *Xenophora solaris*)



(Picture courtesy Moazzam)

Superfamily Calyptraeidae Lamarck, 1809

Family Calyptraeidae Blainville, 1824
 Genus *Desmaulus* Rehder, 1943

Desmaulus extincorium (Lamarck, 1822) 1-2cm, interior glossy white or pale yellow. May be white, pinkish or even reddish.

Occasionally found attached to hard substrates, also in sand or mud shell
 (Khan and Dastagir, 1971 as *Calyptraea extincorium* Lamarck)

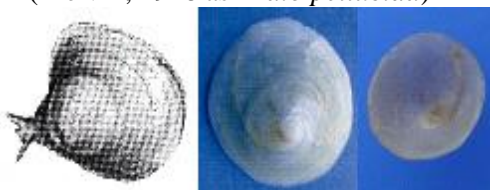


Genus *Calyptraea* Lamarck, 1799
Calyptraea spinifera (Gray, 1867)
 Benthic
 (Melvill as *Calyptraea (Trochita) spinifera* (Gray)

Calyptraea pellucida (Reeve, 1859)

Sub tidal

(Melvill, 1928 as *Erato pellucida*)



Animal in shell, empty shell,

Genus *Crucibulum* Schumacher, 1817

Crucibulum sp.

Low tide (0.5 ft), rocks/sand, weed covered

(Steiner, 1973 15726.0)

Crucibulum scutellatum (Wood, 1828) 11mm

Hard substratum of the rocky beaches and the rocky breakwaters

(Tirmizi and Zehra, 1982 as *Crucibulum* sp; Rao *et al.*, 2004 as *Capulus scutellatum*)



(After Tirmizi and Zehra, 1982)

Genus *Crepidula* Lamarck, 1799

Crepidula plana Say, 1822 1- 1/2inch

Associated with other gastropods, on muddy bottom.

(Khan and Dastagir, 1971)



(After Khan and Dastagir, 1971)

Genus *Ergaea* H. Adams and A. Adams, 1854

Ergaea walshi (Reeve, 1859)

Associated with other gastropods

(Fatima *et al.*, 2003 as *Crepidula walshi*

Reeve)



In empty *Tonna* shell, on empty *Placuna* shell

Superfamily Vanikoroidea Gray, 1840

Family Hipponicidae Troschel, 1861

Genus *Hipponix* DeFrance, 1819

Hipponix sp.

Attached to substrate or other shells (PSF Report, 1977)

Genus *Cheilea* Modeer, 1793

Cheilea equestris (Linnaeus, 1758)

On coral reefs and usually remain attached to the under surface of coral mass taking up the formation of the substratum (Mookherjee, 1985)



Family Amathinidae Ponder, 1987

Genus *Amathina* Gray, 1842

Amathina sp. 26mm.

Lives as an ecosymbiont on bivalves (Tirmizi and Zehra, 1982)



(After Tirmizi and Zehra, 1982)

Amathina tricarinata (Linnaeus, 1767)

Found in subtidal areas, and under stones. Also found living on large bivalves

(Melvill, 1901 as *Amathina tricostata*
(Gmelin)



Genus *Leucotina* A. Adams, 1860
Leucotina gratiosa Melvill, 1898
Benthic, ectoparasites on other molluscs
(Melvill, 1901)

Family Eulimidae Philippi, 1853
Genus *Hypermastus* Pilsbry, 1899

Hypermastus epiphanyes
(Melvill, 1897)

At 9 m, soft mud, on *Echinodiscus*.
(Melvill, 1897 as *Eulima epiphanyes*)

Genus *Niso* Risso, 1826

Niso venosa Sowerby III, 1895 11mm.

Moderately shallow water
(Melvill and Standen, 1895)



(After Kazmi *et al.*, 2018)

Genus *Eulima* Risso, 1826

Eulima bivittata (H. Adams and A.
Adams, 1853)

On soft substrata from 20-250 m.,
associated with the ophiuroids but often
found free

(Altena, 1939)



(Picture by George Brettingham
<https://commons.wikimedia.org/w/index.php?curid=36282359>)

Eulima gentilomiana Issel, 1869

Probably ect- parasitic on echinoderms
(Waren 1981)

(Florida Museum of Natural History
(UF)



Genus *Parvioris* Warén, 1981

Parvioris styliferoides (Melvill and
Standen, 1901) Ectoparasitic
(Melvill and Standen, 1901 as *Eulima
styliferoides* Melvill and Standen)

Parvioris shoplandi (Melvill, 1898)

Ectoparasitic

(Melvill, 1898)



Superfamily Cypraeoidea Rafinesque,
1815

Family Triviidae Troschel, 1863

Genus *Cleotrivia* Iredale, 1930

Cleotrivia pilula (Kiener, 1844)

Intertidal

(Ray, 1948 as *Trivia pilula*).

Family Cypraeidae Rafinesque, 1815

Genus *Melicerona* Iredale, 1930

Melicerona listeri (Gray, 1824)

Sandy shores

(Khan *et al.*, 1973as *Erronea listeri*)

Genus *Monetaria* Troschel, 1863

Monetaria annulus (Linnaeus, 1758) 30
mm.white or creamy with a regular oval
outline and yellow ring around top

Under rocks and corals

(Khan and Dastagir, 1971 as *Cypraea
annulus* Linnaeus)



(After Khan and Dastagir, 1971)



Monetaria caputserpentis (Linnaeus, 1758) 40 mm., broad brown margin with pale top with brown net work
Under rocks in shallow waters
(Khan and Dastagir, 1971 as *Cypraea caputserpentis* Linnaeus)



(After Khan and Dastagir, 1971)

Monetaria obvelata (Lamarck, 1810) 25.00mm.

On rocks, in coral rubble
(Bano, 1981 (unpublished thesis) as *Cypraea obvelata*)

Monetaria moneta (Linnaeus, 1758) 40.00 mm. white or pale yellow
Sandy, mudflats under rocks
(Khan and Dastagir, 1971 as *Cypraea moneta* Linnaeus)



Genus *Mauritia* Troschel, 1863
Mauritia arabica (Linnaeus, 1758) 80 mm. dorsal white patches
On rocks at low tides,
(Melvill and Standen, 1899 as *Cypraea arabica* Linnaeus)



Left, egg case (After Barkati and Ahmed, 1984); Shell (After Tirmizi and Zehra, 1984)

Mauritia arabica asiatica Schilder and Schilder, 1939

On rocks at low tides

(Femorale *Cypraea arabica asiatica*)



Mauritia eglantina (Duclos, 1833)

70mm.

Among exposed rocks and coral reef at low tide

(PARC Report, 1986as *Cypraea eglantina* Duclos)

Mauritia grayana Schilder, 1930 44-52 mm. dorsum surface light gray-brown, with several gray spots and many thin longitudinal lines. In the middle of dorsum a wide longitudinal stripe present. Close to the edges a grayish wide frame with several dark brown spots present; base pale brown, with a wide aperture and fine dark brown teeth on outer and inner lips, mantle quite grayish and almost transparent

Shallow waters, mainly at about 2-5 metres.

(Lorenz and Hubert, 2000)



Genus *Lyncina* Troschel, 1861
Lyncina carneola (Linnaeus, 1758) 50mm.

Among rocks and corals
(Bano, 1981, unpublished thesis as *Cypraea carneola* Linnaeus)



(After Wikimedia)

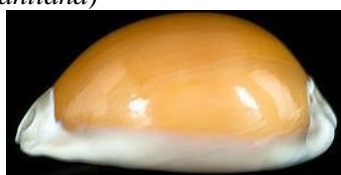
Lyncina lynx (Linnaeus, 1758) 30.00 mm. whitish mottled faintly with irregular brown spots
Among rocks and coral
(Melvill, 1903 as *Cypraea lynx* Linnaeus)



Lyncina vitellus (Linnaeus, 1758)
Intertidal
(Bano, 1981, unpublished thesis)

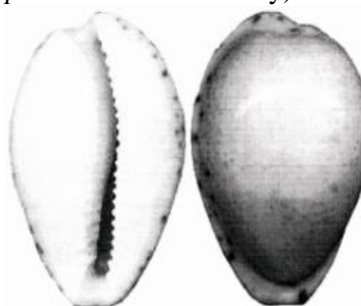


Genus *Callistocypraea* Schilder, 1927
Callistocypraea aurantium (Gmelin, 1791) 2 mm.
Yellowish brown to reddish orange on the dorsum, with white to cream coloured margins. mantle a combination of dark gray with translucent spots and patches that the orange colour of the shell shows through; scattered branching papillae brownish gray, often white at the bases and tips
Sandy shores, on the reef, at depths of 30 to 100 feet
(Khan *et al.*, 1973 as *Callistocypraea aurantiana*)



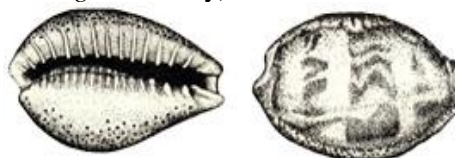
Genus *Macrocypraea* Schilder, 1930

Macrocypraea cervus (Linnaeus, 1771) 60x38mm.
In mud and sand, under coral slabs
(Dance, 1992 as *Lyncina curvus* (Linnaeus)
Genus *Notocypraea* Schilder, 1927
Notocypraea declivis (Sowerby II, 1870). 28mm.
Among rocks
(Bano, 1981, unpublished thesis as *Cypraea declivis* Sowerby)



Genus *Purpuradusta* Schilder, 1939
Purpuradusta gracilis (Gaskoin, 1849) 25mm.
Intertidal under rocks
(PSF Report, 1977 as *Cypraea gracilis* Gaskoin)

Purpuradusta microdon (Gray, 1828) 18x11mm.
Intertidal rocks
(Bano, 1981, unpublished thesis as *Cypraea microdon* Gray)
Genus *Palmadusta* Iredale, 1930
Palmadusta lentiginosa buhariensis (Jonklas and Nicolay 1977) 32mm.
Muddy rocks at low tide
(Tirmizi and Zehra, 1984 as *Cypraea lentiginosa* Gray)



(After Tirmizi and Zehra, 1984)

Genus *Erronea* Troschel, 1863
Erronea succincta succincta (Linnaeus, 1758) 40mm.
On rocks and crevices in fragments of large shells
(Bano, 1981, unpublished thesis; Oliver 2004; Ali, 2006 as *Cypraea onyx succincta* Linnaeus;



(www.idscaro.net/sci/01_coll/plates/gastro/pl_cypraeidae_1.htm as *Adusta onyx succincta* (Linnaeus))

Erronea caurica Linnaeus, 1758

On rocks

(Melvill and Standen, 1904 as variety *cairnsiana* of *Cypraea caurica* Linnaeus)



Erronea pallida (J.E. Gray, 1824)

31x21mm. dorsal surface usually pale brown or greyish, with a darker brown area in the middle, base whitish

At low tide under rocks in mud

(Khan *et al.*, 1973 as *Cypraea pallida* Gray)



Erronea ovum (Gmelin, 1791) 20mm, snow white

At 7 meter depth

(Ali, 2006 as *Cypraea ovum*)



Erronea adusta persica Schilder and Schilder, 1938 35-50mm.

In shallow subtidal water

(Femorale)



Genus *Cypraea* Linnaeus, 1758

Cypraea tigris Linnaeus, 1758 100 mm.

Dorsally white or pale reddish-brown with large dark brown spots, and sometimes a reddish longitudinal stripes

Under coral and boulders in shallow or deep water

(Tirmizi and Zehra, 1984)



Egg case (Barkati and Ahmed, 1984);

Shell (After Tirmizi and Zehra, 1984)

Genus *Contradusta* Meyer, 2003

Contradusta walkeri (Sowerby I, 1832)

30 mm.

On rocks and crevices

(Bano, 1981, unpublished thesis as *Cypraea walker* Sowerby)

Genus *Zonaria* Jousseume, 1984

Zonaria zonaria (Gmelin, 1791)

Sandy shores

(Khan *et al.*, 1973)

Zonaria pyrum (Gmelin, 1791) 32-

38mm. orange-brown, with many brown

spots and two or three clear trasversal

bands; base, the margins and the teeth orange or pinkish

Usually up to 15–50 m., hidden under rocks or coral slabs and caves.

(Lorenz and Hubert, 2000.)



Genus *Cypraeovula* Gray, 1824

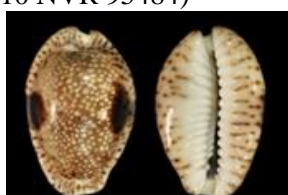
Cypraeovula fuscorubra (Shaw, 1909)

mantle variable in colour from white to black and orange to pink and red, with a

finely granular surface. Black and white markings on small papillae along the mantle edges shell colour ranges from beige and mauve to grey with an overlay of densely spaced reddish brown spots
On reefs from 15 to over 80 metres depth, often on the sides of large granite boulders (Femorale, 2011 as *Cypraea erosasimilis* Gmelin, 1791)

Genus *Naria* Gray, 1837

Naria nebrites (Melvill, 1888) 31-35 mm. Under rocks under stones and dead coral, (Bano, 1981, unpublished thesis as *Cypraea nebrites* Melvill; NHM collected 2000-10 NVR 95484)



(From Natural History Museum, Rotterdam)

Naria lamarckii (J.E. Gray, 1825) Sandy bottoms and the mangroves In intertidal water or on coral reef up to about 20 metres of depth (Apte, 1998 as *Erosaria lamarckii*)



Naria marginalis (Dillwyn, 1817) Sandy bottoms (Femorale, 2011 as *Cypraea marginalis* *Pseudocellata* (Schilder and Schilder)



Naria ocellata (Linnaeus, 1758) 1mm., pale pinkish-livid or grey, dorsally fulvous or raw sienna, flecked with close round white spots Sandy bottom. Among muddy stones and rocks at low tide

(Melvill and Standen, 1904 as *Cypraea ocellata pelidna*)



(After Tirmizi and Zehra, 1984)

Naria turdus (Lamarck, 1810) 50 mm. dark cinereous brown Rocky shores at low tides (Melvill and Standen, 1901; Khan and Dastagir, 1971 as *Cypraea turdus*)



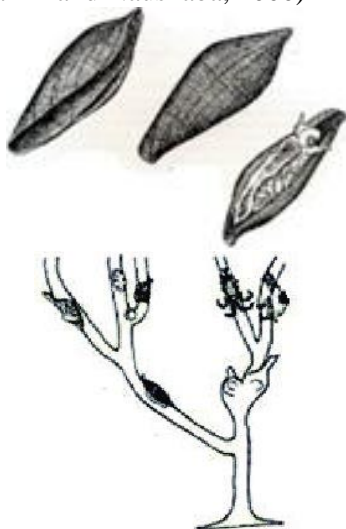
(After Tirmizi and Zehra, 1984)



Genus *Luria* Jousseume, 1884
Luria pulchra (Gray, 1824)
Intertidal
(Femorale, 2011 as *Cypraea pulchra* Gray)

Family Ovulidae Fleming, 1822
Subfamily Ovulinae Fleming, 1828
Genus *Crenovolva* Cate, 1973
Crenovolva sp.

Rocky shores, at very low tide on gorgonian
(Kazmi and Naushaba, 2000)



Genus *Primovula* Thiele, 1925
Primovula tropica Schilder, 1931
Intertidal rocks at very low tide to offshore on corals
(OBIS, 2004)



(Photo courtesy: Moazzam)
Superfamily Velutinoidea Gray, 1840

Family Triviidae Troschel, 1863
Subfamily Eratoinae Gill, 1871
Genus *Proterato* Schilder, 1927
Proterato olivaria (Melvill, 1899) 4mm. bright olive hue.
Offshore and beached
(Melvill, 1899 as *Erato olivaria* Melvill)



(Picture after WMSDB)

Subfamily Triviinae Troschel, 1863
Genus *Trivirostra* Jousseaume, 1884
Trivirostra oryza (Lamarck, 1810) Up to 13 mm. in length .Pure white colour

On intertidal coral reefs, under stones and dead coral
(Melvill and Standen, 1904)



(After Femorale)
Superfamily Naticoidea Forbes, 1838

Family Naticidae Guilding, 1834
Subfamily Naticinae Guilding, 1834
Genus *Stigmaulax* Mörch, 1852
Stigmaulax sulcatus (Born, 1778)
wet fine sandy shore
(Rao and Rao, 2000)
Genus *Natica* Scopoli, 1777
Natica buriasiensis Récluz, 1844
At 15 fathoms
(Melvill, 1901 as *Natica trailli* Reeve)
Natica alapapilionis (Röding, 1798)
Demersal
(Fatima, 2007; Ghani *et al.*, 2018)
Natica marochiensis (Gmelin, 1791)
Intertidal sand, from 0-94m.
(Moazzam and Moazzam, 2007 as *Glypheidhema marochiensis*)



Natica queketti Sowerby III, 1894
Intertidal sand
(Melvill and Standen, 1901)



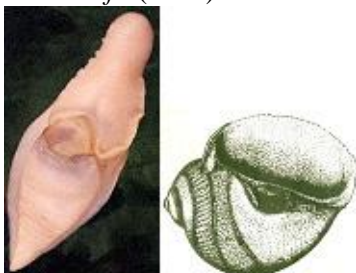
(After Trausel and Sliker)
Natica cincta Récluz, 1850
Intertidal
(Melvill, 1901 as *Natica*)

pulicaris Philippi)



Natica vitellus Linnaeus, 1758. 19 x 28mm. burnt orange with few white blotches

Sandy and rocky shores
(Melvill, 1899 as *Natica ponsonbyi*; 1901 as *Natica rufa* (Born))



Shell (After Tirmizi and Zehra, 1984)

Natica forata Reeve, 1855
Sandy and rocky shores
(Melvill and Standen, 1901)



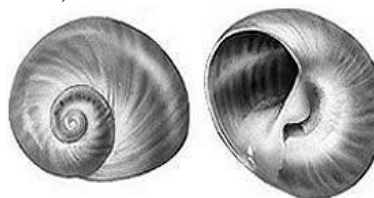
(After Wikimedia)

Genus *Notocochlis* Powell, 1933
Notocochlis tigrina (Röding, 1798)
Purple brown spots all over outer surface
Sandy and rocky shores
(Khan and Dastagir, 1971 as *Natica tigrina* Roding)



(After Khan and Dastagir, 1971)
Notocochlis gualteriana (Récluz, 1844)
10-20mm. Whitish, marked with brown, straight and curved streaks muddy sand

Lives in shallow water, in depressions lined with muddy sand, occasionally on sparse seagrass beds
(Melvill, 1901 as *Natica antoni*; Begum and Nazneen, 1992 as *Natica gualtieriana* Recluz)



Naticarius onca (Röding, 1798)

Subtidal
(Rehman and Barkati, 2012 as *Natica onca*)

Genus *Tanea* Marwick, 1931
Tanea lineata (Röding, 1798) 2-2 1/2"

Sandy/muddy
(Melvill, 1901; Khan and Dastagir, 1971 as *Natica lineata*)



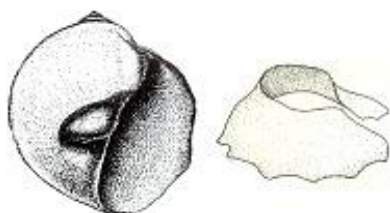
(After Khan and Dastagir, 1971)

Genus *Neverita* Risso, 1826
Neverita josephina Risso, 1826, 36mm.
Sand flats, quite deep water
(Tirmizi and Zehra, 1984 as *Natica (Neverita) josephinae*)



(After Tirmizi and Zehra, 1984)

Neverita didyma (Roding, 1789) 10.48-58.2 mm x 11.45-50.3 mm. Blue-grey or fawn
Intertidal. Mud, sand bottom Usually found from low tide to 3 fathoms, mud and hard sand.
(Melvill, 1901 as *Natica didyma*)



Shell and egg collar (After Tirmizi and Zehra, 1984)

Genus *Polinices* Montfort, 1810
Polinices mammilla (Linnaeus, 1758)
 Ivory white
 Sandy shores, muddy flats at low tide
 (Melvill and Standen, 1901 as *Natica mamilla*)



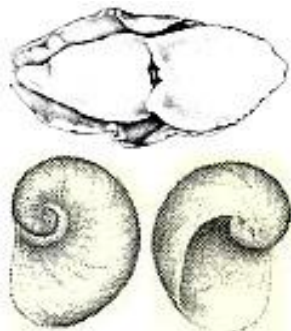
(After Khan and Dastagir, 1971)

Genus *Mammilla* Schumacher, 1817
Mammilla fibrosa (Gray, 1850)
 Benthic
 (Moazzam and Moazzam, 2007 as *Polinices fibrosa* (Eydoux and Souleyet)



(After Femorale)

Subfamily Sininae Woodring, 1928
 Genus *Sinum* Roding, 1798
Sinum haliotoideum (Linnaeus, 1758)
 shell 9x 12.5mm.
 Muddy bottom, in Fish nets, beached
 (Tirmizi and Kazmi, 1995)



Animal and shell
Sinum neritoideum (Linnaeus, 1758)

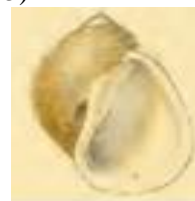
At 0-60 m. depth
 (Rao *et al.*, 1991; Moazzam and Moazzam, 2007)



Sinum planulatum (Récluz, 1843)
 Benthic
 (Moazzam and Moazzam, 2007)



Genus *Eunaticina* Fischer, 1885
Eunaticina nitida L.A. Reeve, 1855
 Benthic
 (Reeve, 1855)



Family Vanikoridae Gray, 1840
 Genus *Vanikoro* Quoy and Gaimard, 1832
Vanikoro cancellata (Lamarck, 1822)
 7-25mm.
 Intertidally or in the shallow sub tidal
 hidden under embedded rocks
 (Melvill and Standen 1901)



(After http://www.idscaro.net/sci/01_coll/plates/gastro/pl_vanikoridae_1.htm)

Vanikoro cuvieriana (Récluz, 1844)
 Grey in colour
 Muddy sand flats
 (Melvill, 1901; Khan and Dastagir, 1971 as *Sinum cuvierianum* Recluz)



(After Khan and Dastagir, 1971)
 Genus *Macromphalus* S.V. Wood, 1842

Macromphalus sp (most probably
Macromphalus subreticulatus (Nevill,
1884) 3-4mm
Mangroves
(Iqbal, 2022)



(After Iqbal, 2022)

Genus *Eunaticina* P. Fischer, 1885
Eunaticina papilla (Gmelin, 1791) 8-
35mm.
Benthic
(Melvill, 1901 as *Sigaretus (Eunaticina)*
papilla)



(After Femorale)

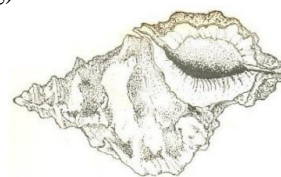
Genus *Sigatica* Meyer and Aldrich, 1886
Sigatica pomatiella (Melvill, 1893)
At 200 - 300m.
(Melvill, 1893 as *Eunaticina pomatiella*)
Superfamily Tonnoidea Suter, H., 1913
(1825)

Family Cassidae Latreille, 1825
Genus *Cypraecassis* Stutchbury, 1837
Cypraecassis rufa (Linnaeus, 1758)
Benthic; depth range 0-12 m. Common in
fairly sheltered areas, on bottoms of coarse
coral sand.
(NMNH, probability of occurrence)
Genus *Semicassis* Morch, 1852
Semicassis bisulcata (Schubert and
Wagner, 1829) 25 - 85 mm. Background
colouration white, cream, pink or
bluegrey, sometimes with 4 or 5 spiral
bands of brown spots; columella and outer
lip white
Intertidal sand, deep water
(Abdullah M. El-Husseini, 1963 as
Phalium bisulcatum)



(After Tirmizi and Zehra, 1984)

Family Bursidae Thiele, 1925
Genus *Tutufa* Jousseaume, 1881
Tutufa bufo (Röding, 1798) 64 mm.
(Femorale, 2011) among rocks
(PSF Report, 1974-77 as *Tutufa bufo*
Roeding)



(After Tirmizi and Zehra, 1984)

Tutufa bubo (Linnaeus, 1758)
On rocks
(Khan and Dastagir, 1971 as *Bursa*
lampus Linnaeus)

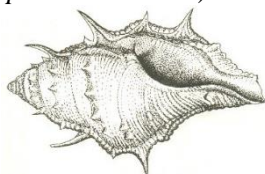


Genus *Bufonaria* Schumacher, 1817
Bufonaria rana (Linnaeus, 1758)
Mangroves
(Tirmizi and Barkati, 1985; Rehman and
Barkati, 2012 as *Bursa subgranosa*
Sowerby)
Bufonaria crumena (Lamarck, 1816)
59.1 mm.
Mangroves
Femorale, 2011)
Bufonaria elegans (Sowerby, 1836) 50-
80-mm.
Deep water.
(Femorale, 2011)



Bufonaria echinata (Link, 1807)
64x53mm. light brown mottled with
darker with 3 narrow white bands
Rocky shores

(Khan and Dastagir, 1971, Tirmizi and Zehra, 1984 (Khan and Dastagir, 1971 as *Bursa spinosa* Lamarck)



Bufo naria perelegans Beu, 1987 65 70 mm. x96 -120 mm

Offshore

(Femorale, 2011)

Tutufa oyamai Habe, 1973

Intertidal sand

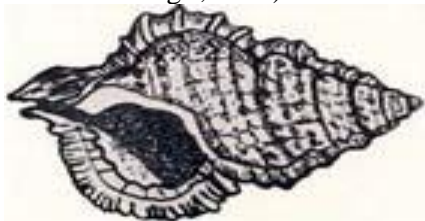
(Habe, 1973)

Genus *Bursa* Roeding, 1798

Bursa granularis (Roding, 1798). 2'' orange-brown

Rocky/muddy cum sandy shores.

(Khan and Dastagir, 1971)



(After Khan and Dastagir, 1971)

Family Ranellidae Gray, 1854

Subfamily Cymatiinae Iredale, 1913

Genus *Cymatium* Röding, 1798

Cymatium ranzanii (Bianconi, 1850)

Offshore

(Emerson and D'Attilio, 1962)



Genus *Monoplex* Perry, 1810

Monoplex parthenopeus (Salis-Marschlins, 1793) 10cm.

Offshore, under rocks stony habitat (Tirmizi and Zehra, 1982 as *Linatella* sp.; NMNH as *Cymatium (Monoplex) parthenopaum*)



Monoplex pilearis (Linnaeus, 1758) 2-6'' pale brown exterior streaked with white revolving bands and folds

Muddy shores, Intertidal, rock pools and offshore

(Khan and Dastagir, 1971 as *Cymatium (Septa) pileare*; Tirmizi and Zehra, 1984 as *Septa pileare*)



(After Tirmizi and Zehra, 1984)

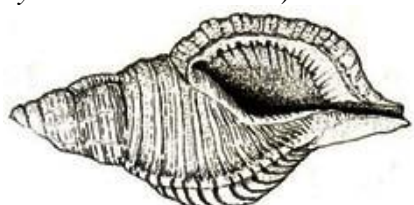
Monoplex nicobaricus (Röding, 1798)

59 x 30mm.

Low water mark in algal turf, offshore

(Tirmizi and Zehra, 1984 as

Cymatritonnicobaricum)



(After Tirmizi and Zehra, 1984)

Monoplex vespaceus (Lamarck, 1822)

Benthic; depth range 4 - 10 m. Dead shells found on the beaches

(Rao *et al.*, 2004 as *Cymatium vespaceum*)

Genus *Lotoria* Emerson and Old, 1963

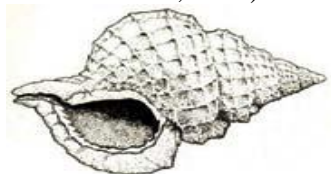
Lotoria perryi (Emerson and Old, 1963)

Muddy shores at low tide

(Femorale, 2011)



Family Charoniidae Powell, 1933
 Genus *Charonia* Gistel, 1847
Charonia sp
 (Zool. Survey Dept. 1965-12-09)
 Genus *Gyrineum* Link, 1807
Gyrineum natator (Roeding, 1798)
 30mm.
 Muddy shores at low tide
 (Tirmizi and Zehra, 1984)



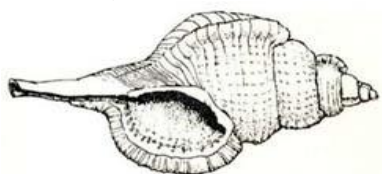
(After Tirmizi and Zehra, 1984)

Genus *Ranella* Lamarck, 1816
Ranella olearium (Linnaeus, 1758) 2-6". light brown, spotted
 Muddy and sandy shores at depth
 (Khan and Dastagir, 1971 as *Cymatium clearium* Linnaeus)



(After Khan and Dastagir, 1971)

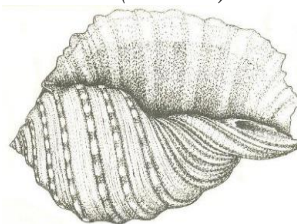
Ranella australasia (Perry, 1811)
 Rocky shores
 (PARC Report, 1986 as *Cymatium Australasia*)



(After Tirmizi and Zehra, 1982 as *Cymatium*).

Family Tonnidae Suter, 1913 (1825)
 Genus *Tonna* Brunnich, 1771
Tonna dolium (Linnaeus, 1758) 78 x 62mm.
 Sandy

(Khan and Dastagir, 1971 as *Tonna maculatum* Lamarck; Tirmizi and Zehra, 1984 as *Tonna (Dolium) maculata*)



(After Tirmizi and Zehra, 1984)

Tonna luteostoma (Kuster, 1857) 68 x 50mm.
 Offshore, usually beached
 (Melvill and Standen, 1901)



(After Tirmizi and Zehra, 1984)

Tonna rosemaryae Vos, 1999
 124.5mm., deep amber golden aperture
 Offshore dredging
 (Kazmi *et al.*, 2018)



Tonna galea (Linnaeus, 1758)
 At 0 - 2359 m. depth
 (Kazmi *et al.*, 2018)



Tonna sulcosa (Born, 1778)
 25 to 30 meters deep
 (Present study)



(Photo: Contributed by Moazzam)

Family Personidae Gray, 1854
 Genus *Distorsio* Röding, 1798
Distorsio reticularis (Linnaeus, 1758)
 40 - 94 mm.
 Dredged
 (Kazmi *et al.*, 2018)



Superfamily Ficoidea Meek, 1864

Family Ficidae Meek, 1864 (1840)
 Genus *Ficus* Röding, 1798
Ficus ficus (Linnaeus, 1758) 100 mm.
 Sandy shores
 (Khan and Dastagir, 1971)



(After Owen, 1832)

Ficus gracilis (Sowerby, 1825) 150mm.
 Deep water, offshore, beached
 (Ahmed *et al.*, 1982)



(After Tirmizi and Zehra, 1984)

Ficus variegata Röding, 1798 40-120mm.
 Benthic, soft substratum consisting of very fine top layered sand
 (Mookherjee, 1985; Nazneen and Begum, 1992)



(After Neo, 2010)

Superfamily Epitonioidea Berry, 1812

Family Epitoniidae Berry, 1910 genys
 Genus *Acrilla* H. Adams, 1860
Acrilla minor (Sowerby II, 1873)
 Eulittoral and deeper
 (Melvill, 1901 *Acrilla gracilis* H. Adams)



Genus *Epitonium* Röding, 1798
Epitonium scalare (Linnaeus, 1758)
 45mm.
 Offshore, beached
 (Melvill, 1901 as *Scala pretiosa*
 (Lamarck); Dance, 1992)



Epitonium deificum (Melvill and Standen, 1903)

Lives in sand
 (Melvill and Standen, 1903 as *Scala deifica*)

Epitonium clementinum (Grateloup, 1840) 6-14 mm. White occasionally with brown splashes

Usually lives in sand near sea anemones or corals

(Melvill, 1901 as *Scala clementina* Grateloup)

Epitonium aculeatum (G. B. Sowerby, 1844)

In sand

(Melvill as *Scala aculeate*)

Epitonium lacrima Kilburn, 1985
 4.5mm.

Shallow dredging

(Kilburn, 1985 as *Epitonium (Foliaceiscalia) lacrima*)



Epitonium pyramidale (Sowerby, 1844)

On rocks, associated with sea anemones, zoanths and stony corals

(Khan and Dastagir, 1971 as *Epitonium pyramidalis*)



Epitonium melior (Melvill and Standen, 1903) 7mm. white in colour
Intertidal, associated with coelenterates (Melvill and Standen, 1903 as *Scala melior* Melvill and Standen)

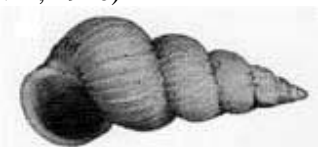
Epitonium eclecticum (Melvill and Standen, 1903)

Intertidal
(Melvill and Standen, 1903 as *Scala eclecticica* Melvill and Standen; OBIS, 2004)



Epitonium zatrephe (Melvill, 1910)

Intertidal
(Melvill, 1910)



Epitonium pallasi (Kiener, 1838)

In sand
(Melvill and Standen, 1903 as *Scala pallasi*)



Epitonium emiliae (Melvill and Standen, 1903) 10 mm. reddish- or yellowish-brown with white ribs and base

In sand near sea anemones or corals
(Melvill and Standen, 1903 as *Scala emiliae*)



Epitonium lyra (Sowerby, 1844) 8.25 to 13.88 mm

Intertidal in mangroves

(Iqbal *et al.*, 2022)

Epitonium viaderi (Fenaux, 1938) 3.58 to 7.86 mm

Intertidal in mangroves

(Iqbal *et al.*, 2022)

Epitonium umbilicatum (Pease, 1869)

Attains 0.5 inch .White occasionally with brown splashes,

Rare in sand at any depth, usually found empty.

(Melvill, 1901 as *Epitonium confusum* (E. A. Smith)



Epitonium irregular (G. B. Sowerby II, 1844)

In sand under rocks

(Melvill, 1901 as *Scala irregularis* G.B. Sowerby)

Epitonium lineolatum (G. B. Sowerby II, 1844)

Benthic

(Melvill, 1901 as *Scala lineolata* G. B. Sowerby)

Epitonium moolenbeeki van Aartsen, 1996 8mm

Trawled at 150-240 m

(Melvill, 1901 as *Scaligeria aculeata* G. B. Sowerby)



(After Aartsen, 1996)

Epitonium amathusium (Melvill and Standen, 1903)

Usually live in sand near sea anemones or corals.

(Melvill and Standen, 1903)



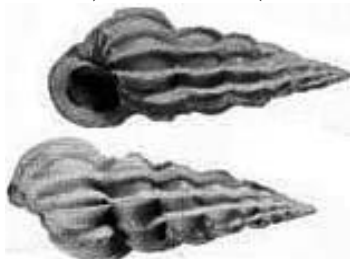
Epitonium townsendi (Melvill and Standen, 1903)

Usually live in sand near sea anemones or corals.

(Melvill and Standen, 1903)



Genus *Gyroscala* de Boury, 1887
Gyroscala lamellosa (Lamarck, 1822)
 Intertidal
 (Melvill and Standen, 1901 as *Epitonium*
 (*Gyroscala*) *lamellosum* (Lamarck))



Gyroscala commutata (Monterosato, 1877)
 Among seaweed, low-tide mark
 (Melvill, 1901 as *Scalaria clathrus* Var.
pseudoscalaris Brocchi)
 Genus *Opalia* H. Adams and A. Adams, 1853
Opalia hidryma (Melvill, 1899)
 Known from seamounts and knolls
 (Melvill, 1899 as *Scala hidryma*)



Genus *Cirsotrema* Mörch, 1852
Cirsotrema fimbriolatum (Melvill, 1897)
 Benthic; depth range 2 - 160 m. Found
 underneath anemones
 (Melvill, 1897 as *Scalaria fimbriolata*)

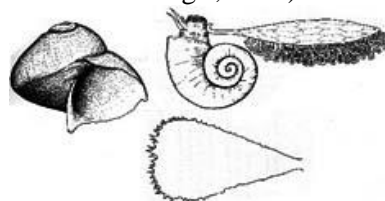


Genus *Constantia* A. Adams, 1860
Constantia standeni Melvill, 1899
 Intertidal
 (Melvill, 1899 as *Scala* (*Constantia*)
standeni Melvill)



Family Janthinidae Leach, 1823

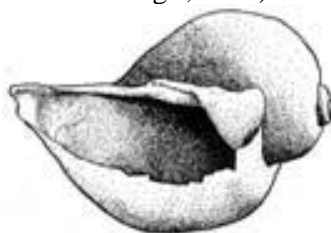
Genus *Janthina* Roding, 1798
Janthina janthina (Linnaeus, 1758) 30
 mm. Light purple shade on the spire of the
 shell, and a darker purple on the ventral
 side
 Holoplanktonic, in creeks, floats
 passively, associated with pleustonic
 siphonophores and sea anemones on
Sargassum. May be stranded on beaches
 when blown ashore by strong winds.
 (Khan and Dastagir, 1971)



Female with floating egg capsules; Shell
 (After Tirmizi and Zehra, 1984); A single
 egg capsule (After Zehra)



Janthina globosa Swainson, 1822
 27x23mm.violet throughout
 Planktonic, creek
 (Khan and Dastagir, 1971)



(After Tirmizi and Zehra, 1984)

Genus *Recluzia* Petitde la Saussaye, 1853
Recluzia lutea (Bennett, 1840)
 Holopelagic, at the oceans surface
 (Fatima, 1988 as *Recluzi arollandiana*
 Petit de la Saussaye)
 Superfamily Truncatelloidea Gray, 1840

Family Irvadiidae Thiele, 1928
 Genus *Pellamora* Iredale, 1943
Pellamora densilabrum (Melvill, 1912)
 Innermost part of large bays; on mud flats
 Intertidal, in damp habitat under rotting
 vegetation, very close to the edge of the
 sea

(Melvill, 1912 as *Rissoa densilabrum*)
 Genus *Iravadia* Blanford, 1867
Iravadia ictriella (Melvill, 1910) 5mm.
 Intertidal
 (Melvill, 1910 as *Iravadia (Pseudonoba)*
ictriella, OBIS, 2004).



Iravadia quadrasi (O. Boettger, 1893)
 2.28 to 3.86 mm,
 Benthic; brackish. Intertidal in mangroves
 (Iqbal *et al.*, 2022)



Iravadia bombayana (Stoliczka, 1868)
 4.35 to 8.68 mm
 Intertidal in mangroves
 (Iqbal *et al.*, 2022)
 Genus *Chevallieria* Cossmann, 1888
Chevallieria columen (Melvill, 1904)
 Mangrove forest
 (Moradi *et al.*, 2021)



Order Neogastropoda Wenz, 1938
 Superfamily Volutoidea Rafinesque,
 1815

Family Cancellariidae Forbes and
 Hanley, 1851
 Genus *Nipponaphera* Habe, 1961
Nipponaphera paucicostata (G. B.
 Sowerby III, 1894)
 Corals
 (Harvard, NCZ)

Family Cystiscidae W. Stimpson, 1865
 Genus *Gibberula* Swainson, 1840
Gibberula mazagonica Melvill, 1893
 Benthic
 (Melvill, 1893)

Superfamily Pterotracheoidea
 Rafinesque, 1814

Family Pterotracheidae Rafinesque, 1814
 Genus *Firoloida* Lesueur, 1817
Firoloida desamarestia Lesueur, 1817
 transparent 40mm.
 Hoploplanktonic, surface-145 m. warm
 waterl.
 (Aravindakashan, 1977)
 Genus *Pterotrachea* Forsskål, 1775
Pterotrachea coronata Forsskål in
 Niebuhr, 1775 260mm.
 Floating, mesopelagic, epipelagic
 (Aravindakshan, 1977)



(After Murray and Hjort, 1912)

Superfamily Muricoidea Rafinesque, 181

Family Costellariidae MacDonald, 1860
 Genus *Vexillum* Röding, 1798
Vexillum obeliscus (Reeve, 1844)
 Intertidal, among coarse sand and stones
 (Ray, 1956 as *Mitra obeliscus* Reeve)
Vexillum daedalum (Reeve, 1845)
 Silt or silty clay
 (Melvill and Standen, 1901 as *Mitra*
daedalum)

Family Marginellidae Fleming, 1828
 Genus *Volvarina* Hinds, 1844
Volvarina charbarensis (Melvill, 1897)
 Snowy-white, unicolorous,
 (Melvill 1897)



Genus *Bullata* Jousseau, 1875
Bullata shoplandi (Melvill, 1897)
 Transparent and exceedingly polished
 and shining, semipellucid milky-white
 colour
 Dredged In shell gravel or mixed
 sediments around rocky areas.
 (Melvill, 1897 as *Marginella*
(Cryptospira) shoplandi)



Genus *Cryptospira* Hinds, 1844
Cryptospira aff. *strigata* (Dillwyn, 1817)
 In shell gravel or mixed sediments around rocky areas
 (Femorale, 2011)



Family Muricidae Rafinesque, 1815
 Subfamily Rapaninae Gray, 1853
 Genus *Vexilla* Swainson, 1840
Vexilla vexillum (Gmelin, 1791) typically 20-25mm long, brightly coloured, yellowish brown with dark brown bands, eight in number on body whorl, two to three in spiral whorls, aperture white
 Inhabits shallow sub-tidal waters, among rocks at low tide, lives parasitically on sea urchins
 (Melvill and Standen 1901)
 Genus *Indothais* Claremont, Vermeij, Williams and Reid, 2013
Indothais blanfordi (Melvill, 1893)
 On rocks
 (Melvill, 1893 as *Purpura blanfordi*)



(WoRMS image)
Indothais lacera (Born, 1778) 23-70mm.
 Outside of shell pale grey, cream or

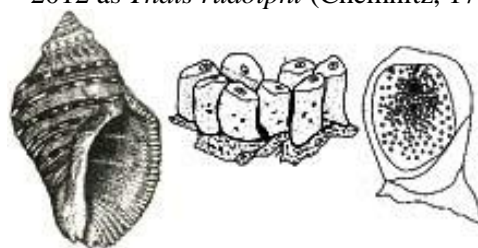
yellowish brown, often with quadrangular brown mottling; aperture flesh-coloured inside, becoming pale cream on margin
 Attached to rocks, and jetty piles in river mouths

(Lamarck, 1822 as *Purpura carinifera*; Cooke, 1919; Tirmizi and Zehra, 1981 as *Cymia carinifera*; Iffat, 2005; Afsar *et al.*, 2012 as *Thais carinifera*)



Shell (After Tirmizi and Zehra, 1984)
 Egg Capsule (Barkati and Ahmed 1983)
Indothais sacellum (Gmelin, 1791)

Rocky
 (Ahmed and Hameed, 1999 as *Thais sacellum* (Gmelin)
 Genus *Purpura* Bruguière, 1789
Purpura persica (Linnaeus, 1758) 30-78mm.
 Rocky shore below low tide mark
 (Khan and Dastagir, 1971; Afsar *et al.*, 2012 as *Thais rudolphi* (Chemnitz, 1788)



Egg capsules; A single egg capsule
 Shell (After Tirmizi and Zehra, 1984)

Purpura panama (Röding, 1798)
 chestnut brown alternate with white; tubercles more prominent on the spire; aperture light orange, outer lip margin with dark brown;
 On rocks
 (Rao and Rao, 1991)

Purpura bufo Lamarck, 1822 22-66 mm.
 On rocks of sub-littoral zone and on inner surface of the boulders

(Khan and Dastagir, 1971 as *Thais bufo* (Lamarck)



Egg capsules (After Barkati and Ahmed, 1983)

Shell (After Tirmizi and Zehra, 1984)

Genus *Reishia* Kuroda and Habe, 1971

Reishia bitubercularis (Lamarck, 1822)

At the outer edge of fringing reefs



(Cooke, 1919 as *Thais bitubercularis* (Lamarck)

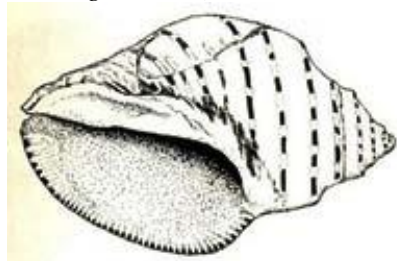
Subfamily Ergalataxinae Kuroda, Habe and Oyama, 1971

Genus *Tenguella* Arakawa, 1965

Tenguella granulata (Duclos, 1832) 20 mm. Dark grey to black, tubercles on white back ground, aperture violet, posterior part of columella with dark brown patch, teeth on outer margin bluish white

Muddy-cum-sandy to rocky, below low-tide mark

(Cernohorsky, 1967; Khan and Dastagir, 1971 as *Drupa tuberculata* (de Blainville); Tirmizi and Zehra, 1984 as *Drupagr anulata* Duclos; Afsar *et al.*, 2012 as *Morula granulata*)



(After Tirmizi and Zehra, 1984)

Genus *Claremontiella* Houart, Zuccon and Puillandre, 2019

Claremontiella nodulosa (C. B. Adams, 1845)

On rocky shores and in estuaries

(Ghani *et al.*, 2018 as *Drupa nodulosa*)

Genus *Drupella* Thiele, 1925

Drupella margariticola (Broderip, in Broderip and Sowerby, 1833)

Rocky, coral associated

(Khan *et al.*, 1973 as *Drupa margariticola* Broderip)



Drupella rugosa (Born, 1778) 35mm.

Muddy rocks in shores

(Khan *et al.*, 1973 as *Thais rugosa* (Born)

Genus *Orania* Pallary, 1900

Orania subnodulosa (Melvill, 1893)

On rocks

(Melvill, 1893 as *Ricinula* (*Sistrum*) *subnodulosa* Melvill)

Genus *Rapana* Schumacher, 1817

Rapana rapiformis (Born, 1778) 61mm.

Deep water on sand

(Rao and Rao, 1983; Tirmizi and Zehra, 1984 as *Rapana bulbosa*)



(After Tirmizi and Zehra, 1984)

Rapana bezoar (Linnaeus, 1767) 25 - 178 mm.

Dredged on soft sea bottom

(Kazmi *et al.*, 2018)



Genus *Taurasia* Bellardi, 1882

Taurasia striata (Blainville, 1832)

Intertidal

(<http://collections.nmnh.si.edu/search> as *Purpura buccinea* Deshayes)

Genus *Tylothais* Houart, 2017

Tylothais savignyi (Deshayes, 1844) ochraceous brown from outside, inner margin of the outer lip purplish Found among rocks and boulders on rocky shores (Nasreen *et al.*, 1999)

Genus *Volema* Röding, 1798

Volema myristica Röding, 1798

On rocks below low tide mark (Tirmizi and Zehra, 1984 as *Thais hippocastanum* (Linnaeus))



(After Tirmizi and Zehra, 1984)

Genus *Semiricinula* Martens, 1904

Semiricinula tissoti (Petit de la Saussaye, 1852)

Reddish brown

On rocks, intertidal

(Khan *et al.*, 1973; Tan and Sigurdsson, 1996 as *Thais tissoti* (Petit))



Animal and Egg capsules

Semiricinula squamosa (Deshayes, 1832)

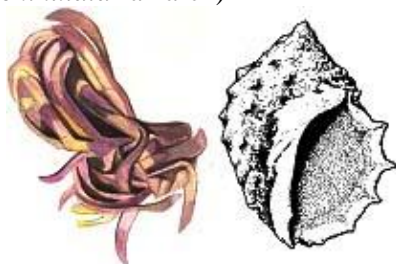
On coasta rocks (WMSDB)

Genus *Mancinella* Link, 1807

Mancinella echinulata (Lamarck, 1822)

Rocky

(Cook, 1919; Ahmed *et al.*, 1982 as *Thais echinulata* Lamarck)



Egg ribbon .Shell (After Tirmizi and Zehra, 1982)

Mancinella alouina (Röding, 1798)

Coral reef

(Cernohorsky, 1972)

Subfamily Ergalataxinae Kuroda, Habe and Oyama, 1971

Genus *Ergalatax* Iredale, 1931

Ergalatax junionae Houart, 2008

Under intertidal rocks

(OBIS, 2004 as *Morula martensi* Schepman)

Ergalatax contracta (Reeve, 1846)

Found on rocks between tides

(Cernohorsky, 1976)

Genus *Morula* Schumacher, 1817

Morul auva (Röding, 1798)

Rocky shores, intertidal

(Fatima *et al.*, 1999 as *Morul auva* Roeding)

Genus *Muricodrupa* Iredale, 1918

Muricodrupa anaxares (Kiener, 1836)

Dirty grey to light brown with white bands, nodules white, aperture light violet streaked with white band, columella light violet in colour, sometimes with white markings

Benthic

(Ray, 1977 as *Morula anaxares*)



(Taken by Raymond Huet)

Genus *Cronia* H. and A. Adams, 1853

Cronia amygdala (Kiener, 1835) 25mm.

Found on rocks between tides

(Tirmizi and Zehra, 1984 as *Morula amygdala*)

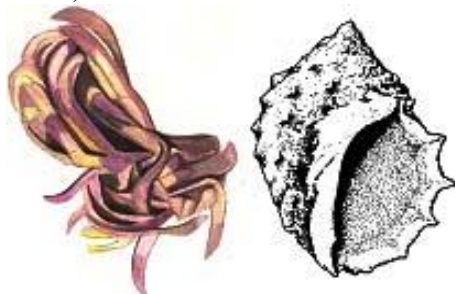


(After Tirmizi and Zehra, 1982)

Subfamily Muricinae Rafinesque, 1815

Genus *Hexaplex* Perry, 1810

Hexaplex kusterianus (Tapperone-Canefri, 1875) 90mm.
Found on sand flat or mud.
(PSF Report, 1974-77, Tirmizi and Zehra, 1984)



Shell (After Tirmizi and Zehra, 1984)
Hexaplex duplex (Röding, 1798) 30 and 229 mm.
Benthic
(Rao and Rao, 1983 as *Murex* (*Phyllonotus*) *turbinatus* Lamarck, 1822.
Identity needs confirmation
Hexaplex trunculus (Linnaeus, 1758) 4 to 10 cm.
3-12 m.depth (Deposited in MRC)



Genus *Haustellum* Schumacher, 1817
Haustellum langleytae Houart, 1993
Offshore
(Houart, 1993 as *Haustellum kurodailangleitae*; OBIS, 2004)
Genus *Vokesimurex* Petuch, 1994
Vokesimurex dolichourus (Ponder and Vokes, 1988) creamy white; faint brown spiral bands at shoulder and base of body whorl; spiral cords lightly topped with reddish brown lines, colour strongest where crossing varices; Aperture white
Offshore
(Ponder and Vokes, 1988 as *Haustellum dolichourus* Ponder and Vokes)

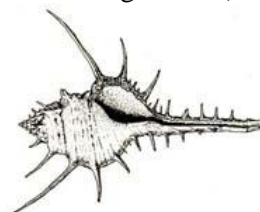


Vokesimurex malabaricus (E. A. Smith, 1894)
Offshore

(Ponder and Vokes, 1988 as *Haustellum malabaricus*)
Genus *Chicoreus* Montfort, 1810
Chicoreus brunneus (Link, 1807)
Muddy cum sandy shores
(Khan and Dastagir, 1971 as *Murexadustus* Lamarck)



Chicoreus virgineus (Röding, 1798) 60 mm- 160 mm.
In the intertidal or shallow subtidal zone, among rocks and corals
(Khan *et al*, 1973 as *Murexvirgineus*)
Genus *Murex* Linnaeus, 1758
Murex ternispina Lamarck, 1822
72mm.
Offshore, in sandy rocky bottom
(Khan and Dastagir, 1971)



(After Tirmizi and Zehra, 1984)

Murex carbonnieri (Jousseume, 1881) creamy white to light tan; in the intervarical areas conspicuous, slightly elongated brown spots between lighter nodes on spiral cords; aperture white, marked by conspicuous brown spots at notches extending into interior of shell as dark brown lines on lighter brown background
Offshore, in sandy bottom
(Melvill and Standen, 1898 as *Murex tribulus*)



Murex pecten Lightfoot, 1786
Offshore, in sandy bottom at 36-55m.

(Melvill and Standen, 1901, Khan *et al.*, 1973 as *Murex tenuispina* Lamarck)
 Subfamily Ocinebrinae Cossmann, 1903
 Genus *Muricopsis* Bucquoy and Dautzenberg, 1882
Muricopsis bombayanus (Melvill, 1893)
 13-35 mm. Light brown, aperture white
 Rocky
 (Ahmed and Hameed, 1999 as *Ocinebra bombayana*)

Family Babyloniidae Kuroda, Habe and Oyama, 1971
 Genus *Babylonia* Schlueter, 1838
Babylonia formosae (Sowerby, 1866)
 Shallow water on muddy sand
 (PSF Report, 1977)
Babylonia japonica (Reeve, 1842)
 Shallow water on muddy sand
 (PARC Report, 1986)
Babylonia kirana Habe, 1965
 Shallow water on muddy sand
 (PSF Report, 1977 as *Babylonia pallida* Perry)
Babylonia spirata (Linnaeus, 1758)
Babylonia valentiana (Swainson, 1822)
 65mm.
 Muddy rocks and sand, offshore
 (Khan and Dastagir, 1971)



Babylonia spirata (Linnaeus, 1758)
 white with orange brown spots
 Intertidal at 0m, in sand
 (Khan and Dastagir, 1971)

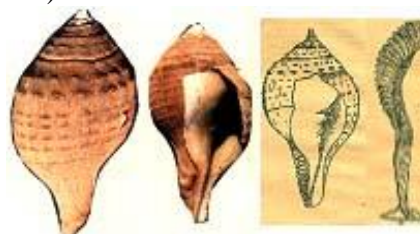


(After Hornell, 1951)

Family Turbinellidae Swainson, 1840
 Genus *Vasum* Röding, 1798
Vasum sp.
 Lives on lower eulittoral, rocky areas
 (Ranjha, 1949-09-22)



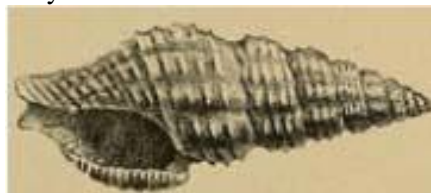
Genus *Turbinella* Lamarck, 1799
Turbinella pyrum (Linnaeus, 1758)
 4''x6''
 Shallow water
 (Khan and Dastagir, 1971 as *Xancus pyrum*)



Right Shell and egg ribbon
 (After Hornell, 1951)

Turbinella ponderosa (Lightfoot, 1786)
 On mud bottom in shallow water
 (NMNH: Invertebrates)
 Superfamily Conoidea Fleming, 1822

Family Clathurellidae H. Adams and A. Adams, 1858
 Genus *Glyphostoma* Gabb, 1873
Glyphostoma soror E.A. Smith, 1882
 5-20 fathoms, among loose stones and muddy sand
 (Melvill and Standen, 1902 as *Clathurella opsimathes*, later declared it synonymous to *Lienardia. soror*.)



(After Jan Delsing)

Clathurella opsimathes Melvill, J.C. and R. Standen, 1903:
 Genus *Etrema* Hedley, 1918
Etrema spurca pasniensis (Melvill, J.C., 1917)

Subtidal
 (Melvill, 1917 as *Lienardia spurca pasniensis*)
Etrema crassilabrum (Reeve, 1843)
 Continental shelf
 (Reeve, 1843 as *Lienardia crassilabrum* Reeve)
 Genus *Lienardia* Jousseume, 1884
Lienardia cardinalis (Reeve, 1845)
 whitish, encircled by three narrow violet brown bands. 10 mm.
 Continental shelf, loose stone bottom
 (Reeve, 1845 as *Pleurotoma cardinalis*)
Lienardia obtusicostata (E. A. Smith, 1882)
 Demersal, 10 fathoms
 (Melvill and Standen, 1901 as *Pleurotoma (Glyphostoma) obtusicostata*)
Lienardia rugosa (Mighels, 1845)
 3- 15 fathoms amongst loose stones and muddy sand
 (Melvill, 1916)
 Genus *Paraclathurella* Boettger, 1895
Paraclathurella gracilentia (Reeve, 1843)
 Sublittoral, on sand or clay bottoms
 (Reeve, 1843 as *Pleurotoma gracilentia*)



Family Raphitomidae Bellardi, 1875
 Genus *Daphnella* Hinds, 1844
Daphnella tetartemoris (Melvill, J.C., 1910)
 At very low tide (Melvill, 1910)
Daphnella cecilliae Melvill and Standen, 1901
 (Melvill and Standen, 1901)
 Genus *Pseudodaphnella* Boettger, 1895
Pseudodaphnella tincta (Reeve, 1846)
 At very low tide, amongst mud and weed on rocks
 (Reeve, 1846 as *Clathurina tincta*)



(After David Kirsh)

Pseudodaphnella lemniscata (G. Nevill and H. Nevill, 1869)
 On rocks
 (Nevill and Nevill, 1869 as *Marginella lemniscata*)
 Genus *Kermia* Oliver, 1915
Kermia albicaudata (E. A. Smith, 1882)
 On rocks amongst weeds at low tide
 (Melvill, 1916 as *Clathurina albicaudata* Smith)
Kermia foraminata (Reeve, 1845) nomen dubium
 Demersal
 (Melvill, 1898 as *Clathurina foraminata camacina*)



Genus *Clathurina* Melvill, 1917
Clathurina receptoria (Melvill and Standen, 1901)
 (Melvill and Standen, 1901)
 Genus *Daphnella* Hinds, 1844
Daphnella axis (Reeve, 1846)
 Amongst broken shell and coral sand
 (Reeve, 1846 as *Pleurotoma axis* Reeve)
 Superfamily Buccinoidea Rafinesque, 1815
 Family Buccinidae Rafinesque, 1815
 Subfamily Pisaninae Gray, 1857
 Genus *Pisania* Bivona-Bernardi, 1832
Pisania tritonoides (Reeve, 1846)
 Rocky shores (Rehman and Barkati, 2012)
 Genus *Cantharus* Reoding, 1798
Cantharus spiralis Gray, 1839 46mm.
 Loose muddy rocks from half-tide to low-water mark
 (Tirmizi and Zehra, 1984)



(After Tirmizi and Zehra, 1984)

Genus *Pollia* Gray, 1834

Pollia undosa (Linnaeus, 1758) 35mm.
Muddy rocks from halfway between flood and ebb to low-tide mark
(Khan and Dastagir, 1971 as *Cantharus undosus* Linnaeus)



(After Tirmizi and Zehra, 1984)

Pollia rubiginosa (Reeve, 1846) 30mm.
Rocky shores
(Rehman and Barkati, 2012 as *Cantharus rubiginosus*)

Genus *Prodotia* Dall, 1924

Prodotia townsendi (Melvill, 1918)
Intertidal
(Melvill, 1918 as *Pisania townsendi* Melvill)

Genus *Phos* Montfort, 1810

Phos senticosus (Linnaeus, 1758)
Rocky shores at very low tide at 25 m.
(Khan and Dastagir, 1971)



(After Khan and Dastagir, 1971)

Phos gladysiae Melvill and Standen, 1901
Offshore mud with algae and other shells
(Melvill and Standen, 1901)

Genus *Engina* Gray, 1839

Engina zea Melvill, 1893 18mm.
Intertidal muddy rocks
(Melvill, 1893)

Engina mendicaria (Linnaeus, 1758) 10 mm and 20 mm. white or yellowish background with a few transversal black bands

Rocky shores
(Desse, 2005)



Engina turbinella (Kiener, 1836) Dark brown, with a central white band In weeds
(Baig and Zehra, 2006 as *Engina zonata*)
Genus *Nassaria* Link, 1807

Nassaria acuminata (Reeve, 1844)
In shallow water on sandy muddy substrates
(Melvill and Standen, 1897 as *Nassaria suturalis*)

Nassaria pusilla (Röding, 1798)
In the offshore waters; soft mud
(WMSD; Moazzam, present study)



(Photos courtesy Moazzam)

Genus *Semiricinula* Martens, 1904

Semiricinula konkanensis (Melvill, 1893) dark chocolate brown tubercles, cords white, aperture light violet with chocolate margin and dark brown lines interior, teeth white
(Melvill and Standen, 1893 as *Sistrum konkanensis* Melvill)

Family Melongenidae Gill, 1871

Genus *Volegalea* Iredale, 1938

Volegalea cochlidium (Linnaeus, 1758) 60-150mm. Body uniform dark or light brown, cream, yellowish, aperture and columella yellowish brown
Offshore waters
(Kazmi and Khan, 2014)



Genus *Melongena* Schumacher, 1817

Melongena bucephala (Lamarck, 1822)
9.8 cm.
Creeks and sand at low tide
(Khan and Dastagir, 1971 as *Hemifusus pugilinus* Bronn; Tirmizi and Zehra, 1984)



(Shell after Tirmizi and Zehra, 1984,
spawn mass and single capsule after
Zehra and Perveen, 1994)

Family Fasciolaridae Gray, 1853
Genus *Fusolatus* Kuroda and Habe,
1971

Fusolatus pagodaformis (Melvill,
1899)

Fairly shallow waters
(Femorale, 2011 as *Latirus pagodaformis* Melvill)
Genus *Filifusus* Snyder, Vermeij and
Lyons, 2012

Filifusus filamentosus (Röding, 1798) 60
- 180 mm.

Shallow rocks or sea grass areas
(Kazmi *et al.*, 2018)



Genus *Fusinus* Rafinesque, 1815
Fusinus colus (Linnaeus, 1758) 75-
200mm. outer surface usually whitish,
but may be yellowish, brown or reddish
in colour

River Delta, Mangroves
(Australian Museum, 1930)

Fusinus forceps (Perry, 1811)

Benthic; depth range 0 - 40 m.
(Kazmi *et al.*, 2018)



Genus *Peristernia* Mörch, 1852
Peristernia pulchella (Reeve, 1847)
River Delta, Mangroves

(Australian Museum, 1930)
Genus *Marmorofusus* Snyder and Lyons,
2014

Marmorofusus nicobaricus (Röding,
1798)

Offshore
(Femorale, 2011 as *Fusinus nicobaricus*
(Roding)

Family Nassariidae Iredale, 1916

Genus *Cyllene* Gray, 1834

Cyllene fuscata A. Adams, 1851

Estuarine
(Ray, 1968)



Genus *Nassarius* Dumeril, 1806

Nassarius conoidalis (Deshayes, 1833)

Size varies between 16mm and 32mm

In mud

(Florida Museum of Natural History (UF)



(After Jan Delsing, 2001)

Nassarius gaudiosus (Hinds 1844)

In sand

(Florida Museum



Nassarius pullus (Linnaeus, 1758) 10 mm
and 25 mm., whitish, ash or bluish,
sometimes without spots or bands, at other
times with two or three deeper bands
which surround the whorls Rocky and
sandy shores

(Harvard, MCZ; Khan *et al.*, 1973 as
Nassa thersites Bruguier)

Nassarius deshayesianus (Issel, 1866)

15x9mm.

Found on hard muddy sand and also under
turnable rocks of the intertidal zone

(Tirmizi and Zehra, 1984 as *Nassarius*
obockiensis)



(After Tirmizi and Zehra, 1984)

Nassarius himeroessa (Melvill and Standen, 1903)

Mud flats or sand flats, intertidally or subtidally, burrow into substrates (Melvill and Standen, 1903 as *Nassa* (*Alectryon*) *himerossa* Melvill and Standen)

Nassarius jactabundus (Melvill, 1906) Intertidal.subtidal sand (Melvill, 1906 as *Nassa* (*Alectryon*) *jactabunda* Melvill)

Nassarius arcularia plicatus (Röding, 1798)

On reefs and sandy bottom, on the shore on stones, from 10-20 fathoms, mostly muddy sandy bottom. (Cernohorsky, 1972)

Nassarius sinusigerus (Adams, 1852) Muddy

(Melvill and Standen, 1901 as *Nassa* (*Lam.*) *collaticia* (*Alectryon*))

Nassarius reeveanus (Dunker, 1847) Rocky

(Melvill- Tomlin, 1932; Ahmed and Hameed, 1999 as *Nassarius lentiginosus*)



(From Jan Delsing)

Nassarius leptospirus (Adams, 1852)

Sub tidal (Cernohorsky, 1984. OBIS, 2004)



Nassarius persicus (von Martens, 1874) 18mm.

Intertidal mud/ sand (Cernohorsky, 1984, OBIS, 2004)



Nassarius perpinguis (Hinds, 1844) Sub tidal

(Melvill, 1918 as *Nassarius gwatkinianus*.OBIS, 2004)

Nassarius fenestrata (Marrat, 1877) Subtidal

(Cernohorsky, 1984; OBIS, 2004)

Nassarius graphiterus (Hombron and Jacquinot, 1848) Known from seamounts and knolls

(Cernohorsky, 1984as *Nassarius luridus* (Gould); OBIS, 2006)

Nassarius limnaeiformis (Dunker, 1847) Sandy shore

(Cernohorsky, 1984; OBIS, 2006)

Nassarius mammilliferus (Melvill, 1897) Seamounts and knolls

(Melvill, 1897)



(After Guido Poppe)

Nassarius nodulosus (Marrat, 1873) Individuals can grow to 12.5 mm.

Shallow marine sediments (Cernohorsky, 1984)

Nassarius foveolatus (Dunker, 1847)

Mud

(Cernohorsky, 1984)

Nassarius comptus (A. Adams, 1852) 15-24mm.

Benthic muddy-sandy, shallow subtidal. (OBIS)

Nassarius pauperus (Lamarck, 1822) uniformly white, yellow or brown, sometimes with a wide spiral brown band 16mm.

Sandy, shallow subtidal

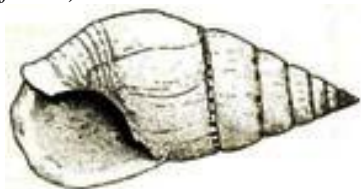
(Cernohorsky, 1984; OBIS, 2006)

Nassarius ischnus (Melvill, 1899)

Sub tidal.

(Cernohorsky, 1984)

Nassarius sufflatus (Gould, 1860)
26x12mm.
Sand and in crevices of rocks
(Tirmizi and Zehra, 1984 as *Alectrion sufflatus*)



(After Tirmizi and Zehra, 1982)

Nassarius obesus (Nevill and Nevill, 1875)
Mud flats or sand flats, intertidally or subtidally
(Melvill-Tomlin, 1903)



Nassarius marmoreus (Adams, 1852)
17-25mm.
Sand flats or in mud flats
(Dekker, 2016; Ghani *et al.*, 2017 as *Nassarius armories*)



Nassarius gemmuliferus (A. Adams, 1852)
Subtidal
(Kazmi *et al.*, 2018)



Nassarius coronatus (Bruguiere, 1789)
Muddy shore
(Melvill-Tomlin, 1930)



Nassarius livescens (Philippi, 1849)

In mud

(Rehman and Barkati, 2012)

Nassarius fissilabris (A. Adams, 1852)

Benthic

(Ghani *et al.*, 2017)

Nassarius protrusidens (Melvill, 1918)

Subtidal to 280 m.

(Melvill, 1918 as *Alectrion (Hima)*

protrusidens)

Nassarius frederici (Melvill and Standen, 1901) 16mm.

Muddy

(Melvill, 1897 as *Nassa (Hima) townsendi*

Melvill; Melvill and Standen, 1901 as

Nassa (Hima) frederici Melvill)

Nassarius arcularia (Linnaeus, 1758)

At from 10-20 fathoms, mostly muddy sand-bottom

(Melvill and Standen, 1901 as *Nassa arcularia*)



(Photo courtesy: Moazzam)

Nassarius marmoreus (A. Adams, 1852)

15 - 30 mm

Sandy beaches with rocky cliffs.

(OBIS; Ghani *et al.*, 2018)

Nassarius bimaculosus (A. Adams, 1852)

Sandy

(Harvard, MCZ)

Nassarius delicates (A. Adams, 1852)

Sandy beaches

Melvill, 1918 as *Alectrion (Phrontis) alcimus* Melvill)

Genus *Reticunassa* Iredale, 1936

Reticunassa zanzibarensis (Kool and Dekker, 2007) 5.5 - 11.5 mm.

Living between sea grasses in sand intertidally to few meters deep. (Kool and Dekker, 2007 as *Nassarius zanzibarensis* needs confirmation)
Genus *Nassa* Röding, 1798
Nassa sarta (Bruguière, 1789)
Reef-associated; depth range 3 - 12 m (Rao and Rao, 2000)
Genus *Bullia* Gray, 1835
Bullia indusica Melvill, 1898 14 - 20 mm
Sandy
(Melvill, 1898 as *Bullia indusindica* (sic) Melvill)



(Picture after Poppe)

Bullia kurrachensis Angas, 1877
Shell size 30 - 50 mm.
Sandy. Shallow water
(Angas, 1877; Khan and Dastagir, 1971)



(Picture taken from Poppe, 2004)

Bullia mauritiana Gray, 1839 Shell size 30 - 75 mm.
Intertidal and offshore sand.
(Ahmed and Hameed, 1999)

Bullia persica Smith, 1878 25mm.
Found on loose stones and sandy mud
(Tirmizi and Zehra, 1984)



(Shell after Tirmizi and Zehra, 1984) Egg case

Bullia melanoides (Deshayes, 1832)
Shell size 16 - 28mm.
Sandy
(Melvill, 1901 as *Bullia strenaria* Melvill)

Bullia tranquebarica (Röding, 1798) 18 - 38 mm.

Sandy beaches along the surf zone, low on the shore from middle tidal zone seawards
(Harvard, MCZ; Ghani *et al.*, 2017)



Bullia ceroplasta Melvill 1898
Sandy beaches along the surf zone, low on the shore from middle tidal zone seawards
(Melvill, 1898)



Bullia nuttalli Kilburn, 1978
Sandy shore, from middle tidal zone seawards where the sand is not too coarse.
(WMSDB)

Bullia nitida G. B. Sowerby III, 1895
Sandy shore from middle tidal zone seawards where the sand is not too coarse.
(Sowerby III, 1895)



Bullia othaeitensis (Bruguière, 1789) 30mm., sparse orange-brown axial flammules inhabits sandy bottoms of shallow waters down to about -15m.
(Gmelin, 1791 as *Bullia tahitensis*; Avon, 2016)

Family Columbellidae Swainson, 1840
Genus *Decipifus* Olsson and McGinty, 1958

Decipifus consanguineus (G. B. Sowerby III, 1897)
(Kobelt, 1905 as *Mangilia thalia* W. H. Turton, 1932)

Genus *Aesopus* Gould, 1860
Aesopus urania Melvill and Standen, 1901

Sandy bottom
(Melvill and Standen, 1901)
Genus *Anachis* H. Adams and A. Adams, 1853
Anachis cf *fauroti* (Jousseume, 1888).
Rocky shores
(Melvill and Standen, 1901 as *Mitrella zebra* Gray; Ghani *et al.*, 2017)



Anachis terpsichore (G. B. Sowerby II, 1822)

Rocky shores
(Trew, 1987 as *Mitrella terpsichore* Sowerby)

Anachis miser (G. B. Sowerby II, 1844)
16mm.

Rocky shores in weeds
(Baig and Zehra, 2006 as *Pyrene miser*)
Genus *Mitrella* Risso, 1826

Mitrella cartwrighti (Melvill, 1897)

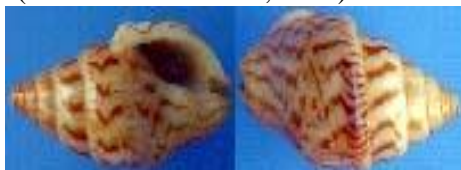
Mangroves
(Melvill, 1896 as *Collumbella cartwrighti*)

Mitrella nomadica (Melvill and Standen, 1901) 14 mm.

Mid littoral.
(Melvill and Standen 1901 as *Columbella (Mitrella) nomadica* Melvill and Standen)

Mitrella blanda (Sowerby, 1844) 3.8-11 mm.

Mid littoral to 20m.
(Melvill and Standen, 1901)



Genus *Zafra* A. Adams, 1860

Zafra savignyi (Moazzo, 1939)

In 15-30 m water depth
(Melvill and Standen, 1901 as *Columbella (Seminella) melitoma*, Melvill and Standen)

Zafra townsendi (Melvill and Standen, 1901)

Depth range 50 - 70 m.
(Melvill and Standen, 1901 as *Columbella (Seminella) townsendi*)

Zafra selasphora (Melvill and Standen, 1901)

In estuaries, including the seaward side of mangrove swamps, under stones and litter and on sea grass; intertidal
(Melvill and Standen, 1901 as *Columbella (Seminella) selasphora*.

Zafra phaula (Melvill and Standen, 1901)

Coral reef
(Melvill and Standen, 1901 as *Columbella (Seminella) phaula*)



Genus *Euplica* Dall, 1889

Euplica varians (Sowerby I, 1832)

Benthic
(Ghani *et al.*, 2018)

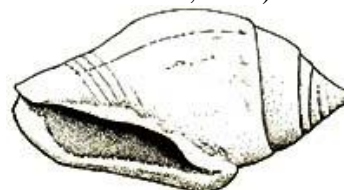


Genus *Pyrene* Roeding, 1798

Pyrene flava (Bruguiere, 1789)

21x10mm Abundant on mud-covered rocks

(Tirmizi and Zehra, 1984)



(After Tirmizi and Zehra, 1982)

Pyrene splendidula (G. B. Sowerby I, 1844) 20-30 mm.

Rocky shores
(Melvill, 1884)

Pyrene punctata (Bruguière, 1789)

Rocky shores
(Rehman and Barkati, 2012)

Genus *Pictocolumbella* Habe, 1945

Pictocolumbella ocellata (Link, 1807)
10x20mm, monochromatic black or red-brown on white, with a lilac stain around the aperture edge

Intertidally, on and under rocks and on mangroves
(Ali, 2006 as *Pyrene fulgurans* Lamarck)
Genus *Parviterebra* Pilsbry, 1904
Parviterebra thyrsea (Melvill, 1897)
White with transverse interrupted brown banding or spotting
Subtidal
(Melvill, 1897 as *Terebra thyrsea* Melvill)

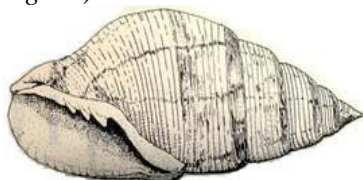


Family Harpidae Bronn, 1849
Genus *Harpa* Röding, 1798
Harpa cabriti Lamarck, 1816
Intertidal sand, coral reef pools
(PSF Report, 1977 as *Harpa ventricosa* Lamarck)



(After Hornell, 1951)

Family Mitridae Swainson, 1831
Genus *Mitra* Lamarck, 1798
Mitra ambigua Swainson, 1829
Muddy rocks at low-tide mark
(Rehman and Barkati, 2012)
Mitra caliginosa Reeve, 1844
Muddy rocks at low-tide mark
(Tirmizi and Zehra, 1984 as *Mitra caeligena*)



(After Tirmizi and Zehra, 1984)

Mitra proscissa Reeve, 1844
Rocks, Coral reef and muddy areas
(Reeve, 1844 OBIS, 2004)
Mitra subruppeli Finlay, 1927 27 x 12mm. Intertidal
(Sowerby, 1914 as *Mitra multisulcata* Cernohorsky)

Genus *Pseudonebularia* Fedosov, Herrmann, Kantor and Bouchet, 2018
Pseudonebularia proscissa (Reeve, 1844) 28.24 mm
4/6m deep under rocks
(Reeve, 1844; Harvard, MCZ)



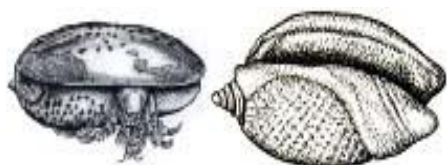
Genus *Tiara* Swainson, 1831
Tiara tuberculata (Mullher, 1774)
Rocky
(Ahmed and Hameed, 1999)
Genus *Strigatella* Swainson, 1840
Strigatella scutulata (Gmelin, 1791)
In sand at low tide
(Lt.-Col. A. J. Peile, 1932 as *Mitra amphorella* Lamarck)
Genus *Scabricola* Swainson, 1840
Scabricola desetangii (Kiener, 1838)
Intertidal
(Ghani *et al.*, 2018)
Superfamily Olivoidea Latreille, 1825

Family Olividae Latreille, 1825
Subfamily Olivine Latreille, 1825
Genus *Oliva* Bruguiere, 1789
Oliva bulbosa (Roding, 1798 21-60 mm.
Sandy substrates intertidally and subtidally
(Femorale, 2011)



(After Aemon Khan)

Oliva australis Duclos, 1835.
Intertidal shallow water, in sand
(PSF Report, 1977)
Oliva concavospira Sowerby III, 1914
In sand
(PARC Report, 1986)
Oliva elegans Lamarck, 1811
30mm. yellowish brown marked by longitudinal grayish brown wavy somewhat zigzag lines
Loose stones and mud at low tide
(Tirmizi and Zehra, 1984)



Empty shell (After Tirmizi and Zehra, 1984) Shell occupied by hermit crab (After Kazmi, 2016)

Oliva mustelina Lamarck, 1811
Intertidal sand just below the surface (PSF Report, 1977; El Huesseini, 1963)



Oliva oliva (Linnaeus, 1758).
Intertidal sand just below the surface (Khan *et al*, 1973)

Oliva oliva stellata (Duclos, 1835)
Intertidal sand just below the surface. (Femorale, 2011)

Oliva reticulata (Roding, 1798)
Intertidal sand just below the surface (PARC Report, 1986)

Oliva rufula tectiphora (P.L. Duclos, 1835) 30 mm
Benthic (WMSD)



Oliva sericea (Roding, 1798)
Intertidal sand just below the surface (PARC Report, 1986)

Oliva tremulina Lamarck, 1811
Intertidal sand (Rehman and Barkati, 2012)

Genus *Agaronia* Gray, 1839
Agaronia acuminata (Lamarck, 1811)
(WMSD - ANSP Malacology Collection Specimen, Donor El-Husseini, 1963)

Agaronia griseoalba (Marrat, 1897)
Dredged at 20/40 meters depth (WMSDB)

Agaronia gibbosa (Born, 1778 2-3''
Sandy bottom
(M. A. El Huesseini, 1963 as *Agaronia nebulosa* (Lamarck); Khan and Dastagir, 1971 as *Oliva gibbosa*)



(After Hornell, 1951)



Agaronia pallida (Swainson, 1832)
River mouth
(Reeve, 1850 as *Oliva indusica* Reeve)



Agaronia ancillarioides (Reeve, 1850)
Estuarine
(Reeve, 1850 as *Oliva ancillarioides* Reeve)



Subfamily Ancillinae Swainson, 1853
Genus *Ancilla* Lamarck, 1799
Ancilla castanea (G. B. Sowerby I, 1830)
30mm.
Intertidal, subtidal sandy shores, Coral reef, amongst loose rocks and sandy mud. (Kilburn, 1981).



Ancilla boschi (Kilburn, 1980) Pale orange-yellow to moderate brown, or light

brown, sometimes suffused posteriorly with white; marked by two narrow white lines or bands, one situated some distance below suture^ the other encompassing (more or less symmetrically) the ancillid groove; rarely a third white band; apex and columella pillar white, aperture brownish pink to light brown, shading to white anteriorly.

Coarse sand and shingle, from low tide to about 20 metres.

(Kilburn, 1980)

Ancilla scaphella (G. B. Sowerby II, 1859)

Intertidal, subtidal sandy shores (Femorale, 2011)

Ancilla farsiana (Kilburn, 1981) 15mm. Subtidal mud

(Kilburn, 1981 as *Ancilla Sparella farsiana*; OBIS, 2004)



Ancilla eburnean (Deshayes, 1830)

Burrows shallowly in sand or mud from low tide, in fine to coarse sand, sometimes muddy or in beds of sea grasses, from low-tide banks to about 24 metres (with one record from 91 metres).

(Burch and Burch, 1958, erroneous record; NMNH)

Ancilla ventricosa (Lamarck, 1811)

18-20m.

(NMNH; Erroneous record Burch and Burch, 1958 based on *A. castanea*)

Ancilla ovalis (G. B. Sowerby II, 1859) 32-34mm.

Subtidal muddy sand. Burrows shallowly in sand or mud from low tide. Burrows in sand or mud, from low tide to depths of 430 metres or more

(Kilburn, 1981)

Family Conidae Rafinesque, 1815

Genus *Conus* Linnaeus, 1758

Conus augur [Lightfoot], 1786 Medium-sized to moderately large. Cream, suffused with yellow or orange. Last whorl with numerous spiral rows of fine reddish brown dots from base to shoulder and with a spiral band of reddish brown to dark brown axial blotches on each side of

centre. Larval shell white. Teleoconch sutural ramps with moderately dense, reddish to dark brown, curved axial streaks often reduced to a pre-sutural and a sub-sutural row of spots. Aperture white, often variously tinged with orange. Periostracum greyish brown to blackish brown, thick, opaque, and axially ridged. In 3-25 m; living in muddy sand, on coral rubble and beneath rocks.

(Florida Museum of Natural History)

Conus quercinus Lightfoot, 1786 Ground colour pale yellow; a paler mid-body band visible. Spire uniformly yellowish white, early whorls dark brown. Aperture white Sand or mud to at least 250 feet.

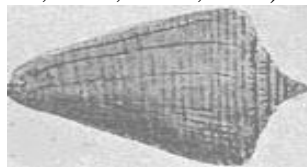
Juveniles prefer deep water (Melvill-Tomlin, 1930)



Conus aculeiformis Reeve, 1844 Body cream. Body whorl with spiral rows of brown squarish to rectangular spots on ribbons, often fused into an interrupted spiral band on each side of the centre. Aperture pale brown.

Sub tidal

(Melvill, 1901; OBIS, 2004)



Conus biliosus (Roding, 1798).

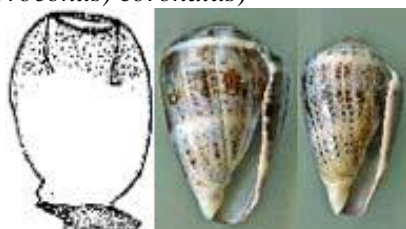
Intertidal, shallow subtidal, muddy shores and coral

(Smith, 1903 as *Conus piperatus* Dilwyn)



Egg capsules (After Zehra and Perveen, 1991); Shell (After Kazmi *et al.*, 2018)

Conus coronatus Gmelin, 1791 Pinkish to violet, with pale bluish spiral bands below shoulder and centre. Spiral bands of variously sized brown and black markings on either side of sub-central band, overlaying the two solid colour bands. Spire similar to body colour. Aperture pale grey, edges tinged dark violet
Mid tidal zone of rocky shore
(Khan and Dastagir, 1971 as *Conus (Virroconus) coronatus*)



Egg capsule (After Zehra and Perveen, 1991) Shell (After Animal Base)

Conus buxeus loroisii Kiener, 1845
Subtidal sand
(Sowerby, 1896; OBIS, 2004; Coomans *et al*, 1986 as *Conus figulinus* Linnaeus)



Conus vicweei Old, 1973
In 70-200 m
(OBIS, 2006)

Conus geographus Linnaeus, 1758
Found in the sublittoral epipelagic zone, surrounding habitat includes living or fragmented coral reefs, and sandy regions within tidal zones; less commonly found in deeper waters.
(IUCN RED LIST, 2019)



(Photo courtesy: Animals of Pakistan)

Conus parvatus Walls, 1979
Benthic

(IUCN RED LIST, 2019)

Conus vexillum Gmelin, 1791
Intertidal to 70 m. Juveniles on intertidal benches. larger individuals on subtidal reefs from the infralittoral fringe to about 30 m and to 50-70 m. , reported from shallow water. Lagoon pinnacles, on sand, sand with gravel, among weed or rocks and under dead corals.
(IUCN RED LIST, 2019)

Conus virgo Linnaeus, 1758 size of the shell varies between 50mm and 151mm. Shell pale yellowish brown, tinged with violet at the base.¹

Benthic; depth range 1 - 30 m. Found on shallow muddy areas; in sand and rubble on reef flats, sometimes amongst weed and beneath dead coral rocks
(IUCN RED LIST, 2006)

Conus miliaris Hwass in Bruguière, 1792
Intertidal to about 10 m. typical form is more common on intertidal benches of beachrock or truncated reef limestone than on slightly subtidal reef platforms. It can be found at protected or exposed sites, in or on sand, coral rubble or rocks, and algal turf, infrequently also on large patches of sand and on bare reef limestone
(IUCN RED LIST, 2019).

Conus hyaena Hwass in Bruguière, 1792 colour of the shell light yellowish brown, variegated by darker striations, and faint revolving lines or rows of spots, often indistinctly lighter-banded in the middle. Intertidal and upper subtidal.
(IUCN RED LIST, 2019)

Conus episcopatus da Motta, 1982. shell varies between 40 mm and 115 mm Ground colour white, often suffused with pink in shells . Last whorl overlaid with light do dark brown leaving numerous medium-sized to large, separate or overlapping tentlike ground-colour markings; tents concentrated in 3-4 axial bands from base to shoulder and in 3 spiral bands, below shoulder, below centre, and near base. Brown colour zones interspersed with spiral rows of alternating dark brown dashes and very small white markings. Small subadult specimens usually with alternating brown

and white axial bands, the latter sparsely crossed by brown reticulated lines. Following ramps matching last whorl in colour pattern. Aperture white to bluish white, sometimes cream to yellow
In shallow water to 40 m; on the lagoon and ocean sides of coral reefs, in sand and coral rubble, often beneath coral rocks (IUCN RED LIST, 2019)



Conus sponsalis Hwass in Bruguière, 1792. Yellowish white, with a few chestnut or red zigzag longitudinal markings, forming an interrupted broad superior, and often a narrower inferior band, base of the shell violaceous

Epifaunal, in protected and exposed sites. Intertidally on beach rock and limestone benches, usually inhabiting algal turf binding sand. Small sand-filled depressions, coral rubble and crevices of rocks; subtidally, on reef flats, lagoon pinnacles and deeper reef habitats to 18 m. depth

(IUCN RED LIST, 2019)

Conus striatellus Link, 1807 36x18mm

Benthic; depth range 41 - 52 m

(IUCN RED LIST, 2019)



Conus striatus Linnaeus, 1758

Found also in shallow subtidal

(IUCN, 2006)

Conus eburneus Hwass in Bruguière, 1792

Intertidal to about 65 m, mostly in 1-25 m. Lives primarily in and on sand bottoms of subtidal reef flats, in sand-filled channels, large patches of sand and among weed on sandy or muddy substrate.

(IUCN RED LIST, 2019)

Conus acutangulus Lamarck, 1810

Usually in 3-100 m, adults sometimes in 0.5-5 m, juveniles sometimes as deep as 180 m. On coral or shell sand often mixed with coral rubble, on muddy sand and on fine shell rubble with seaweed.

Conus acutangulus Lamarck, 1810

13mm - 46mm.

Ground colour white. Last whorl variably patterned with light to dark brown: Largely brown except for small scattered ground-colour blotches at shoulder and centre, or white flecked with brown, or white spirally spotted with brown, or all white. Larval whorls white. Spire variably streaked with brown. Aperture white.

Usually in 3-100 m, adults sometimes in 0.5-5 m, juveniles sometimes as deep as 180 m. On coral or shell sand often mixed with coral rubble, on muddy sand and on fine shell rubble with seaweed

(IUCN RED LIST, 2019)

Conus generalis Linnaeus, 1767

Subtidal, Coral reef and sand

(OBIS, 2004)



Conus milneedwardsi Jousseaume, 1894

Body colour white. Body whorl generally with reddish brown reticulated lines forming small to large triangles and with similarly coloured triangular spots to variably shaped blotches concentrated in two spiral bands, within basal third, and just above centre. Spire whorls with large reddish brown regular blotches. Aperture white

Subtidal , 120-200 m

(OBIS, 2004)



Conus milneedwardsi clytospira Melvill and Standen, 1899 180 mm.

Subtidal

(Melvill and Standen, 1899)



Conus textile Linnaeus, 1758 Body whorl generally with network of light to dark brown lines edging tiny to moderately large tents. Yellowish-brown flecks and blotches arranged in two to three interrupted to solid spiral bands on both sides of the centre and often below shoulder; bands interspersed with broad, dark brown, straight to wavy axial lines, shows wide variations in colour patterns.

Rocky

(Khan and Dastagir, 1971 as *Conus textile*)



(After Khan and Dastagir, 1971)

Conus catus Hwass, 1792 37x24mm.

On rocks at low tide

(Tirmizi and Zehra, 1984)



Shell drawing (After Tirmizi and Zehra, 1984) Egg capsules

Conus canonicus Hwass in Bruguière, 1792

Intertidal and uppermost subtidal; on subtidal coral reef flats, in sand under coral rocks, in coral rubble with or without sand and on limestone pavement, often close to living corals

(IUCN Red List, 2019)

Conus maldivus Hwass in Bruguière, 1792

Slightly subtidal to about 6 m on reefs and coastal flats, in sand, sandy gravel or

rubble, sometimes beneath coral blocks among weed

(OBIS, 2004)

Conus litoglyphus Hwass in Bruguière, 1792

Usually subtidal to about 60 m: on reefs, lagoon pinnacles. Rocky platforms exposed to wave action and more frequently below 10 m on sand or reef rock under dead corals or on reef slopes

(IUCN Red List, 2019)

Conus rattus Hwass in Bruguière, 1792

Benthic; depth range 1 - 17 m

(IUCN Red List, 2019)



Conus aulicus Linnaeus, 1758 size of an adult shell varies between 65 mm and 163 mm. colour of the shell chocolate-brown, covered by elevated close revolving lines of darker color. Surface irregularly overlaid by subtriangular white spots, some of which are very large.

In 1-30 m; on reef flats and coral reefs near dead and living corals, sand substrates or sometimes coral rubble

(IUCN Red List, 2019)



(From Creative Commons Attribution)

Conus terebra Born, 1778

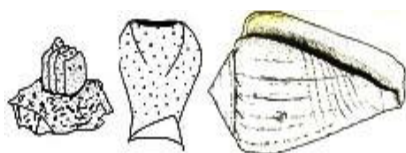
Benthic; in 0.5-20 m on coral reef or lagoon pinnacles, in fine sand with or without sea-weed and coral rubble; reported from sheltered sites beneath coral rocks and from exposed rocky areas.

(IUCN Red List, 2019)

Conus magus Linnaeus, 1758.

44x24mm.

Abundant on rocks at low-tide (Tirmizi and Zehra, 1984)



Egg capsules single egg capsule, shell
(After Tirmizi and Zehra, 1984)
Conus locumtenens Blumenbach, 1791.
Rocky
(Khan *et al.*, 1973 as *Conus acuminatus*
Hwass)

Conus ebraeus Linnaeus, 1758
On rocks
(PARC, Report, 1986)
Conus emaciatus Reeve, 1849
Intertidal
(Reeve, 1849)



Conus flavidus Lamarck, 1810
Intertidal
(Shah *et al.*, 2003)



Conus chaldaeus (Roding, 1789)
Intertidal
(Shah *et al.*, 2003)



Conus arenatus Hwass in Bruguiere, 1792 9inches. Body white. Body whorl with spiral rows of widely spaced brown dots, clustered in two interrupted spiral bands, and one above centre and the other near the base; dotted areas often with underlying greycolors, most conspicuous within spiral bands. White dashes often irregularly alternating with brown dots. Early spire whorls white. Spire with radial clusters of brown dots. Aperture white
Intertidal
(Shah *et al.*, 2003)



Conus vaultieri Kiener, 1849
Intertidal
(Shah *et al.*, 2003)



Conus nussatella Linnaeus, 1758 50mm. Light cream with spiral rows of small dark brown spots and variably sized orange brown axial blotches coalescing axially as well as spirally, especially concentrating above and below the centre. Aperture white
Beached
(Shah *et al.*, 2003)



Conus tessulatus Born, 1778. 55mm. Body white. Body whorl with spiral rows of mostly bright orange rectangular spots or bars, often alternating with white markings
Intertidal
(Shah *et al.*, 2003)

Conus marchionatus Hinds, 1843
Intertidal
(Shah *et al.*, 2003)



Conus luteus Sowerby, 1833
Intertidal
(Shah *et al.*, 2003)



Conus tenuistriatus Sowerby, 1858

Intertidal

(Shah *et al.*, 2003)

Conus coffeae Gmelin, 1791

Intertidal

(Shah *et al.*, 2003 as *Conus scabriusculus* Dillwyn)

Conus frigidus Reeve, 1848. Shell tan, with paler transverse bands at shoulder and centre, base violet. Aperture purple. Exterior colour band visible as a band along interior border of lip. Periostracum yellowish brown, thick, opaque with numerous axial ridges

Offshore

(Shah *et al.*, 2003)



Conus marmoreus Linnaeus, 1758. 60mm. dull-coloured, uniformly greenish or with spiral bands of alternating chestnut brown and grey spots; interior of aperture silvery white; exterior of operculum whitish

At 3-5m depth

(Ali, 2006)

Conus inscriptus Reeve, 1843. Body pale brown to dark brown to rusty brown. Body whorl with spiral rows of orange to dark brown dots, spots, bars or axial streaks fusing into axial flames and blotches and forming interrupted spiral bands below shoulder and within ad apical and abapical thirds. Sub-shoulder band less prominent than anterior bands. Aperture white. Periostracum brown

In 5-85 m., most frequently reported from 40-80 m, sometimes as deep as 150 m.

(Melvill-Tomlin, 1903)



Conus bengalensis (Okutani, 1968) 60-148mm.

At 50-130m. on mud and sand bottoms (Femorale, 2011)

Conus miles Linnaeus, 1758 Ground colour white. Last whorl with a variably broad dark brown spiral band above centre, also dark brown on basal fourth to third. Remaining areas clouded with lighter brown or olive, crossed by closely spaced to well separated, fine, brown to orange axial lines that extend to shoulder ramp. Larval whorls and adjacent sutural ramps pale yellow. Later sutural ramps white, with fine brown or orange axial lines partly overlying tan or olive blotches. Aperture translucent.

Intertidal, more common in upper subtidal to about 50 m; on intertidal benches and reefs, in bays, on slightly subtidal reef flats and in deeper subtidal habitats. In shallow water on sand or gravel among rocks, on beachrock, rough truncated reef limestone and lagoon pinnacles

(IUCN)



Genus *Conasprella* Thiele, 1929.

Conasprella elegans (G. B. Sowerby III, 1895) white to beige, last whorl encircled with rows of orange to brown dots, irregular blotches and axial streaks, often forming interrupted spiral bands below shoulder and on both sides of centre. Larval shell white or light brown. Late sutural ramps usually with irregular brown blotches; sometimes brown subsutural dots present. Aperture white or light brown. Ground colour white to beige, last whorl encircled with rows of orange to brown dots, irregular blotches and axial streaks, often forming interrupted spiral

bands below shoulder and on both sides of centre, late sutural ramps usually with irregular brown blotches; sometimes brown subsutural dots present. Aperture white or light brown.

Upper subtidal to about 60 m.; 9- 11 m.

(Royal Belgian Institute of Natural Sciences National Natural History collections; Coomans, Moolenbeek and Wils, 1986)

Offshore and beach

(Sowerbyi, 1895)

Conasprella stocki (Coomans and Moolenbeek, 1990) 45 mm.

Shallow subtidal among rocks

(OBIS, 2004 as *Conus stocki*)

Conasprella dictator (Melvill, 1898)

Colour cream. Body whorl with orange to brown axial streaks or flammules, generally fusing in three spiral bands, within the basal third, near centre and below the shoulder. Aperture white marginally, violet within; basal portion often orange

Intertidal, subtidal coral and sand (Melvill, 1898 as *Conus (Leptoconus) dictator*; OBIS, 2004)



(Source Allen Kohn)

Conasprella ramalhoi (Coomans, Moolenbeek and Wils, 1986) Ground colour white to beige, last whorl encircled with rows of orange to brown dots, irregular blotches and axial streaks, often forming interrupted spiral bands below shoulder and on both sides of centre, late sutural ramps usually with irregular brown blotches; sometimes brown subsutural dots present. Aperture white or light brown.

On intertidal benches and subtidal coral reef platforms. Upper subtidal to about 60 m. 9- 11 m.

(Royal Belgian Institute of Natural Sciences National Natural History

collections; Coomans *et al*, 1986 as *Conus elegans ramalhoi*



Conasprella saecularis (Melvill, 1898)

Shells usually found from 100-400 m.

(IUCN 2006)

Conasprella coromandelica (E. A.

Smith, 1894)

In 70-400 m.

(IUCN)

Family Borsoniidae Bellardi, 1875

Genus *Drilliola* Locard, 1897

Drilliola reevii (C. B. Adams, 1850)

3-7 fathoms, loose stones and mud

(Hinds, 1843 as *Pleurotoma violacea*)

Genus *Tomopleura* Casey, 1904

Tomopleura vertebrata (E. A. Smith, 1875). 20 mm.

At depth

(Australian Museum, 1897; Melvill, 1916

as *Turris (Tomopleura) vertebrata*

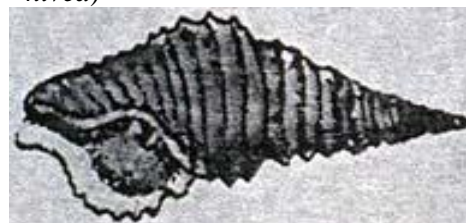
(Smith))



Tomopleura nivea (Philippi, 1851) 15 mm 30 mm.

3-7 fathoms, muddy sand, loose stones

(Melvill, 1917 as *Turris (Tomopleura) nivea*)



Tomopleura reevii (C. B. Adams, 1850)

Loose stones and mud, 3-7 fathoms

(Melvill, 1917 as *Pleurotoma*

var. *violacea* Hinds)

Tomopleura pouloensis (Jousseume,

1883) 8 mm and 17 mm.

(Melvill, 1917 as *Pluerotoma pouloensis*)



(Picture Courtesy: Femorale)
 Genus *Microdrillia* T.L. Casey, 1903
Microdrillia patricia (Melvill, 1904) 6x2 mm, pale violet
 At 40 fathoms
 (Melvill, 1917 as *Turris* (*Tomopleura*) *patricia*)



Family Pseudomelatomidae Morrison, 1966
 Genus *Funa* Kilburn, 1988
Funa tayloriana (Reeve, 1846) 25mm-40mm.
 Continental shelf, subtidal, coral, Rocks, fine to coarse sand, fine muddy sand, shell rubble, shell gravel.
 (Reeve, 1846)



Genus *Crassispira* Swainson, 1840
Crassispira sinensis (Hinds, 1843) shell yellowish or flesh-brown, sometimes narrowly dark-banded at the suture and base, interior yellowish
 10-15 fathoms
 (Melvill, 1917 as *Drillia sinensis* Hinds)



(Courtesy: Naturalis Biodiversity Center/Wikimedia Commons)

Genus *Epideira* Hedley, 1918
Epideira multiseriata (E. A. Smith, 1877)
 Sandy open shores, in corals
 (Melvill and Standen, 1895 as *Turris* (*Gemmula*) *multiseriata* Smith)



Genus *Gemmula* Weinkauff, 1875
Gemmula speciosa (Reeve, 1843) 40 – 80 mm.
 Sandy open shores, deep sea at 70 fathoms
 (Melvill, 1917 as *Turris* (*Gemmula*) *guadurensis*)
 Genus *Inquisitor* Hedley, 1918
Inquisitor intertinctus (E. A. Smith, 1877)
 Benthic, 5-15 fathoms, mud and sand
 (Melvill, 1917 as *Drillia intertincta*)



Inquisitor variabilis (E. A. Smith, 1877)
 pale, freckled with pale brown
 Coral sand, oyster bed, soft mud, river mouth. At 10-20 fathoms
 (Tryon, 1884 as *Drillia turris*)



Genus *Ptychobela* Thiele, 1925
Ptychobela baynhami (E.A. Smith, 1891)
 Demersal
 (Melvill, 1917 as *Drillia baynhami*)
Ptychobela nodulosa (Gmelin, 1791) 34-50 mm.
 At 20 m.
 (Melvill, 1917 as *Pleurotoma* (*Drillia*) *atkinsonii* E.A. Smith)
Ptychobela griffithii (Gray, 1833)
 Benthic, at low spring tide
 (Melvill, 1917 as *Pleurotoma griffithii*)

Family Drillidae Olsson, 1964
 Genus *Splendrillia* Hedley, 1922
Splendrillia persica (E.A. Smith, 1888) 9 mm.
 Thick clayey mud
 (Melvill, 1917 as *Drillia persica*)



Genus *Drillia* Gray, 1838
Drillia major (Reeve, 1843)
 10-20 fathoms
 (Reeve, 1843)
Drillia griffithii (Reeve, 1843)
 Deepsea
 (Reeve, 1843 as *Pleurotoma griffithii*
 Reeve)

Genus *Clavus* Montfort, 1810
Clavus obliquatus (Reeve, 1845)
 33mm. Yellowish brown, within and
 without, with a narrow lighter band on the
 periphery, may be with a row of white dots
 on the ribs a little below the middle of the
 body whorl. Among loose stones.
 (Melvill, 1917 as *Drillia obliquata*)



Clavus sacra (Reeve, 1845) 27mm.
 Among loose pebbles
 (Melvill, 1917 as *Drillia (Tylotia) sacra*)



Clavus exasperatus (Reeve, 1843)
 Uniform greyish or yellowish-white,
 sometimes with a broad, faint band of pale
 buff around middle of last whorl;
 columella and lip white, interior of
 aperture yellowish; apical whorls
 evidently brown.
 In sand or stones under and between dead
 coral, low tide to 75 m.
 (Moazzam, present study)



Genus *Fenimorea* Bartsch, 1934

Fenimorea fucata (Reeve, 1845)
 Loose stones and mud
 (Melvill, 1917 as *Drillia (Tylotia) fucata*)

Family Terebridae Adams and Adams,
 1854

Genus *Myurellopsis* Fedosov, Malcolm,
 Terryn, Gorson, Modica, Holford and
 Puillandre, 2020

Myurellopsis guphila (Poppe, Tagaro
 and Terryn, 2009)

Intertidal to upper bathyal depths,
 typically shallow
 (Bibi *et al.*, 2021)



(Photo courtesy: By Indici - Own work,
 CC BY-SA 4.0)

Genus *Punctoterebra* Bartsch, 1923

Punctoterebra contracta (E.A.

Smith, 1873

Shallow coastal waters in sand and mud
 (Bibi *et al.*, 2021)

Punctoterebra pellyi (E. A. Smith,
 1877)

Shallow coastal waters in sand
 (Bibi *et al.*, 2021)

Punctoterebra trismacaria (Melvill,
 1917) 10-57 mm.

At depths of 0.5 to 40 m. on coral reefs,
 coral rubble and in fine sand with algae
 (Melvill, 1917)



(Photo Source: E. Hardy)

Punctoterebra polygyrata (Deshayes,
 1859) 16-33mm., pale yellowish with
 reddish and white markings below suture
 Subtidal

(Deshayes, 1859; Melvill, 1912 as
Terebra ambrosia; Bibi *et al.*, 2021 as
Punctoterebra ambrosia (Melvill))



Genus *Duplicaria* Dall, 1909
Duplicaria remanalva (Melvill, 1910)
 Bathymetry remains unknown but is presumed to be rather shallow (0-20 m) (Bibi *et al.*, 2021)
Duplicaria duplicata Linnaeus, 1758. 90mm.
 Sand between rocks
 (Cernohorsky, 1969; Khan and Dastagir, 1971)



(After Tirmizi and Zehra, 1984)

Duplicaria edgarii (Melvill, 1898)
 Found in shallow sandy bays
 (Melvill, 1898 as *Terebra edgarii*)
Duplicaria similis (E.A. Smith, 1873) 28-45mm, pale ochraceous yellow to fawn
 Sublittoral
 (Melvill and Standen, 1895 as *Terebra (Euterebra) similis*)
Duplicaria tricincta (E.A. Smith, 1877)
 At 10-50m.
 (Ray, 1968 as *Granuliterebra tricincta*)
Duplicaria lamarckii (Kiener, 1837)
 Intertidal sand flats
 (Bibi *et al.*, 2021)
Duplicaria spectabilis (Hinds, 1844)
 Low tidal zone, swampy, sandy/ muddy lagoon, semisheltered rocky shore with sandy pockets
 (Ahmed *et al.*, 1982 as *Duplicaria duplicata* (Linnaeus), might be misidentified *D. spectabilis* fide: Bibi *et al.*, 2020)



(After Bibi *et al.*, 2020)



Genus *Macaulager* Fedosov, Malcolm, Terryn, Gorson, Modica, Holford and Puillandre, 2020

Macaulager cinctellus (Deshayes, 1859)
 Small crevices and small lodges of sloping rocks.

(Melvill and Abercrombie, 1893 as *Terebra cinctella* Deshayes)

Genus *Terebra* Bruguiere, 1789

Terebra helichrysum Melvill and Standen, 1903

Subtidal

(Australian Museum, 1913; OBIS, 2004)



Terebra anilis (Röding, 1798)

Upper slope and continental shelf soft bottoms

(Bibi *et al.*, 2021 as *Terebra serotina*)

Terebra cognata Smith, 1877

In shallow water

(Florida Museum of Natural History (UF); Bibi *et al.*, 2021)

Genus *Euterebra* Cotton and Godfrey, 1932

Euterebra capensis (E.A. Smith, 1873)

In the sand to a depth usually not exceeding the shell length

(Melvill and Standen, 1901 as *Terebra capensis*, probably a misidentification; Bibi *et al.*, 2021 presume *Partecosta* species (possibly *P. nassoides* (Hinds, 1844), *P. fuscobasis* E. A. Smith, 1877)



(Figure Source Turton, 1932)

Euterebra severa (Melvill, 1897) brown, 15mm.

In sand to a depth usually not exceeding the shell length.

(Melvill, 1897 as *Terebra severa*)



(Source Femorale)

Genus *Hastula* H. Adams and A. Adams, 1853

Hastula strigilata (Linnaeus, 1758)

Benthic

(Melvill and Standen, 1901)

Hastula hectica (Linnaeus, 1758)

From the intertidal zone to depths not deeper than 10 m. On sandy beaches under the action of surf

(Harvard: MCZ; Bibi *et al.*, 2021)



(After FAO)

Hastula modesta (Deshayes, 1859)

(Deshayes, 1859) 20 - 44 mm.

Delta

(Deshayes, 1859 as *Terebra modesta*)



(Photo Source Wikipedia)

Hastula nana (Deshayes, 1859)

River Delta, Mangroves

(Deshayes, 1859 as *Terebra nana*)



(Picture courtesy: Simon Aiken)

Hastula nimbosa (Hinds, 1844)

Just beyond the surf zone

(Terry and Keppens, 2020, most probably as the boundaries of the ranges of the species)

Genus *Hastulopsis* Oyama, 1961

Hastulopsis gotoensis (E.A. Smith, 1879)

From sand bottom

(Bibi *et al.*, 2021)

Genus *Granuliterebra* Oyama, 1961

Granuliterebra bathyrhapha (E.A. Smith, 1875) 14 - 35 mm.

River delta, mangroves

(Australian Museum, 1913 as *Terebra bathyrhapha*)

Granuliterebra persica (E.A. Smith, 1877) 10 - 14 mm

Sandy-clay mixed beach, and beaches associated with tidal flat

(Bibi *et al.*, 2021)

Genus *Partecosta* Dance and Eames, 1966

Partecosta tantilla (E. A. Smith, 1873)

Muddy stony bottom

(Smith, 1873 as *Myurella tantilla*)



(Photo Courtesy: Simon Aiken)

Partecosta tenera (Hinds, 1844)

Intertidal and shallow subtidal areas

(Hinds, 1844)



(Picture Courtesy: Simon Aiken)

Partecosta macandrewi (E. A. Smith, 1877)

Low tide mark

(Bibi *et al.*, 2021)

Family Turridae Swainson, 1840

Genus *Clavatula* Lamarck, 1801

Clavatula sp. 34.5mm.

Offshore

(Tirmizi and Zehra, 1982)



(After Tirmizi and Zehra, 1982)

Genus *Turris* Roeding, 1798

Turris amicta (Smith, 1877) 65mm.

Shallowly subtidal in marine grassflats (Melvill, 1917 as *Surcula cingulifera* var. *amicta*; OBIS, 2004 in Vitrinellidae)

Turris chilosema Melvill, 1952 dull reddish central, lateral and dorsal interrupted band. whitish straw-colour

Loose rock, sand, mud at low tide

(Melvill, 1917 as *Pleurotoma chilosema*)

Turris pouloensis Jousseaume, 1833

3-5 fathoms, loose stones and muddy sand

(Melvill, 1917)

Genus *Turricula* Schumacher, 1817

Turricula javana (Linnaeus, 1767)

75mm.

Rocky shore

(Melvill, 1917 as *Surcula javana*; Khan and Dastagir, 1971)



(After Tirmizi and Zehra, 1984)

Turricula tornata fulminata (Kiener, 1839) 48 - 69 mm. Reddish brown

Subtidal

(Kiener, 1839 as *Pleurotoma fulminata*)

Turricula nelliae (E. A. Smith, 1877)

Subtidal

(Melvill, 1917 as *Pleurotoma nelliae*)



Family Horaiclavidae Bouchet, Kantor, Sysoev and Puillandre, 2011

Genus *Paradrillia* Makiyama, 1940

Paradrillia inconstans prunulum

(Melvill and Standen, 1901)

Subtidal to offshore

(Melvill and Standen, 1901, OBIS, 2004)



Paradrillia inconstans (E. A. Smith, 1875) pale straw to chocolate brown

Offshore

(Melvill, 1916 as *Drillia inconstans*)



Paradrillia melvilli Powell, 1969 10 mm.

Subtidal, shelf

(Melvill, 1917; OBIS, 2004)



(Picture after Lowtide Shell)

Family Mangeliidae Fischer, 1884

Genus *Eucithara* P. Fischer, 1883

Eucithara turricula (Reeve, 1846) 12.5 mm. shell whitish, sometimes with a central brown band, with fine brown revolving lines

In shallow water

(Melvill, 1917 as *Mangelia turricula*)



Genus *Mangelia* Risso, 1826

Mangelia horneana Smith, 1884

Amongst weed and rocks at low tide

(Melvill, 1917)



Mangelia myrmecodes Melvill and Standen, 1901 pale straw colour

In mud

(Melvill and Standen, 1901 as *Mangilia myrmecodes*)



Mangelia theskeloides Melvill, 1889 uncertain, taxon inquirendum

On sandy bottom

(Melvill, 1889 as *Mangilia theskeloides*)

Mangelia costulata Risso, 1826 chestnut or horny brown

On sandy bottom

(Melvill, 1917 as *Clathurella smithii*)
Mangilia albolabiata E.A. Smith, 1882
 whitish straw-colour
 On sand, in shell sand
 (Melvill, 1899 as *Pleurotoma (Mangilia)*
albolabiata E. A. Smith; 1901 as *Mangilia*
chelosema),



Genus *Citharomangilia* Kilburn, 1992
Citharomangilia townsendi (Sowerby,
 1895)
 Demersal and offshore, at low water
 mark on muddy sand
 (Sowerby, 1895 as *Mangilia townsendii*)



(Picture courtesy Moazzam)

Genus *Pseudorhaphitoma* Boettger, 1895
Pseudorhaphitoma averina (Melvill and
 Standen, 1901) 50-90mm.
 At low water mark
 (Melvill and Standen, 1901 as *Mangilia*
averina Melvill and Standen)



Pseudorhaphitoma perlonga Melvill,
 1899 50-90m.
 (Melvill, 1899as *Mangilia perlonga*)



Pseudorhaphitoma fairbanki (G. Nevill
 and H. Nevill, 1875) 4.48-6.70 mm,
 brown
 Low water mark
 (Melvill, 1913 as *Mangilia fairbanki*)



Pseudorhaphitoma ditylota (Melvill,
 1912)
 3-10 fathoms
 (Melvill, 1912 as *Lienardia ditylota*
 (Melvill))



Pseudorhaphitoma scitula (Smith, 1884)
 10-156 fathoms
 (Melvill, 1917 as *Mangilia scitula*
 (Smith).



Pseudorhaphitoma ichthys (Melvill,
 1910) shell varies between 4.5mm and
 9mm. Shell has a light or pinkish brown
 colour.
 40-90 fathoms
 (Melvill, 1910)



SubClass Heterobranchia Gray, 1840

Family Amphibolidae J. E. Gray, 1840
 Genus *Salinator* Hedley, 1900
Salinator fragilis (Lamarck, 1822)
 In salt-marshes, estuaries and mangrove
 ecosystems
 (Bosh *et al.*, 1995)
 Infraclass Opisthobranchia Milne-
 Edwards, 1848
 Order Pleurobranchomorpha Schmekel,
 1985
 Superfamily Pleurobrancoidea Gray,
 1827

Family Pleurobranchidae Gray, 1827
 Genus *Pleurobranchus* Cuvier, 1804
Pleurobranchus peronii Cuvier, 1804
 colour from a pale translucent white,
 through yellow and brown to a deep
 purple, mantle small tubercles each

outlined by deeper in colour.variable in colour. As the animal grows, all the tubercles gradually colour, from the tip down, and the purple fades from the scattered purple-tipped tubercles.

Juvenile specimen's e usually distinctly differt in colour with a translucent white background, some of the tubercles tipped with reddish purple and the mantle edged in orange or red.

In shallow lagoons, reefs crests and pools (White, 1946 as *Pleurobranchus winckworthi*)



(Specimen picture after Mike Krampf; eggmass after Philibert Bidgrain)

Pleurobranchus forskalii Rüppell and Leuckart, 1828 Light, mottled orange-brown or dark red. Tubercles outlined with white arcs in dark animals and dark arcs in light animals

Intertidally and in shallow subtidal (White, 1946 as *Susania karachiensis* (dubious synonymy))

Pleurobranchus obsess K. White, 1946 Intertidal and shallow subtidal waters (White, 1946)
Superfamily Pyramidelloidea Gray, 1840

Family Pyramidellidae Gray, 1840

Genus *Costabieta* Laseron, 1956

Costabieta epentroma (Melvill, 1896) pure white

Mud-covered rocks at low tide (Melvill, 1901 as *Rissoa epentroma*)

Genus *Ondina* de Folin, 1870

Ondina warren (W. Thompson, 1845)

Shallow marine sediment (Melvill, 1901 as *Odostomia decorate* Jeffreys)

Genus *Egilina* Dall and Bartsch, 1906

Egilina callista (Melvill, 1893)

Shallow marine sediments. (Melvill, 1901 as *Pyrgulina callista*)

Genus *Mormula* A. Adams, 1863

Mormula philippiana (Dunker, 1860)

Shallow marine sediments.

(Melvill, 1901 as *Mormula rissoina* A. Adams)

Genus *Turbonilla* Risso, 1826

Turbonilla templaris Melvill, 1898

Offshore at 10-15 fathoms

(Melvill, 1898 as *Turbonilla (Pyrgostelis) templaris* Melvill)

Turbonilla mumia (A. Adams, 1861)

Offshore

(Melvill, 1898 as *Turbonilla manorae* Melvill)

Turbonilla edgarii (Melvill, 1896)

Amongst mud, weed, and loose stones at low tide

(Melvill, 1896 as *Pyrgulina edgarii* Melvill)

Turbonilla exilispira Melvill, 1918

Offshore

(Melvill, 1918 as *Turbonilla (Pyrgostelis) exilispira*)

Turbonilla julia Melvill, 1910

Offshore, dredged at 90 fathoms (Melvill, 1910)

Turbonilla umbrina Melvill, 1918 dull brown colour throughout

Offshore

(Melvill, 1918; OBIS, 2004)

Turbonilla candida (Adams, 1855)

Amongst rocks covered at low tide with mud, sand, and weeds.

(Adams, 1855 as *Chemnitzia candida* A. Adams)

Turbonilla uncinata Melvill, 1910

Offshore

(Melvill and Standen, 1901)

Turbonilla stegastris Melvill and Standen, 1901

Epifaunal

(Melvill and Standen, 1901; Ode, 1998)

Turbonilla charbarensis Melvill and Standen, 1901

Epifaunal

(Melvill and Standen, 1901)

Turbonilla terebrina Melvill, 1896

Amongst muddy rocks at low tide.

(Melvill, 1901)

Genus *Parthenina* Bucquoy, Dautzenberg and Dollfus, 1883

Parthenina pagodula (A. Adams, 1860)

109 meters

(Foster (RV Anton Bruun 04b 1963) as *Turbonilla monocycle* A. Adams)

Genus *Cingulina* A. Adams, 1860

Cingulina spina (Crosse and Fischer, 1864)

In association with molluscs and tubicolous polychaetes

(Melvill, 1901 as *Turbonilla spina*)

Cingulina secernenda Melvill, 1918

Tidal flats.

(Melvill, 1918; OBIS)

Cingulina isseli (Tryon, 1886)

Found upon muddy weed-covered rocks at low water, and at 7 fathoms

(Melvill, 1901)



Genus *Odostomia* Fleming, 1813

Odostomia major Melvill and Standen, 1901

Coastal areas and sandy shores

(Melvill and Standen, 1901)

Odostomia antelia Melvill, 1896 shining white

Brackish

(Melvill, 1896)

Odostomia carinata H. Adams, 1873

From 66 m depth, off mud at anchorage

(Melvill, 1910)

Odostomia sp

Mangroves

(Kazmi *et al.*, 2018)



Genus *Eulimastoma* Bartsch, 1916

Eulimastoma eutropia (Melvill, 1899) in mud at 25 fathoms

(Melvill 1899 as *Odostomia eutropia*)



Genus *Babella* Dall and Bartsch, 1906

Babella glycisma (Melvill, 1899)

From rocky shores

(Melvill, 1899 as *Pyrgulina glycisma* Melvill)

Genus *Pyrgulina* A. Adams, 1863

Pyrgulina pirinthella (Melvill, 1910).

Benthic habitats both soft and hard substrata

(Melvill, 1910)



Genus *Chrysallida*

Chrysallida decorata (Philippi, 1849)

Live specimens from the intertidal zone; empty shells on beaches

(Melvill, 1899 as *Pyrgulina decorata* (Philippi))

Genus *Tropaeas* Dall and Bartsch, 1904

Tropaeas brunneomaculata (Melvill, 1897)

Muddy and sandy, offshore dredged in 5 fathoms, sand and mud

(Melvill, 1897 as *Elusa*

brunneomaculata; OBIS, 2004)

Tropaeas strigulata (A. Adams, 1863)

Muddy and sandy, offshore

(Melvill, 1911 as *Elusa strigillata* A. Adams)

Genus *Syrnola* A. Adams, 1860

Syrnola karachiensis Melvill, 1897

ochraceous-brown

Mud flats. Amongst weed and mud upon rocks at low tide

(Melvill, 1897)

Syrnola metria Melvill, 1910

Mud flats At low tide amongst weed and loose rocks.

(Melvill, 1910)

Syrnola elegans A. Adams, 1860

Mud flats. Dredged amongst muddy sand and shingle, 7 fathoms.

(Adams, 1860)

Syrnola cinctella A. Adams, 1860

Ectoparasitic

(Melvill, 1910)

Syrnola brunnea (A. Adams, 1854) 9 - 16 mm.

Among detritus
(Melvill, 1910)

Syrnola mekranica Melvill and Standen, 1904 10mm.

Ectoparasitic
(Melvill and Standen, 1904)



Genus *Pyrgulina* A. Adams, 1863

Pyrgulina pirinthella Melvill, 1910

Pyrgulina epentromidea Melvill, 1899
2mm.

Intertidal
(Melvill, 1899)



Pyrgulina milicha Melvill, 1911 1mm

Intertidal
(Melvill, 1911)

Pyrgulina jllanorce Melvill, 1903

Intertidal
(Melvill, 1903)

Pyrgulina pyrgomella (Melvill, 1896)

On rocks at low tide
(Melvill and Standen, 1901 as *Odostomia*
Pyrgulina) *pyrgomella*)

Pyrgulina casta (A. Adams, 1853)
amongst weed, mud, and loose stones at
low tide

(Melvill, 1901)

Genus *Mumiola* A. Adams, 1863

Mumiola spirata (A. Adams, 1860)

7mm. shell white covered under a
yellowish or brownish, olivaceous
epidermis

Intertidal
(Adams, 1860)



Genus *Miralda* Adams, 1864

Miralda opephora Melvill, 1898

Subtidal
(Melvill, 1898)

Miralda gemma (A. Adams, 1861)

3 mm.

Sea mounts

(Melvill, 1896 as *Odostomia gemma*
(Adams, 1861)



Miralda diadema (A. Adams, 1860)

At 7 fathoms

(Melvill, 1901 as *Parthenia diadema* A.
Adams)

Genus *Oscilla* A. Adams, 1861

Oscilla tornata (A.E. Verrill, 1884)

3mm.

At depths between 27 m. and 260 m.

(Melvill, 1896)

Oscilla indica Melvill, 1896 2.8mm.

Cream, blotched with gray

In beach drift, occasionally in tide pools
and shallow rocky habitats

(Melvill, 1896)

Oscilla evanida Melvill, 1904

Likekely to be parasitic

(Melvill, 1901)

Genus *Otopleura* Fischer, 1885

Otopleura mitralis Adams, 1855

Sand dweller, occasionally found in
protected

Mixed habitats and *Halimeda* beds at
depths of 1-10 m.

(Melvill, 1911 as *Pyramidella propinqua*
A.Adams)



Genus *Pyramidella* Lamarck, 1799

Pyramidella dolabrata (Linnaeus, 1758)

Benthic; depth range 0 - 57 m.

(Pilsbry and Johnson, 1903)

Genus *Longchaeus* Mörch, 1875

Longchaeus maculosus (Lamarck, 1822)

Moderately deep water in sand 3-7
fathoms, muddy sand.

(Melvill, 1910 as *Pyramidella maculosa*
Lamarck)

Genus *Monotygma* G. B. Sowerby II, 1839

Monotygma fulva (A. Adams, 1853) 5-7mm. brownish, with a lighter colouration near the columellar zone
Dredged

(Melvill and Standen, 1901 as *Adelactaeon fulvus*)



Monotygma eximia (Lischke, 1872)
Sandy mud bottoms, subtidal to 60m deep
(Harvard: MCZ as *Actaeopyramis eximia* (Lischke))

Monotygma psyche (Melvill, 1901)
Sandy mud bottoms
(Melvill, 1901 as *Actaeopyramis psyche* (Melvill))

Superfamily Architectonicoidea Gray, 1840

Family Architectonicidae Gray, 1850

Genus *Architectonica* Roeding, 1798

Architectonica arcana Bieler, 1993

Intertidal sand

(Bieler, 1993; OBIS, 2004)

Architectonica laevigata (Lamarck, 1816) 30mm.

Sand between rocks, river mouth
(Melvill, 1864)

Architectonica nobilis Roding, 1798

Seamounts and knolls

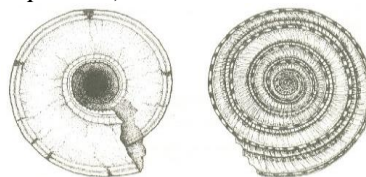
(Khan and Dastagir, 1971; Oliver, 2004 as *Architectonica granulata* Lamarck)



(After Khan and Dastagir, 1971)

Architectonica perspectiva (Linnaeus, 1758) 24mm. yellowish brown
Sandy areas

(Melvill and Standen, 1903 as *Solarium perspectiva*)



(After Tirmizi and Zehra, 1984)

Architectonica maxima (Phillipi, 1849)
60 mm.

Shallow sands

(Oliver, 2004)

Genus *Adelphotectonica* Bieler, 1987

Adelphotectonica kuroharai (Kuroda and Habe in Habe, 1961)

Sandy beaches

(PARC Report, 1986 as *Architectonica kuroharai* Kuroda and Habe)

Genus *Haliacus* Gmelin, 1797

Haliacus variegatus (Gmelin, 1791)

At low tide, offshore and beached

(Khan and Dastagir, 1971 as *Torinia variegata*)



(After Khan and Dastagir, 1971)

Haliacus cerdaleus (Melvill and Standen, 1903)

Subtidal

(Melvill and Standen, 1903)



Haliacus implexus Mighels, 1845

Subtidal

(Barnard, 1963 as *Haliacus dorsuosus* (Hinds))



Heliacus stramineus (Gmelin, 1791)

Subtidal

(Rehman and Barkati, 2012)

Genus *Pseudotorinia* Sacco, 1892

Pseudotorinia delectabilis (Melvill, 1893)

Mostly empty shells from beach washup, with a few subtidal down to 115 m. A few collected alive intertidally

(Bieler, 1993)

Infraclass Pulmonata Cuvier in

Blainville, 1814

Order Systellommatophora Pilsbry, 1948

Family Pupillidae Turton, 1831

Genus *Pupoides* Pfeiffer, 1854

Pupoides karachiensis Peile, 1929

Beach sand

(Peile, 1929)



Superfamily Onchidioidea Rafinesque, 1815

Family Onchidiidae Gray 1824

Genus *Onchidella* Gray, 1850

Onchidella sp.

Attached on rocks

(Barkati *et al.*, 1990)



Egg mass and animal

Genus *Paromoionchis* Dayrat and

Goulding, 2019

Paromoionchis daemelli (Semper, 1885)

Intertidal

(Rahman and Barkati, 2004 as *Onchidium daemelli*)



Genus *Peronia* Fleming, 1822

Peronia peronii (Cuvier, 1804)

Supralittoral

(Kazmi *et al.*, 2018)



Peronia verruculata (Cuvier, 1830)

Rocky shore .Predominantly dwells in intertidal water

(1884 Dickson leg.; SMNH

180721; Hoffmann, 1928; Labbé ,1934 as

Paraperonia gondwanae; Zehra nd

Shamim, 2004 as *Onchidium*

verruculatum (Cuvier) Dayrat et al,2020)

Genus *Wallaconchis* Goulding and Dayrat, 2018



Genus *Wallaconchis* Goulding and Dayrat, 2018

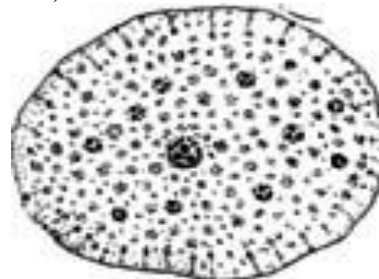
Wallaconchis simrothi (Plate, 1893)

uncertain > nomen dubium 14x15mm.

Mangrove mud

(Marcus, 1971 as *Onchidium simrothi*

(Plate)



(After Marcus, 1971)

Superfamily Ellobioidea L. Pfeiffer, 1854

(1822)

Family Ellobiidae L. Pfeiffer, 1854

(1822)

Genus *Laemodonta* Philippi, 1846

Laemodonta sykesii (Melvill, 1897)
 horny yellow
 Salt marsh
 (Melvill, 1897 as *Plecotrema sykesii*
 Melvill)



Laemodonta concinnum (H. and A. Adams, 1853)
 Mangroves
 (Melvill, 1897 as *Plecotrema concinnum*
 H. and A. Adams)
 Genus *Melampus* Montfort, 1810
Melampus taeniolatus Hombron and
 Jacquinot, 1851 16mm.
 In the intertidal zone of mangroves
 amongst the roots and branches
 (Habe, 1964)

Melampus castaneus Megerle von
 Mühlfeld, 1818
 In the intertidal zone of mangroves
 amongst the roots and branches
 (Bosh *et al.*, 1995)

Genus *Ellobium* Röding, 1798
Ellobium opportunatum Gould, A.A.,
 1859

In the intertidal zone of mangroves
 amongst the roots and branches
 (Habe, 1964)

Ellobium gangeticum (L. Pfeiffer, 1855)
 Estuarine, mangroves
 (STRI Marine Portal Collection Search
 Parameters – InvertEBase)

Genus *Cassidula* *Férussac*, 1821
Cassidula nucleus (Gmelin, 1791)
 Estuarine

(STRI Marine Portal Collection Search
 Parameters – InvertEBase)
Cassidula labrella (Deshayes, 1830)

Mangrove forest
 (Moradi *et al.*, 2021)
 Superfamily Siphonarioidea Gray, 1827

Family Siphonariidae Gray, 1840
 Genus *Siphonaria* Sowerby, 1823
Siphonariarosea Hubendick, 1943.
 13x10x6v mm.

Found on rocks very near to high tide level
 (Tirmizi and Zehra, 1984.)



(After Tirmizi and Zehra, 1984)

Siphonaria javanica (Lamarck, 1819)
 Intertidal rocks
 (Melvill and Standen, 1901)



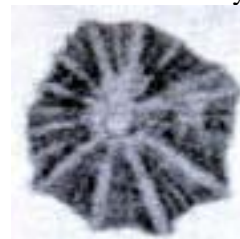
Siphonaria atra Quoy and Gaimarid,
 1833, 1892
 Intertidal rocks, on large boulders near
 reefs.

Among Oyster shells.
 (Melvill and Standen, 1901 as *Siphonaria*
lecanium; Siddiqui and Ahmed, 2001
 misidentification of *atra*, fide Hubendick
 (1946)



(After Kazmi *et al.*, 2018)

Siphonaria belcheri Hanley, 1858



(After Bano *et al.*, 2011)

Siphonaria asghar Biggs, 1958.
 Intertidal rocks
 (Winckworth, 1924, unpublished).



(Picture courtesy Moazzam)
Siphonaria kurracheensis (Reeve, 1856)

Rocky shores
(Reeve, 1856; Bano *et al.*, 2011)



Siphonaria savignyii Krauss, 1848
On rocks?
(Ghani *et al.*, 2017)



Siphonaria basseinensis Melvill, 189
Among Oyster shells.
(Siddiqui and Ahmed, 2001)
Siphonaria siphon Sowerby, 1830.
On rocks Intertidal rocks.
(Melvill and Standen, 1901)
Order Architectibranchia Haszprunar,
1985
Superfamily Ringiculoidea Philippi, 1853

Family Ringiculidae Philippi, 1853
Intertidal rocks.
Genus *Ringicula* Deshayes, 1838
(Bano *et al.*, 2011)
Ringicula propinquans Hinds, 1844 3-
4mm.
Off shore, deep sea
(Melvill and Standen, 1901)



Order/clade Cephalaspidea Fischer, 1883

Family Cylichnidae H. Adams and A.
Adams, 1854
Genus *Cylichna* Lovén, 1846
Cylichna crenilabris Melvill and Standen,
1901 taxon inquirendum

Burrower in fine sand, found in the top
30 mm. Rarely on the lower shore;
sublittoral, to 1500 m. n
(Hameed *et al.*, 2015)
Superfamily Acteonoidea D'Orbigny,
1835

Family Acteonidae Orbigny, 1835
Genus *Pupa* Roding, 1798
Pupa solidula Linnaeus, 1767 15-35
mm. shell with a white background,
covered with horizontally spiraling bands
of dark brown to light brown patterns;
Shallow water on sand of rocky shores



Shell and Egg ribbon (After Tirmizi,
1985 unpublished)
Pupa sulcata (Gmelin, 1791) 10-25
mm. light brown shell with horizontal
darker bands, where the darkest parts
form a vertical band
Shallow water on sand; intertidal and up
to depths of 30 m, burrowing in the sand
(Kazmi *et al.*, 1996)



(From Femorale)

Pupa affinis (Adams, 1855) 5-15m.
On muddy sand
(Melvill and Standen, 1901)

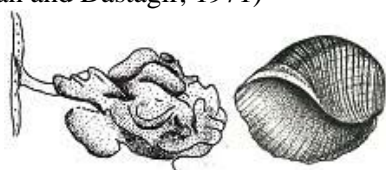


Genus *Acteocina* Gray, 1847
Acteocina crithodes (Melvill and
Standen, 1901)
In sand
(Melvill and Standen, 1901 as *Tornatina*
(A. Ad.) *crithodes*)

Family Aplustridae Gray, 1847
 Genus *Hydatina* Schumacher, 1817
Hydatina albocincta van der Hoeven,
 1811 five or more dark bands
 Offshore
 (Kazmi *et al.*, 1996)



Hydatina physis Linnaeus, 1758 23mm.
 Rocky shores in small pools on silty sand
 (Khan and Dastagir, 1971)



Spawn mass (After Zehra and Perveen,
 1992)

Hydatina zonata (Lightfoot, 1786) 25mm.
 Shell ivory coloured, encircled by one
 white band bordered with black
 Among stones in sand at low tide.
 (Khan and Dastagir, 1971 as *Hydatina
 velum* (Gmelin, 1791).



(Shell picture courtesy: Moazzam.
 Animal, after Hornell, 1951; Shell after
 Khan and Dastagir, 1971)
 Superfamily Philinoidea Gray, 1850

Family Aglajidae Pilsbry, 1895 (1847)
 Genus *Chelidonura* A. Adams, 1850
Chelidonura electra Rudman, 1970 up
 to 11 cm long .Pure white with bright
 yellow margins and edging
 Shallow sandy areas, possibly associated
 with Porites species of hard coral
 (Ali, 2006)

Family Cylichnidae H. Adams and A.
 Adams, 1854
 Genus *Tornatina* A. Adams, 1850

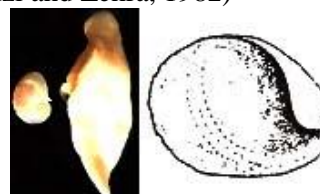
Tornatina townsendi Melvill, 1898 2-
 4mm.
 Sandy beaches
 (Melvill, 1898)



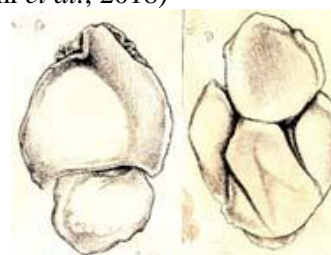
Tornatina zoe Melvill and Standen, 1901
 uncertain > taxon inquirendum
 Sandy beaches
 (Melvill, 1901)

Family Philinidae Gray, 1850
 Genus *Philine* Ascanius, 1772
Philine lima (Brown, 1827)
 Sandy beach
 (Ahmed and Hameed, 1999 as *Bullia
 lineolata* (Wood)

Philine kurodai Habe, 1952
 Shallow waters on soft wet sandy
 beaches, burrowing
 (Tirmizi and Zehra, 1982)



Philine asperta (Linnaeus, 1767) shell
 translucent, white to pale yellow, with
 white dots subtidally to several hundreds
 of meters underwater
 (Kazmi *et al.*, 2018)



Family Haminoeidae Pilsbry, 1895
 Genus *Bakawan* Oskars and Malaquias,
 2019
Bakawan rotundata (A. Adams, 1850)
 Detaic region
 (Oskars *et al.*, 2019)
Bakawan fusca (A. Adams, 1850)
 Tidal, estuarine, mud-flats with oyster
 reefs

(Hamdard *et al.*, 2016 as *Haminoea exarata*, needs verification since being endemic to the north-eastern Chinese and western South Korean coastlines fide: Tchang, 1934; Aslam *et al.*, 2019 as *Haminoea* fide *fusca*)

Genus *Haminoea* Turton and Kingston, 1830

Haminoea tenera Adams, 1858 Shell uniformly pale greenish white Muddy-cum-sandy shores (Khan *et al.*, 1973)

Haminoea natalensis (Krauss, 1848) species inquirenda. Shell and body green, irregular patches and spots of darker shades of green Shallow pools in the rocky area with weeds (Kazmi *et al.*, 1996)



Animal, Shell



Egg spawn, radula

Haminoea elegans A. Adams, 1850 Rocky shores (Iffat, 2005 as *Haminea elegans*; most certainly a misidentification as this species is restricted to the Atlantic Ocean; fide Aslam *et al.*, 2019)



Genus *Atys* Montfort, 1810 *Atys* fide *cylindrica* Hinds, 1779 30 mm.

Littoral, sandy (Kazmi and Khan, 2014; as *Haminoea* sp. Aslam *et al.*, 2019)



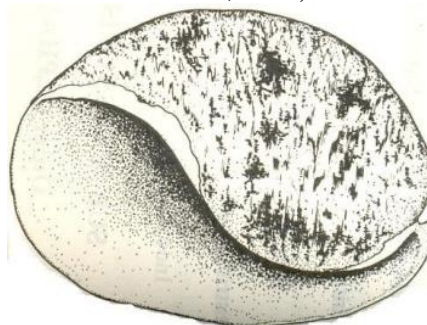
Genus *Haloa* Pilsbry, 1921

Haloa japonica (Pilsbry, 1895) Mangroves, in sheltered waters, mudflats, tide pools (Barkati and Rahman, 2005; this species is of temperate affinities and its presence in Pakistan most presumably a misidentification, fide: Aslam *et al.*, 2019)

Family Bullidae Rafinesque, 1815

Genus *Bulla* Linnaeus, 1758

Bulla ampulla Linnaeus, 1758 Cream with blotches of dark, purple-brown At 3 fathoms, in mud. Sublittoral. In rock and tidal pools association with seaweed, near mangroves (Melvill and Standen, 1901)



(After Tirmizi and Zehra, 1984)

Bulla arabica Malaquias and Reid, 2008 Orangeyellow with bright white dots scattered over cephalic shield, cephalic and parapodial lobes and foot Low intertidal in sheltered lagoons (Malaquias and Reid, 2008) Order Anaspidea Fischer, 1883

Family Aplysiidae Laplysiens Lamarck, 1809

Genus *Aplysia* Linnaeus, 1767

Aplysia argus Rüppell and Leuckart, 1830

Rocky shore

(Kazmi *et al.*, 1996 as *Aplysia benedicti* Eliot)

Aplysia juliana Quoy and Gaimard, 1832 Brown with pale dots

Tide pools

(Engel and Eales, 1957, specimen collected in 1883)

Aplysia oculifera Adams and Reeve, 1850

Rock pools
(Kazmi *et al.*, 1999)



Aplysia parvula Mörch, 1863 40mm.
Occurs consistently in at least two forms, the larger pale-coloured and the tiny black one although other colour forms recorded
Shallow water associated with algae, reef
(Kazmi *et al.*, 2018)



Aplysia sp.1
In weeds
(Kazmi *et al.*, 2018)



Aplysia sp.2 near *Aplysia dactylomela*
In weeds
(Kazmi *et al.*, 2018)



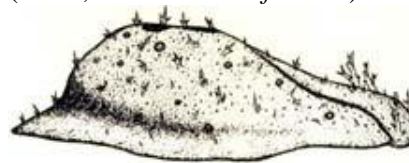
Aplysia cornigera G. B. Sowerby I, 1869
Intertidal zone
(Ghory *et al* 2020 as *Aplysia (Varria) cornigera*)
Genus *Syphonota* Adams, 1854
Syphonota geographica (Adams and Reeve, 1856) 150mm.

At 5m depth, lagoons, bays on sandy beaches
(Ali, 2006)

Family Notarchidae Eales and Engel, 1935

Genus *Bursatella* Blainville, 1817

Bursatella leachii Blainville, 1817 large eye like spots scattered over body, each spot peacock green in centre Mid-tidal zone with seaweeds
(Eales, 1944 as *B. l. africana*)



(After Tirmizi and Zehra, 1982 as *Notarchus*)

Order Sacoglossa Ihering, 1876

Suborder Plakobranchea Jensen, 1996
Superfamily Plakobranchoidea Gray, 1840

Family Plakobrancheidae Gray, 1840

Genus *Elysia* Risso, 1818

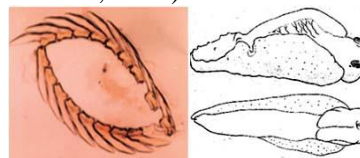
Elysia grandifolia Kelaart, 1858 10cm. or more. Body green with opaque white and black spots, parapodia with black and orange bands at the edge, not separated by white at 8 m. In tidal pools with green algae

(Kazmi *et al.*, 1996 as *Elysia marginata* Pease;



Elysia expansa (O'Donoghue, 1924).

Body deep green to pale yellow, depending upon its feeding state, large green parapodia margined by a black line. Rhinophores pale brown and tubular
Usually found on *Caulerpa* beds
(Kazmi *et al.*, 2018)



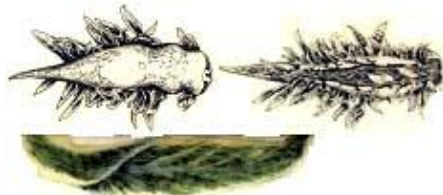
Radula; Dorsal views, ventral view

Elysia near *maoria* Powell, 1937 15 mm. Grass green with white spots, Tips of tail black

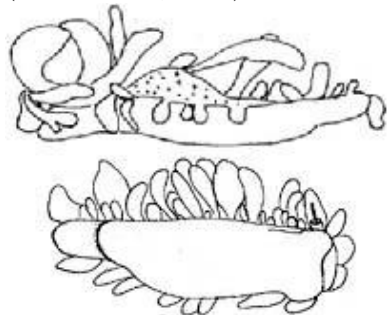
Among weeds on lower shores
(Kazmi *et al.*, 1996)
Superfamily Limapontioidea Gray, 1847
Family Caliphyllidae Thiele, 1931
Genus *Polybranchia* Pease, 1860
Polybranchia orientalis (Kelaart, 1858)
Grayish Yellow with chocolate brown mottling, highly variable in colour, the variation in colour between individuals presumably related to the last algae
Rocky shores
(Kazmi *et al.*, 1996)



Animal and single ceras
Polybranchia viridis (Deshayes, 1857)
Green-brown with white specks
Rocky cum muddy shores, with *Caulerpa*
(Kazmi *et al.*, 1996)
Polybranchia sp.
Associated with green alga *Caulerpa faridii* on rocky shores
(Kazmi *et al.*, 1996)



Animal .Dorsal views, ventral view and single seras
Genus *Cycerce* Bergh, 1871
Cycerce sp. 5.8 mm. Yellow body with green specks Associated with green seaweed
(Kazmi *et al.*, 2018)



Lateral view; ventral view
Order Pleurobranchomorpha WoRMS editors, 2010
Superfamily Pleurobrancoidea Gray, 1827

Family Pleurobranchidae Gray, 1827
Genus *Berthellina* Gardiner, 1936
Berthellina citrina (Ruppell and Leuckart, 1828)
In rock pools attached to under surface of stones
(Kazmi *et al.*, 1996)



Animal and egg ribbon
Genus *Berthella* Blainville, 1824
Berthella stellata (Risso, 1826)
Translucent with opaque white markings
Mid-intertidal zone under rocks
(Kazmi *et al.*, 1996 as *Berthella tupala* Marcus)



Order Nudibranchia Blainville, 1814
Superfamily Dendronotoidea Allman, 1845

Family Tethydidae Rafinesque, 1815
Genus *Melibe* Rang, 1829
Melibe viridis (Kelaart, 1858) Body translucent pink covered with scattered tiny, white-speckled tubercles. Dorsum and cerata bearing brown spots/blotches and rose-pink round tubercles, and a row of yellow-speckled tubercles on distal margin of cerata
Thought to be mostly pelagic
(Gul, 2019 as *Melibe japonica* Eliot)



(After Gul, 2019)
Superfamily Fionoidea Gray, 1857

Family Flabellinidae Bergh, 1889
Genus *Coryphellina* O'Donoghue, 1929
Coryphellina rubrolineata O'Donoghue, 1929 In classic colouration body milky

white to translucent, three reddish to purple continuous or dotted lines run on both side and in the middle of the body, oral tentacles and rhinophores whitish with a mauve to purple ring at two-thirds of their extremity, cerata whitish with a purple ring and with orange tip.

On shallow reef or rocky slopes rich in hydroids

(Collected 1995 ,present study unpublished;Gul, 2019)

Genus *Tenellia* Costa 1866

Tenellia oranta (Baba 1937)

At depth

(Present study)



(Picture courtesy Kamran Shaikh)

Superfamily Phyllidioidea Rafinesque, 1814

Family Phyllidiidae Rafinesque, 1814

Genus *Phyllidia* Cuvier, 1797

Phyllidia ocellata Cuvier, 1804 Mantle bearing yellow tubercles of different sizes. Jetblack bordered in white expand and meander on both sides of mantle forming rings Sides of mantle with small, round black spots.Rhinophores yellow

On coral rubble and reefs

(Gul, 2019)



(Picture courtesy Indus Scuba 2022)

Phyllidia rueppelii (Bergh, 1869) Mantle having three less organized rows of orange-yellow capped tubercles on mid dorsum; one medial and two outer rows, and yellow margin. Ground colour blue-

grey with black on dorsum; black rays on sides forming blue-grey scalloped pattern
Depth 3 m.

(Gul, 2019)

Phyllidia picta Pruvot-Fol, 1957 bearing three rows of orange-yellow capped tubercles on mid-dorsum. Dorsum black forming transverse rays giving bluegrey scalloped pattern on sides. Rhinophores orange-yellow

Depth 14 metres

(Gul, 2019)

Suborder Euctenidiacea Tardy, 1970

Infraorder Doridacea Thiele, 1931

Superfamily Onchidoridoidea Gray, 1827

Family Goniodorididae H. and A. Adams, 1854

Genus *Goniodoris* Forbes and Goodsir, 1839

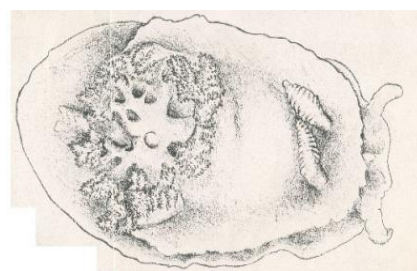
Goniodoris modesta Alder and Hancock, 1864 12mm. Dark brown more or less mottled, gills light brown

Shallow water offshore, down to 25 m. rarely in the inter-tidal zone

(Eliot, 1905)



Animal with egg ribbon



Goniobranchus obsoletus (Rüppell and Leuckart, 1830) mostly white mantle and an orange mantle edge, an irregular band of blue-black just inside the orange margin and the mantle with an orange-brown reticulation between the raised pustules.

The rhinophores and gills translucent brown with white markings.

At 24 m depth



(Courtesy Kamran Shaikh)

Genus *Okenia* Menke, 1830

Okenia sp.1

Under small stone, muddy cum sandy

(Kazmi *et al.*, 1996)



Okenia sp.2

In weeds

(Kazmi *et al.*, 2018)



Okenia sp.3

In weeds

(Kazmi *et al.*, 2018)



Genus *Ancula* Loven, 1846

Ancula sp. With brown dots

Associated with coelenterate colonies in back waters

(Kazmi *et al.*, 2018)



Animal and rhinophore magnified
Superfamily Polyceroidea Alder and
Hancock, 1845

Family Polyceridae Alder and Hancock,
1845

Subfamily Polycerinae Alder and
Hancock, 1845

Genus *Tambja* Burn, 1962

Tambja morosa (Bergh, 1877).60-75
mm.

Tidal pools to 8 m. depth, reef, bryozoans
colonies, in moderately exposed to highly
exposed rocky habitats, particularly
shaded cliffs

(Ali, 2006)

Genus *Crimora* Alder and Hancock, 1862

Genus *Thecacera* Fleming, 1828

Thecacera peningera (Montagu, 1804)

adult length usually between 15 mm - 30
mm., translucent white and the upper side
covered with orange splotches and small
black spots. Foot yellow, and spotted with
tiny orange and black spots. Rhinophore
sheath and gills covered by orange and
black spots.

Occurs from intertidal boundary to
depths of down to 36 metres

(Eliot, 1905 as *Thecacera maculata*; a
complex of several species rather than a
single cosmopolitan species.)



(Photo by Bernard Picton - Own work,
CC BYSA 4.0,

<https://commons.wikimedia.org/w/index.php?curid=36848025>)

Genus *Plocamopherus* Rüppell and
Leuckart, 1828

?*Plocamopherus ocellatus* Rüppell and
Leuckart, 1828 dark brown body with
several large whitish markings

On hard bottom

(Kazmi *et al.*, 1996 as *Risbecia pulchella*)



Plocamopherus, perhaps *maculapodiu* Vallès and Gosliner, 2006. 35mm. red background colour, notum slightly speckled with minute black dots., also present along the margin of the oral veil, on the tip of the posterior portion of the foot, tips of branchiae, clavus of the rhinophores, dorsal tubercles and oral veil appendages. A few black larger spots on the sides of the animal at the base of the foot. The rhinophores at the peduncle have the same red background coloration., the clavus red-brown with a white spot at the tip. Posterior portion of the foot tipped with white

Rocky shores in shallow water
(Kazmi *et al.*, 2018 as *Crimora* sp)



Body uniform brown to reddish brown with some minute white spots, usually in a line around the mantle edge. The colour lightens down the sides of the body, becoming almost yellow on the foot. Dark brown to black spots scattered over the foot, three pairs of lateral processes arranged along the mantle edge, the most anterior pair being about midway between the rhinophores and the gills, and the most posterior pair being just behind the gills, lateral processes white, and the anterior two on each side have branched papillae, while the posterior pair tipped with a spherical tubercle. Anterior mantles with white branched papillae along its edge. From the posterior lateral process on each side an irregular white line runs into the dorsal midline where it joins its partner from the other side and runs posteriorly to the tip of the foot.

Genus *Kaloplocamus* Bergh, 1880

Kaloplocamus ramosus (Cantraine, 1835) probability of occurrence

Inhabits deep water

(AquaMaps, 2019)

Subfamily Kalinginae Pruvot-Fol, 1956

Genus *Kalinga* Alder and Hancock, 1864

Kalinga ornata Alder and Hancock, 1864

130 mm.

In deep coastal waters to tide pools, within intertidal zone; in subtidal waters, and on rocky shores, prefers sandy or silty substrate

(Moazzam *et al.*, 2016)



Subfamily Nembrothinae Burn, 1967

Genus *Tyrannodoris* Willan and Chang, 2017

Tyrannodoris luteolineata (Baba, 1936)

Ground colour black with four green-yellow lines/stripes on dorsum. Head bearing two green-yellow markings between rhinophores and connected with medial lines. Rhinophores black. Gills black with green-yellow rachis

Depth 8 metres

(Gul, 2019)

Superfamily Doridoidea Rafinesque, 1815

Family Dorididae Rafinesque, 1815

Genus *Doris* (Linnaeus, 1758) Cuvier, 1804

Doris cameroni (Allan, 1947) 190mm.

Brown with scattered brown blotches of different shades

Sandy. Intertidal

(Kazmi *et al.*, 1996)



Family Discodorididae Bergh, 1891
 Genus *Sebadoris* Marcus and Marcus, 1960
Sebadoris fragilis (Alder and Hancock 1964) 15-80 mm.
 Intertidal
 (Kazmi *et al.*, 1996 as *Discodoris concinna* Alder and Hancock)



Animal with egg ribbon



Genus *Artachaea* Bergh, 1881
Artachaea sp. Brownish mottled
 Intertidal rocks
 (Kazmi *et al.*, 1996)



Genus *Jorunna* Bergh, 1876
Jorunna funebris (Kelaart, 1858) White body with black spots
 Rock pools, attached to underside of stones, intertidal to subtidal
 (Kazmi *et al.*, 1996 as *Jorunna zania* Marcus)



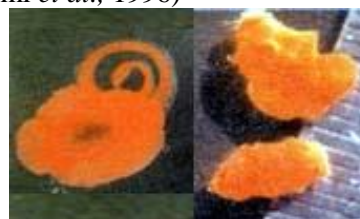
Animal with egg ribbon

Joruna tomentosa (Cuvier, 1804) 2mm.
 Yellow brown body with dark brown spots. Along with seaweed
 (Kazmi *et al.*, 2018)



Animal and radular teeth

Genus *Rostanga* Bergh, 1879
Rostanga muscula (Abraham, 1877) Red orange with dark markings on entire body
 Under rocks in midintertidal zone
 (Kazmi *et al.*, 1996)



Rostanga calumus Rudmann and Avern, 1989, 44 mm.
 Yellow-orange with black spots on yellow central part of notum
 Associated with red sponge
 (Kazmi *et al.*, 2018)



Animal and radula

Family Chromodorididae Bergh, 1891
 Genus *Chromodoris* Alder and Hancock, 1855
Chromodoris orientalis Rudman, 1983
 At depth
 (Kamran Sheikh)



(Picture courtesy Kamran Shaikh)

Genus *Glossodoris* Ehrenberg, 1831

Glossodoris rufomarginata (Bergh, 1890)

Mantle bearing tan-brown coloured speckled pattern on dorsum, submarginal white border and brown margin. Rhinophores and gills brown with white edges, quite variable in colour

Found on rocky bottoms in protected to highly exposed locations, particularly common on shaded cliffs, occasionally occurs in tide pools or in close proximity to its favourite food source -some black sponges of the family Thorectidae

(Gul, 2019)

?*Glossodoris cincta* (Bergh, 1888) three regional colour forms. The southwest Pacific form with a mottled brown body with bluish white (outer), then black, then yellow (inner) bands on the heavily folded mantle edge, and the foot. The Philippines - Indonesia colour form has a bluish outer band on the mantle edge but the inner black and yellow lines tend to merge into a dull khaki band. The East African animals lack a distinct bluish white band at the mantle edge. Pakistani specimen most similar in colour to the african version

(Present study)



(Photo courtesy Kamran Shaikh)

Glossodoris pallida (RüppellLeuckart, 1830)

Body white with opaque white raised markings in the mid dorsal line. Two marks prominent; one large spot behind rhinophores and other, inverted V-

shaped mark. Mantle margin edged with faint yellow. Rhinophores and gills white; tips tinged with yellow

Benthic

(Gul, 2019)



(Photo courtesy Kamran Shaikh)

Genus *Goniobranchus* Pease, 1866

Goniobranchus annulatus (Eliot, 1904)

white with bright yellow raised spots on mantle. Two dark purple-black rings, each around rhinophores and gills; rings completely separated. Rhinophores, gills and mantle margin also tinged with purple-black

Found in rocky habitats in moderately protected to exposed locations at 22-18m depth

(Gul, 2019)



(Picture courtesy Shalwarkush PADI.com)

Goniobranchus decorus (Pease, 1860)

Body translucent grey-white bearing orange border with single row of irregular shape purple spots on inner side and a thin opaque white line running longitudinally parallel to mantle margin encircling rhinophores and gills. Dorsum with similar white line medially bifurcating in Y-shape around gills and without any spots

Found in tide pools and from the low intertidal to 10 m (32 ft) on protected to exposed rocky bottoms

(Gul, 2019)

Goniobranchus tumuliferus (Colling-

wood, 1881) Body white bearing brown-red spots, variably tint with blue and bright

yellow submarginal border on mantle and foot. Mantle below border having blue spots or mixed with red ones and interrupting border. Rhinophores and gills tinged with yellow

Rocky shores, dwells in crevices, 2m.
(Kazmi *et al.*, 1996 as *Chromodoris aspersa*; Kazmi, 2015 as *Chromodoris* near *tumulifera*; Gul, 2019)



(After Kazmi, 1992)

Goniobranchus petechialis (Gould, 1852) 11mm.

Edge bright orange, deep crimson spots
External slopes of coral reefs
(Eliot, 1905 as *Chromodoris petechialis* Gould)



Goniobranchus kuniei (Pruvot-Fol, 1930)

Subtidal.

(Ali, 2006 as *Chromodoris kuniei*)

Goniobranchus cavae (Eliot, 1904) variation in colour occurs. Body white with scattered black polka dots and numerous yellow spots of different sizes; black spots surrounded by white lines. Border of mantle white/free of spots and edged with faint violet shade. Gills and rhinophores tinged violet.

Tidal reefs, rocky reefs and artificial reefs
(Gul, 2019)



(Picture courtesy Kamran Shaikh)

Genus *Hypselodoris* Stimpson, 1855

Hypselodoris ghardaqana

(Gohar and Aboul-Ela, 1957) Body opaque white bearing bright yellow spots on dorsal surface of mantle and foot. Mantle margin and posterior edge of foot deep blue. Rhinophore clubs maroon. Gills white with maroon edges

Rocky reef

(Gul, 2019)

Hypselodoris kanga Rudman, 1977

Rocky reef

(Gosliner *et al.* 2008)

Hypselodoris pulchella (Ruppell and Leuckart, 1828) Brown body with yellow spots, Margin bright violet

Rocky shores in crevices, associated with sponges and weeds

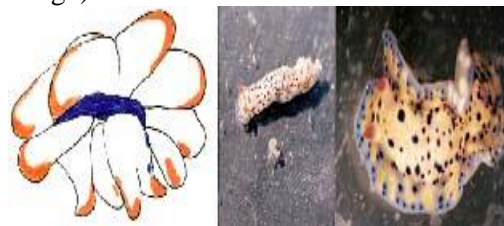
(Kazmi *et al.*, 1996 as *Risbecia pulchella*)

Hypselodoris infucata obscura complex (Ruppell and Leuckart, 1830) 17-21mm. Body covered with black and yellow spots of varying sizes, broken lines of purple spots along the margins, gills white and orange.

Exhibits a high degree of variability in colour pattern and the bright yellow spots. A second colour morph with triangular blue grey patches on the either side of the dorsum

Rocky areas

(Eliot, 1905 as *Chromodoris semperi* Bergh)



Gills and animal

Family Dendrodorididae O'Donoghue, 1924 (1864)

Genus *Doris* Linnaeus, 1758

Doris kerguelenensis (Bergh, 1884), presumably a misidentification

Shallow marine sediments

(Balushi and Wadi, 2022)

Genus *Dendrodoris* Ehrenberg, 1831

Dendrodoris krusensternii (Gray, 1850) 80-90mm. beige, brown and white tubercles

with vivid blue spots in between tubercles. Gills axes dark brown and numerous white dots on outer face, rhinophores brown with white tips
Low tidal zone

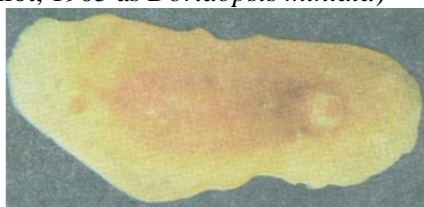
(Khanum and Kazmi, 2016)



Dendrodoris miniata (Alder and Hancock, 1864) 23mm. Pale with center of back black

Intertidal

(Eliot, 1905 as *Doridopsis miniata*)



Dendrodoris nigra (Stimpson, 1856)

On mudflats in intertidal region

(Kazmi *et al.*, 1996)



Dendrodoris nigromaculata (Cockerell and Eliot, 1905)

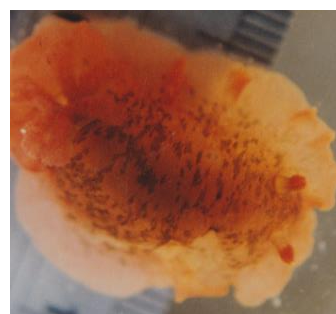
Rocky shores

(Tirmizi and Zehra, 1988)

Dendrodoris fumata (Ruppell and Leuckart, 1831) 8-60 mm. A number of colour morphs: a) pale brown to deep orange in specimens around 8-20 mm; b) pale brown with patches of dark brown or vice versa in specimens around 20-40 mm; and c) pale brown with dark brown or blackish patches in specimens around 40-60 mm)

In weeds at rocky shore It is found mostly in shallow pools and under rocks on muddy reefs.

(Eliot, 1905 as *Doridopsis rubra*)



Superfamily Polyceroidea Alder and Hancock, 1845

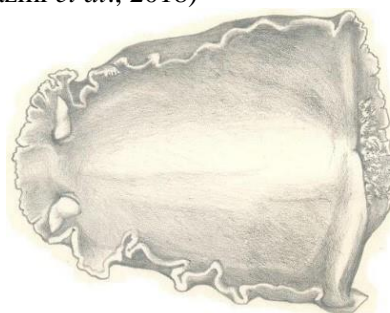
Family Hexabranhidae Bergh, 1891

Genus *Hexabranhus* Ehrenberg, 1828

Hexabranhus sanguineus (Rüppell and Leuckart, 1830) 40 cm.

In caves or around rocks

(Kazmi *et al.*, 2018)

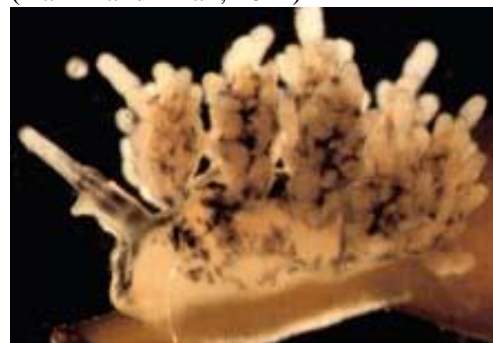


Family Dotoidae Gray, 1853

Genus *Doto* Gray, 1853

Doto cf kya Marcus, 1961 3mm. Body with irregular, brown-black patches, on yellow ground colour Shallow water, floating among hydroids

(Kazmi and Khan, 2014)

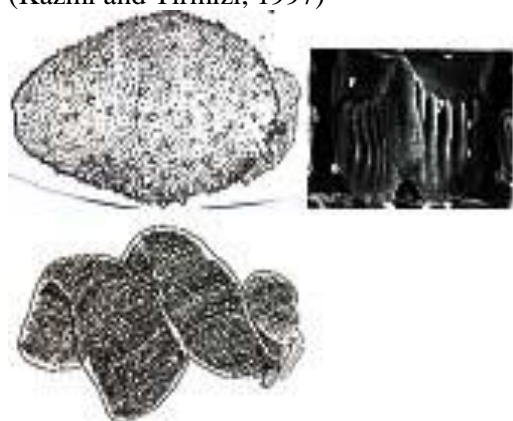


Suborder Dexiarchia Schrödl, Wägele and Willan, 2001

Infraorder Euarminida Odhner, 1939

Superfamily Arminoidea Iredale and O'Donoghue, 1923 (1841)

Family Arminidae Rafinesque, 1814
 Genus *Armina* Rafinesque, 1814
Armina cf babai (Tchang, 1934) 50 mm
 General ground color of live specimens ashy, with two large purplish spots on the notum; head veil ashy with dark brown papillae, some papillae below rhinophores, and the anterior gills yellowish white; posterior gills dark purple; sole yellow
 Rocky-cum-muddy shores, burrow in the sediment, live mainly in deep water (Kazmi and Tirmizi, 1997)



Animal, radular tooth and egg ribbon
Armina fide *punctilopsis* Lin, 1992
 Muddy bottom. Off shore
 (Kazmi and Tirmizi, 1996)



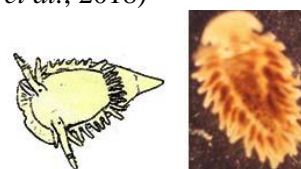
(Left picture after Guangyu, 1992)
Armina cara Marcus, 1971 5 x 27mm.
 Pale brown, yellow mottling
 Sandy beach, low water zone
 (Marcus, 1971)
 Infraorder Dendronotida Odhner, 1934

Family Bornellidae Bergh, 1874
 Genus *Bornella* Gray, 1850
Bornella stellifer (Adams and Reeve in Adams, 1848) Deep reddish-brown with white patches, tips of cerata and papillae with a red band
 Rocky shores, reefs
 (Eliot, 1905 as *Bornella digitata* Adams and Reeve)



Suborder Dexiarchia Schrödl, Wägele and Willan, 2001
 Infra order Aeolidida Cuvier, 1798
 Superfamily Aeolidioidea Gray, 1827

Family Madrellidae Preston, 1911
 Genus *Madrella* Alder and Hancock, 1864
Madrella sp.
 Intertidal pools
 (Kazmi *et al.*, 2018)



Family Tergipedidae Bergh, 1889
 Genus *Cuthona* Alder and Hancock, 1855
Cuthona aff *columbiana* (O'Donoghue, 1922) 20mm. Head with triangle orange blotch. Oral tentacles with orange and white stripes, rhinophores orange
 Low water zone
 (Kazmi and Khan, 2014)



Animal and cerata

Family Facelinidae Bergh in Carus, 1889
 Genus *Phidiana* Gray, 1850
Phidiana militaris (Alder and Hancock, 1864).
 Intertidal zone
 (Kazmi *et al.*, 1996 as *Caloria militaris*)



Family Limapontiidae Gray, 1847
 Genus *Placida* Trinchese, 1876
Placida daguilarensis Jensen, 1990

Associated with green algae
(Kazmi and Khan, 2014)

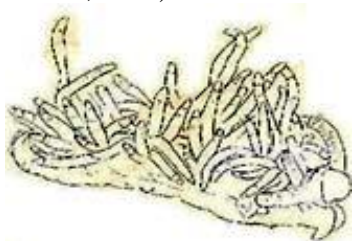


(Animal photo courtesy I. Zehra) single ceras

Genus *Cratena* Bergh, 1864

Cratena sp. 7mm. body off-white, oral tentacles bright orange, cerata off white, with sub apical maroon and orange bands
Intertidal zone with weeds.

(Kazmi *et al.*, 2018)



(Picture courtesy Indus Scuba Divers)

Family Aeolidiidae Gray, 1827

Genus *Anteaeolidiella* M. C. Miller, 2001

Anteaeolidiella indica (Bergh, 1888)

Under rocks

(Kazmi and Khan, 2014)



Animal with egg ribbon

Order Thecosomata Blainville, 1824

Superfamily Cavolinioidae Gray, 1850

Family Creseidae Rampal, 1973

Genus *Creseis* Rang, 1828

Creseis clava (Rang, 1828) 17mm.

Epiplanktonic, from 100 m up to 2,000 m.

(Stubbing, 1933; Nayeem and Zehra, 1995 as *Creseis acicula* Rang)



(After Burnett, 2012)

Creseis virgula Rang, 1828, 4-12mm.

Epiplanktonic

(Stubbing, 1933)



(Picture Source CMarZ)

Genus *Boasia* Dall, 1889

Boasia chierchiae (Boas, 1886) 2.5mm.

Epiplanktonic

(Sakthivel, 1974 as *Creseis bulgia*;

Nayeem and Zehra, 1995 as *Creseis virgula constricta*)

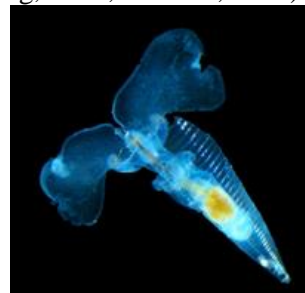


Genus *Hyalocylis* Fol, 1875

Hyalocylis striata (Rang, 1828) 1.1 x 6.0 mm.

Holoplanktonic

(Stubbing, 1933; Frontier, 1968)



Family Cavoliniidae Gray, 1850 (1815)

Genus *Clio* Linnaeus, 1767

Clio pyramidata Linnaeus, 1767 9mm.

Pelagic, known to be an intermediate host for parasitic copepods that eventually infests fish

(Sakthivel, 1977)



(After McGowan, 1968)

Genus *Styliola* Gray, 1810

Styliola subula (Quoy and Gaimard, 1827) 3 x 7.5mm.

Shell transparent, visceral mass rose or red, wings rosecoloured

Holoplanktonic, shells moderately rare in sand samples.

(Stubbing, 1933)

Genus *Diacavolinia* Vander Spoel, 1987

Diacavolinia flexipes Van der Spoel, Bleeker and Kobayasi, 1993 4 x 5.5 mm.

Planktonic

(Stubbing, 1933 as *Cavolina longirostris* Blainville)



Genus *Diacria* Gray, 1850

Diacria costata (Pfeffer, 1879) taxon inquirendum 25mm.

Planktonic

(Leyen and Spoel, 1982)

Diacria quadridentata (de Blainville, 1821 3 x 1.8 to 2.5 mm.

Planktonic

(Stubbing, 1933)



Suborder Pseudothecosomata

Meisenheimer, 1905

Superfamily Cymbulioidea Gray, 1840

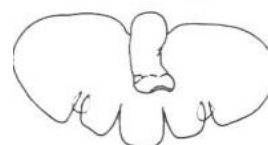
Family Desmopteridae Dall, 1921

Genus *Desmopterus* Chun, 1889

Desmopterus papilio Chun, 1899

Pelagic

(Frontier, 1968)



Suborder Euthecosomata Meisenheimer, 1905

Superfamily Limacinoidea Gray, 1840

Family Limacinidae Gray, 1840

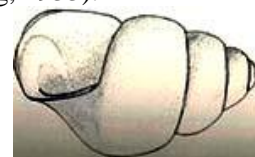
Genus *Limacina* Bosc, 1817

Limacina trochiformis (d'Orbigny, 1836) 7 x 8mm.

Planktonic, common in sand samples (Stubbing, 1933)



Limacina bulimoides (d'Orbigny, 1834) 1.2 x 1.3mm. Holoplanktonic or beached (Stubbing, 1933).



Genus *Heliconoides* d'Orbigny, 1835

Heliconoides inflatus (d'Orbigny, 1834) 0.5 x 1.5mm.

Epipelagic, in the upper 150m. neritic zone, occasionally in large swarms.

(Frontier, 1968 as *Limacina inflata* (d'Orbigny)



Class Bivalvia Linnaeus, 1758
Subclass Protobranchia Pelseneer, 1889
Order Nuculanida Dall, 1889
Superfamily Nuculoidea Dall, 1889

Family Nuculidae Gray, 1924
Genus *Ennucula* Iredale, 1931
Ennucula mullanii (A. Adams, 1856)
12mm.
Intertidal in mud
(Melvill *et al.*, 1906 as *Nucula layardii*)



Genus *Saccella* Woodring, 1925
Saccella bellula (A. Adams, 1856)
7.8mm.
Benthic, infaunal
(Melvill *et al.*, 1906 as *Leda bellula*)



Family Yoldiidae Dall, 1908
Genus *Orthoyoldia* Verrill and Bush, 1897
Orthoyoldia lepidula (A. Adams, 1856)
Offshore muddy and sandy bottom; depth range 50 - 100 m.
(Melvill *et al.*, 1906 in Nuculidae as *Yoldia lepidula* Adams)



(After Poppe, 2008)

Genus *Scissileda* Kilburn, 1994
Scissileda tropica (Melvill, 1897) 18 mm. milky-white within the shell
At 15 fathoms, offshore mud
(Melvill *et al.*, 1906 as *Yoldia tropica* Melvill in Nuculidae)



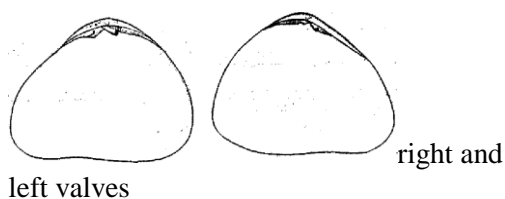
Order Solemyida Dall 1889
Superfamily Solemyoidea Gray, 1840

Family Solemyidae Gray, 1840
Genus *Acharax* Dall, 1908
***Acharax* sp.**
From cold seeps
(Imhoff *et al.*, 2003)



Acharax johnsoni (Dall, 1891)
Methane Seeps, bathymetric ranges from 100 to over 5000m
(Duperron, 2012)
Subclass Autobranchia Grobben, 1894
Order Galeommatida Lemer, Bieler and Giribet, 2019

Family Lasaeidae Gray, 1842
Genus ? *Pseudopythina* P. Fischer, 1878
Pseudopythina ?subsinuta Lischke, 1871
Commensal epibiont, firmly attached to the host by fine byssus threads
Host: *Clorida* sp. (mantis shrimp)
(Tirmizi and Kazmi, 1984 as bivalve sp)



Family Galeommatidae Gray, 1840
Genus *Lepirodes* P. Fischer, 1887
Lepirodes layardi (Deshayes, 1856)
Under stones and in rock crevices at and below low tide
(Florida Museum of Natural History as *Scintilla layardi* Deshayes)
Order Mytilida Ferussac, 1822

Family Mytilidae Rafinesque, 1915
Genus *Perna* Philipson, 1788
Perna viridis (Linnaeus, 1758) 70 -150 mm. brownishgreen
Rocks, creeks, Found attached in shallow intertidal and subtidal
(Melvill *et al.*, 1906 as *Mytilus* (*Chloromya*) *smaragdinus*; Hornell, 1951; Khan and Dastagir, 1972 as *Mytilus viridis*)



(After Khan and Dastagir, 1972)
Perna perna (Linnaeus, 1758)
Rocky shores, also attaches to submerged man-made objects
(Melvill and Standen, 1906 as *Mytilus* (*Chloromya*) *pictus*)



Genus *Modiolus* Lamarck, 1799
Modiolus auriculatus (Krauss, 1848) 70 mm.
Intertidal rocks and stones
(Shah *et al.*, 2003)
Modiolus hanleyi Dunker, 1822
Intertidal zone in mud
(PSF Report, 1977)

Modiolus modulaides (Röding, 1798)
Subtidal zone on sand and mud
(PSF Report, 1977 as *Modiolus metcalfei* Hanley)



Genus *Botula* Morch, 1853
Botula cinnamomea (Gmelin, 1791) 23-35 mm.
Boring in soft rocks, corals and shelly bottom
(Melvill *et al.*, 1906 as *Lithodomus cinnamomeus*, OBIS, 2006)
Genus *Lithophaga* Roding, 1798
Lithophaga sp.

On rocks
(Bahsiruddin 1955-05-25)
Lithophaga attenuata Deshayes, 1836
On rocks
(Melvill *et al.*, 1906 as *Lithodomus attenuatus*)



Lithophaga bisulcata d'Orbigny
Rocky shores, boring in soft rocks
(PSF Report, 1977)
Lithophaga lithophaga (Linnaeus, 1758)
70 mm.
Rocky shores, boring in soft rocks and corals
(PSF Report, 1977)



Lithophaga teres (Philippi, 1846) 45-80 mm. Glossy black brown
Rocky shores, in soft rocks, intertidal region
(Khan and Dastagir, 1972)



(After Khan and Dastagir, 1972)

Lithophaga nigra (d'Orbigny, 1853)
Rocky shores, in soft rocks, intertidal region
(Khan and Dastagir, 1972)



Lithophaga malaccana Reeve, 1857
Rocky shores, in soft rocks, intertidal region
(Reeve, 1857 as *Lithodomus malaccanus* Reeve)

Genus *Musculus* Roding, 1798

Musculus discors (Linnaeus, 1767) 15mm.

Intertidal mud and rocks
(PSF Report, 1977 as *Musculus laevigatus* (Gray))



Musculus cumingiana (Dunker, 1857)
40 mm. Shiny dark brown
Intertidal with squirts and sponges, 3 to 7 fathoms
(Melvill *et. al.*, 1906 as *Modiolaria cumingiana*; OBIS, 2006)



Genus *Mytilus* Linnaeus, 1758
Mytilus edulis Linnaeus, 1758 100 mm.
Brown and black, attached to intertidal rocks
(PSF Report, 1977)



Genus *Septifer* Dunker, 1848
Septifer excisus (Wiegmann, 1837) 10-15 mm., straw to dark purple
Intertidal rocks and corals
(Melvill *et al.*, 1906; Siddiqui and Aslam, 2017)



Genus *Brachidontes* Swainson, 1840
Brachidontes variabilis (Krauss, 1848)
Found intertidal on mangrove trees and oyster-covered rocks
(Melvill *et al.*, 1906 as *Mytilus variabilis*)
Brachidontes pharaonis (Fischer, 1870)
On loose stones and rocks at low tide
(Melvill *et al.*, 1906 as *Mytilus variabilis*; *Brachydontes karachiensis*)



Genus *Solamen* Iredale, 1924
Solamen persicum (Smith, 1906) 10 mm.
Sand, deep water
(Melvill *et al.*, 1906 as *Crenella adamsiana*)



Order Arcida Stoliczka, 1871

Family Arcidae Lamarck, 1809
Genus *Arcopsis* Koenen, 1844
Arcopsis sculptilis Reeve, 1844
Creeks, rocky shores
(Melvill and Standen, 1906 as *Barbatia (Acar) sculptilis*)
Genus *Arca* Linnaeus, 1758
Arca avellana Lamarck, 1819 30mm.

Rocky shores, intertidal
(PARC Report, 1986 as *A. arabica*
Philippi, OBIS, 2006)



Arca navicularis Bruguiere, 1789 30 mm. yellowish

Sandy shores, attached to marine algae
(Khan and Dastagir, 1972)



(After Khan and Dastagir, 1972)

Arca imbricata Bruguiere, 1789 80 mm. Brown in colour

Subtidal mud, rocks and rubbles
(Melvill *et al.*, 1906 as *Barbatia imbricata*; IT IS)



Genus *Anadara* Gray, 1847

Anadara rufescens (Reeve, 1844)

Subtidal

(Melvill *et al.*, 1906 as *Arca rufescens*,
OIBS, 2006)

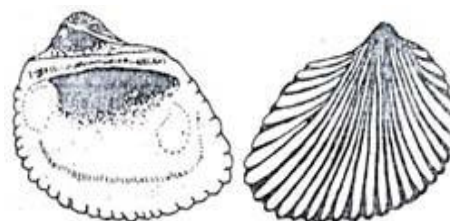


*Anadara gubernaculum*s (Reeve, 1844)

Colour variable, orange or red with
darker radial streaks or purplish with
lighter radial streaks

Coral reef, creek rocks

(Khan and Dastagir, 1972 as *Arca gubernaculum*s)



(After Khan and Dastagir, 1972)

Anadara antiquata (Linnaeus, 1758)
100mm.

Offshore and in muddy sand, intertidal,
mangrove roots

(Moazzam and Ahmed, 1994)



Anadara oceanica (Lesson, 1831) 60 mm.

Subtidal zone, in mud and sand
{ PARC Report, 1986 as *Anadara*
(*Scapharca*) *maculosa* }



Anadara satowi (Dunker, 1882)

Offshore sand

(PARC Report, 1986)

Anadara troscheli (Dunker, 1882)

Offshore sand

(PARC Report, 1986 as *Anadara*
(*Scapharca*) *troscheli*; OBIS, 2006)

Anadara uropygimelana (Bory, 1824)

Intertidal rocks and crevices

(Dance, 1992)

Anadara rhomboidalis (Schumacher,
1817).

Creeks, sandy muddy

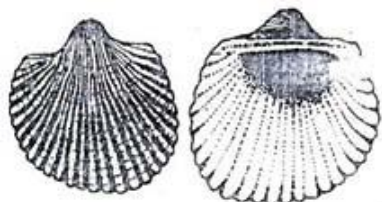
(Khan and Dastagir, 1972 as *Arca*
rhomboidalis Linnaeus)



Anadara cymbaeformis Reeve, 1844

Sandy shore

(Melvill *et al.*, 1906 as *Barbatia cymbaeformis*)
Anadara inaequalvis (Bruguière, 1789)
 30mm.
 Offshore, intertidal sand and shell gravel
 (Khan and Dastagir, 1972 as *Arca inaequalvis*)



(After Khan and Dastagir, 1972)

Anadara indica (Gmelin, 1791) 40mm.
 Offshore
 (Reeve, 1844; Khan and Dastagir, 1972 as *Arca indica*)

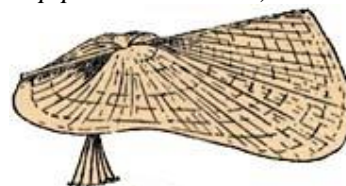


Anadara sativa (Bernard, Cai and Morton, 1993)
 Offshore sand
 (PARC Report, 1986 as *A. (Scapharca) subcrenata*; OBIS, 2006)
Anadara natalensis (Krauss, 1848)
 Benthic; depth range 125 - 200 m.
 (Ghani *et al.*, 2018)



Genus *Tegillarca* Iredale, 1939
Tegillarca rhombea (Born, 1778)
 Littoral
 (PSF Report, 1977 as *Anadara rhombea*; OBIS, 2006)
Tegillarca granosa (Linnaeus, 1758) 53 mm.
 Backwaters and estuaries, muddy bottoms of intertidal, subtidal, backwaters and coastal waters
 (PSF Report, 1977 as *Anadara granosa* Linnaeus)
 Genus *Trisidos* Roding, 1798

Trisidos tortuosa (Linnaeus, 1758)
 120mm. colour white
 Sandy, dirty muddy bottom, loose rocks, offshore, 3- 17 fathoms
 (Melvill and Standen, 1906 as *Parallelipedumtortuosum*)



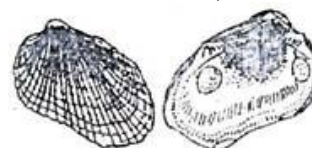
(After Hornell, 1951)

Genus *Acar* Gray, 1857
Acar plicata (Dillwyn, 1817).
 Shallow subtidal, sand rocky bottom, 50-150m.
 (Melvill and Standen, 1906 as *Barbatia divaricata*; OBIS, 2006)
 Genus *Mesocibota* Iredale, 1939
Mesocibota bistrigata (Dunker, 1866)
 33-38mm.
 On rocks at low tide.
 (Melvill *et al.*, 1906 as *Arca bistrigata*; Oliver *et al.*, 1993)



(After Khan and Dastagir, 1972)

Genus *Barbatia* Gray, 1942
Barbatia velata (Sowerby, 1843)
 Intertidal rocks
 (Shah *et al.* 2003 as *Arca velata*)
Barbatia foliata (Forsskål in Niebuhr, 1775)
 Intertidal rocks
 (PARC Report, 1986 as *Barbatia lima* Reeve)
Barbatia complanata (Bruguière, 1789)
 25-40 mm., surface brownish white
 Rocky shores, attached to the under side of rocks
 (Khan and Dastagir, 1972 as *Arca complanata*; OBIS, 2006)



(After Khan and Dastagir, 1972)

Barbatia virescens (Reeve, 1944)

Rocky shores, attached to the rocks
(PARC Report, 1986)
Barbatia obliquata Wood, 1828 60 mm.
Littoral, sublittoral, attached to the rocks
and crevices
(Khan and Dastagir, 1972)



(After Khan and Dastagir, 1972)

Barbatia virescens (Reeve, 1844)
In crevices
(PARC Report, 1983 as *Virescens
obtusoides*; OBIS, 2006)

Barbatia amygdalumtostum (Roding,
1798)
Under rocks and corals
(Dance, 1992)



Barbatia foliata (Forskål, 1775)
Under rocks. Littoral and sublittoral
(Dance, 1992)



Family Noetiidae Stewart, 1930
Genus *Didimacar* Iredale, 1939
Didimacar tenebrica (Reeve, 1844) 6.75-
15.25mm.
Creeks, benthic, intertidal zone on rocks,
under stones in lower shore
(Melvill *et al.*, 1906 as *Barbatia (Acar)
tenebrica*)



Family Glycymerididae Dall, 1908
(1847)
Genus *Glycymeris* Da Costa, 1778

Glycymeris taylori (Angas, 1879)
On shallow seabed in heterogeneous-
grained sediments
(Melvill *et al.*, 1906 as *Pectunculus
taylorianus*)
Glycymeris spurcus Reeve, 1843 nomen
dubium
On shallow seabeds in heterogeneous-
grained sediments
(Melvill and Standen, 1906 as
Pectunculus spurcus)
Glycymeris livida (Reeve, 1843) 65 mm.
Sandy beaches
(Melvill *et al.*, 1906 as *Pectunculus
lividus* in Arcidae; OBIS, 2006)



(Photo source Femorale)

Glycymeris reevei (Mayer, 1868)
Shallow water sand
(Dance, 1992)



Genus *Tucetona* Iredale, 1939
Tucetona pectunculus (Linnaeus, 1758)
Found at and just below the surface of
coarse sand or fine gravel substrate
(Melvill *et al.*, 1906 as *Pectunculus
(Axinea) pectiniformis*)



Genus *Striarca* Conrad, 1826
Striarca symmetrica (Reeve, 1844) 3mm.
Creeks, rocky shores. Attached by byssus
to rock or stone in shallow water
(Melvill *et al.*, 1906 as *Barbatia (Acar)
symmetrica*; Khan, *et. al.* 1973 as *Arca
symmetrica*; OBIS, 2006)



Genus *Verilarca* Iredale, 1939
Verilarca sinensis Thiele and Jaeckel, 1931
 Intertidal
 (Oliver, 1985)
 Order Arcoidea Lamarck, 1809

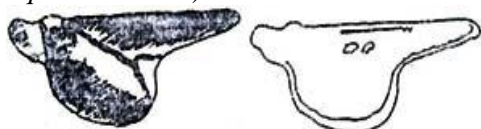
Family Cucullaeidae Stewart, 1930
 Genus *Cucullaea* Lamarck, 1801
Cucullaea labiata (Lightfoot, 1786)
 10cm.
 Found buried in sandy or muddy substrates
 (Kazmi *et al.*, 2018)



(After Kazmi *et al.*, 2018)
 Superfamily Pterioidea Gray, 1847
 (1820)

Family Pteriidae Gray, 1847
 Genus *Pteria* Scopoli, 1777
Pteria peasei (Dunker 1872).
 Attached by byssus to whip corals or debris
 (PSF Report, 1977)

Pteria heteroptera (Lamarck, 1819) 3-8mm.
 Attached by byssus on zoophytes
 (Khan and Dastagir, 1972 as *Pteria inquinata* Reeve)



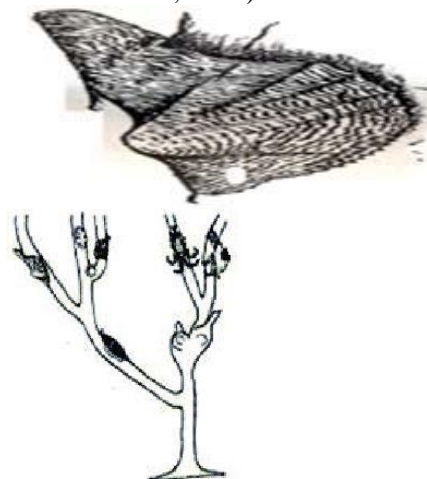
(After Khan and Dastagir, 1972)



(Picture taken from WoRMS)

Pteria penguin (Röding, 1798)
 Intertidal zone, on rock and coral usually with gorgonia
 (Shah *et al.* 2003 as *Pteria macroptera* Lamarck)

Pteria avicular (Holten, 1802)
 With gorgonia
 (Kazmi and Naushaba, 2002 as ?*Pteria chinensis* Leach, 1814)



on host gorgonia

Pteria tortirostris (Dunker, 1849) 29 mm.
 Benthic; depth range 0 - 180 m.
 (Kazmi *et al.*, 2018)



Family Isognomonidae Woodring, 1925
 (1828)
 Genus *Isognomon* Lightfoot, 1786
Isognomon legumen (Gmelin, 1791)
 Intertidal to subtidal. Sedentary, epifauna
 (Kazmi *et al.*, 2018)



Family Margaritidae Blainville, 1824
 Genus *Pinctada* Röding, 1798
Pinctada margaritifera (Linnaeus, 1758)
 shade of green on dark ground colour with radial lines of white spots
 8 fathoms, in muddy sand
 (Melvill and Standen, 1900)



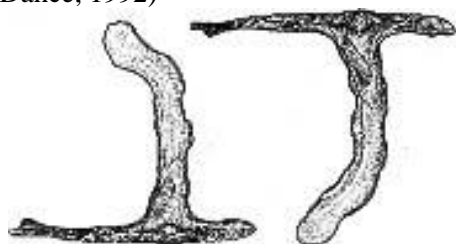
(Courtesy Animal Diversity Web, 2023 at https://animaldiversity.org/collections/contributors/Grzimek_inverts/Bivalvia/Pinctada_margaritifera/2004."Pinctada_margaritifera.jpg)

Pinctada imbricate Röding, 1798 50-80mm. greenish-brown
Low tide mark, intertidal rocks, stones (Khan and Dastagir, 1972 as *Pinctada vulgaris* Schumacher)



(After Khan and Dastagir, 1972)

Family Malleidae Lamarck, 1819
Genus *Malleus* Lamarck, 1799
Malleus legume Reeve, 1858
Intertidal rocks
(PSF Report, 1977 as *Malleus irregularis* Jousseaume)
Malleus albus Lamarck, 1819
Shallow water sand
(Dance, 1992)



Left valve. Right valve

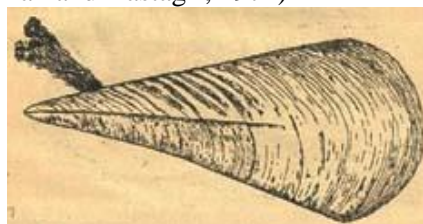
Malleus regula (Forsskål in Niebuhr, 1775) 70mm. colour pattern variable, brown-purple throughout to greyish-yellow with purple brown spots to greyish yellow
At depths 1.5-59 m, in rock crevices or under stones. Attached by byssus among rocks, stones and coral debris (Kazmi *et al.*, 2015)



Malleus regula (Forsskål in Niebuhr, 1775) 70mm. colour pattern variable, brown-purple throughout to greyish-yellow with purple brown spots to greyish yellow

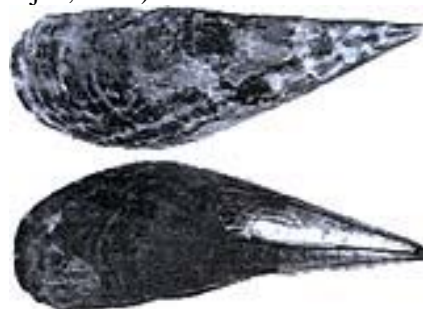
At depths 1.5-59 m, in rock crevices or under stones. Attached by byssus among rocks, stones and coral debris (Kazmi *et al.*, 2015)

Family Pinnidae Leach, 1819
Genus *Pinna* Linnaeus, 1758
Pinna atropurpurea Sowerby, 1825
Intertidal sand or mud, in soft substratum (Khan and Dastagir, 1972)



(After Hornell, 1951)

Pinna bicolor Gmelin, 1791 200-250 mm.
Creeks, sandy mud and gravel in shallow water below low tide (Ranjha, 1960)



(After Zehra, 2001)

Pinna deltodes (Menke, 1843)
Hard substrate, either within cobble flats or beneath boulders, coral blocks, and rock pools, intertidal zone to 14.0m (Scheltema, 1983)
Pinna muricata Linnaeus, 1785 186-340 mm. shell usually reddish brown with few dark yellowish to reddish brown radiating bands on posterior half

Buried in sand or silty mud among rocks in shallow water
(Tirmizi and Kazmi, 1994 as pinnid; Zehra, 2001)



(After Tirmizi and Kazmi, 1994 with pair of commensal shrimp taken out)

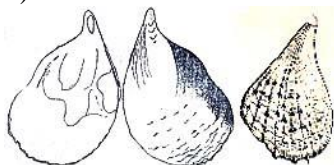
Genus *Atrina* Gray, 1842

Atrina fragilis Pennant, 1777 220-347 mm, half of shell besides dorsal margin dark brown and half adjacent to ventral margin blackish brown shells buried in muddy substratum. Attached (PSF Report, 1977; Sultana and Jamil, 2012 as *Pinna fragilis*)

Atrina vexillum Born, 1778 350-450 mm. Outside of shell dark reddish brown to nearly black, usually dull; shell material semitranslucent, appearing a rich reddish purple, interior dark brown to black, iridescent on nacreous area

In sand and mud, in sandy-mud bottoms, or in sandy patches on reefs, sublittorally, from extreme low tide to a depth of about 35 m.

(Melvill, *et al.*, 1906 as *Pinna (Atrina) vexillum*; Ranjha, 1960 as *P.vexillum* and *P. nigra*)

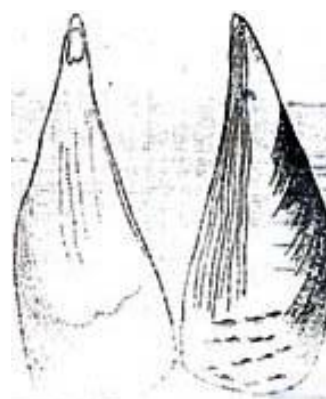


(Left after Khan and Dastagir, 1972; Right after Tirmizi and Zehra, 1982)

Atrina pectinata (Linnaeus, 1767) Up to 37 x 20 cm. Outside of shell slightly shiny, translucent olivaceous tan often tinged with darker purplish brown or grey toward the umbones. Interior similarly coloured, iridescent on nacreous area

Offshore, in mud, sand or fine gravel, On muddy bottoms. Intertidal and sublittoral to a depth of 25 m.

(Khan and Dastagir, 1972)



(After Khan and Dastagir, 1972)
Order Limida Moore, 1952

Family Limidae Rafinesque, 1815

Genus *Limea* Bronn, 1831

Limea juglandula (Melvill and Standen, 1907)

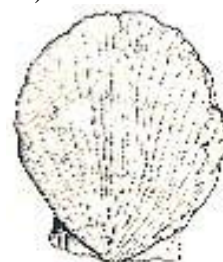
Shallow waters, benthic, Shell-sand (Melvill and Standen, 1907)

Genus *Lima* Bruguiere, 1797

Lima vulgaris Link, 1807

Shallow waters

(Dance, 1992)



Lima sp.

Under rocks.

(Kazmi, 1993)

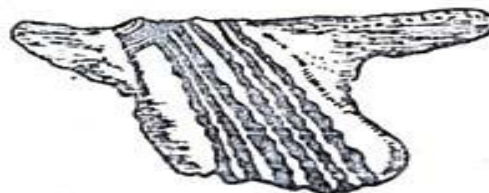


Genus *Pterelectroma* Iredale, 1939

Pterelectroma physoides (Lamarck, 1819) 6-10mm. brown and white stripes

Upon a zoophyte *Halichornaria*

(Khan and Dastagir, 1972 as *Pteria zebra*)

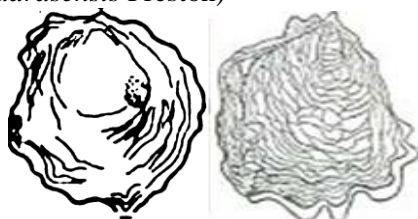


(After Khan and Dastagir, 1972)

***Atrina pectinata* (Linnaeus, 1767)** Up to 37 x 20 cm. Yellow-horns to darker brown, occasionally with few darker patches
Offshore, in mud, sand or fine gravel
(Khan and Dastagir, 1972)
Order Limoida Waller, 1978

Family Osteridae Rafinesque, 1815
Genus *Crassostrea* Sacco, 1897
Crassostrea bilineata (Röding, 1798)
Marine to brackish water areas of estuaries. Intertidal zone and sublittorally to a depth of about 20 m
(Psomadakis *et al.*, 2015)

Crassostrea glomerata Gould, 1850
Low tide marks on rocks.
(Hasan, 1960 as *Ostrea glomerata*)
Crassostrea madrasensis Preston, 1916
40-85mm.
Creeks, at low tide, attached to dead shells or other hard objects and stones
(Ahmed, 1971 as *Crassostrea virginica* Gemlin; Ansari and Ahmed, 1972 as *Crassostrea elongata*; Khan and Dastagir, 1972 as *Crassostrea madrasensis* Preston)



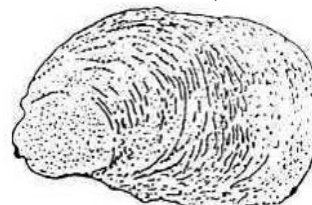
Genus *Magallana* Salvi and Mariottini, 2016

Magallana belcheri (G. B. Sowerby II, 1871)
(Hasan, 1960 as *Crassostrea belcheri* Sowerby, 1871)



Magallana rivularis (Gould, 1861) taxon inquirendum 50-150 mm. Outside of shell whitish to dull green; interior of valves porcelaneous white, with pearly white muscle scar
Low tide marks, attached either to dead shells or other hard objects or stones.

Brackish water areas of estuaries, backwaters, mangroves. Intertidal zone and shallow subtidal water to about 5 m deep
(Awati and Rai, 1931 as *Ostrea discoidea*; Ahmed, 1971 as *Crassostrea rivularis* Gould; Khan and Dastagir, 1972 as *Crassostrea discoidea*)



Magallana gryphoides (Schlotheim, 1820) 6 - 7 inches
Subtidal and low tide area
(Ranjha, 1960 as *Ostrea gryphoides*; Ali, 2012 as *Crassostrea gryphoides* (Afsar *et al.*, 2014). The status of the extant species is unclear)



Magallana bilineata (Röding, 1798)
Outside of shell dirty white, often flushed with pale greyish brown; interior of valves whitish and shiny, often with irregular areas of chalky white, deep purple-brown to blackish on posterior adductor scar (sometimes also on inner margins).
Marine to brackish water areas of estuaries. Intertidal zone and sublittorally to a depth of about 20 m.
(Psomadakis *et al.*, 2015 as *Crassostrea bilineata* (Röding); Aslam *et al.*, 2020)
Magallana cuttackensis (Newton and E. A. Smith, 1912) uncertain, taxon inquirendum

Intertidal reef habitat

(Aslam *et al.*, 2020)

Magallana ariakensis (Fujita, 1913)

Muddy beds. Adheres to other objects by the umbronal part of the left valve

(Asif, 1979)

Genus *Hytissa* Stenzel, 1971

Hytissa quercinus (G. B. Sowerby II, 1871)

Benthic

(Hasan, 1960 as *Ostrea quercina* Sowerby)

Genus *Dendostrea* Swainson, 1835

Dendostrea sandwichensis Sowerby in Reeve, 1871

Mid to low-tide zone; attached to pier pilings, corals and rocks

(Siddiqui and Ahmed, 2002 as *Ostrea nomads*)



(Line drawing after Hornell, 1951)

Dendostrea folium Linnaeus, 1758

Outside of shell with different shades of yellowish brown to purplish brown, usually with some darker radial lines or streaks; interior of shell glossy white with outer shell colour toward the margins and often iridescent patches of olive yellow.

On rocks, dead shells or seawhip stems, in marine and estuarine waters. Common in mangrove areas. Lower intertidal zone and sublittorally to a depth of 10 m or more.

(Ranjha, 1960 as *Ostrea folium*)



Genus *Saccostrea* Dollfus and Dautzenberg, 1920

Saccostrea cucullata (Born, 1778) 40 mm

Attached to rocks

(Ranjha, 1960 as *Ostrea cucullata*)



Saccostrea echinata (Quoy and Gaimard, 1832)

Subtidal rocks and gravel (Siddiqui and Ahmed, 2002)

Saccostrea scyphophilla (Peron and Lesueur, 1807)

Attached to rocks

(Tirmizi and Barkati, 1985)

Genus *Pustulostrea* Harry, 1985

Pustulostrea australis (Lamarck, 1819)

Rocky shores

(Ranjha, 1960 as *Saccostrea tuberculatum* Lamarck)

Subfamily Lophinae Vialov, 1936

Genus *Lopha* Röding, 1798

Lopha cristagalli Linnaeus, 1758

Shallow subtidal, attached, coral reef, mangrove

(Siddiqui and Ahmed, 2002 as *Ostrea cristagalli*)



(Photo courtesy Moazzam)

Order Pectinida Gray, 1854

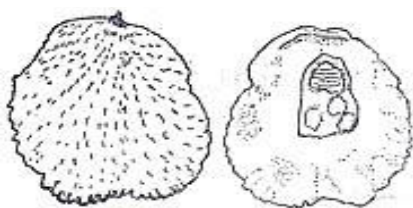
Superfamily Anomioidea Rafinesque, 1815

Family Anomiidae Rafinesque, 1815

Genus *Anomia* Linnaeus, 1758

Anomia achaeus Gray, 1849 45mm. translucent reddish-brown

Attached to the rocks and any hard object in intertidal region, parasitic on *Placenta* (Melvill *et al.*, 1906)



(After Khan and Dastagir, 1972)

Anomia chinensis Philippi, 1849

On intertidal rocks
(PARC Report, 1986)

Anomia sol Reeve, 1859

Creeks, attached to the rocks and other shells

(Khan *et al.*, 1973)

Genus *Isomonnia* Dautzenberg and H. Fischer, 1897

Isomonnia umbonata Gould, 1861.

Intertidal rocks and mangroves, attached to oyster shells

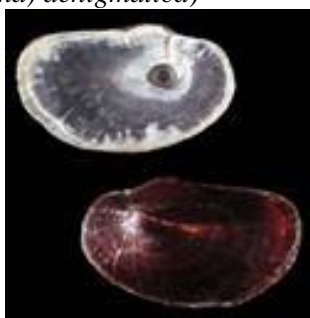
(Tirmizi and Barkati, 1985 as *Monia umbonata*)

Genus *Enigmonia* Iredale, 1918

Enigmonia aenigmatica Sowerby, 1825

Intertidal, occurs on the leaves and exposed roots of mangroves over an uncertain area

(Melvill *et al.*, 1906 as *Anomia (Aenigma) aenigmatica*)



(After Poppe, 2015)

Family Placunidae Gray, 1842

Genus *Placuna* Lightfoot, 1786

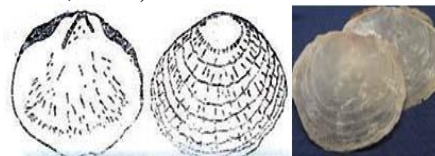
Placuna placenta Linnaeus, 1758 80-100 mm.

Outside of shell silvery white with a dull finish, occasionally with pale brown or light purplish rays towards the umbones; interior nacreous white.

On the surface of soft muddy to sandy mud bottoms, from low tide levels to a depth of about 100 m. Natural beds range from 4 to 20 m deep. Abundant in quiet waters of

lagoons, protected bays and mangrove areas, or near estuaries

(Melvill *et al.*, 1906 as *Placenta orbicularis* in family Anomiidae; Hornell, 1951)



(Line drawings after Khan and Dastagir, 1972)

Family Propeamussiidae Abbott, 1954

Genus *Propeamussium* de Gregorio, 1884

Propeamussium caducum Smith, 1894 29mm.

Soft substrata of mud or muddy sand at a bathyal range of -90–1500 m.

(Melvill *et al.*, 1906 as *Amusium caducum* in Pectinidae)

Genus *Parvamussium* Sacco, 1897

Parvamussium cristatellum

(Dautzenberg and Bavay, 1912)

Offshore

(Foster, RV Anton Bruun 04b, 1963)

Family Pectinidae Wilkes, 1810

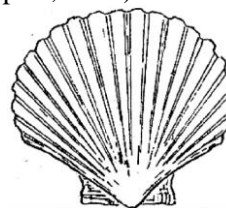
Genus *Chlamys* Röding, 1798

Chlamys senatorius Gmelin, 1791

brilliantly iridescent green

Rocks at low tide zone

(PARC Report, 1986)



(After Harnoll, 1951)

Chlamys gibbus Linnaeus, 1758 90mm.

Rocks at low tide zone

(PSF Report, 1977)



(After Tirmizi and Zehra, 1984)

Chlamys coruscans Hinds, 1845

Low tide zone

(Shah *et al.*, 2003)
 Genus *Decatopecten* Sowerby, 1839
Decatopecten amiculum (Philippi, 1851)
 very colourful
 Shallow subtidal mud and sand
 (Melvill *et al.*, 1906 as *Pecten flabelloides*)



Decatopecten plica (Linnaeus, 1758)
 37mm
 Shallow subtidal mud and sand
 (Melvill *et al.*, 1906 as *Pecten plica*)



(Photo source WMSDB)
 Genus *Laevichlamys* Waller, 1993
Laevichlamys lemniscata Reeve, 1853
 Rocks and corals
 (Melvill *et al.*, 1906 as *Pecten luculentus*)
 Genus *Mimachlamys* Iredale, 1929
Mimachlamys senatoria Gmelin, 1791
 Shallow subtidal on all substrate
 (Melvill *et al.*, 1906 as *Pecten layardi* and *P. senatorius*)
Mimachlamys crassicostata (Sowerby, 1842)
 Rocks at low tide zone, below littoral
 (Fatima, 1972 as *Pecten crassicostatus* Sowerby; PARC Report, 1986 as *Chlamys crassicostatus*; OBIS, 2006)
Mimachlamys townsendi (Sowerby III, 1895) 60-110mm. reddish brown
 On subtidal sand/rocky area
 (Melvill and Standen, 1906 as *Pecten townsendi*)



(Left image after Khan and Dastagir, 1972)

(Coloured Photos courtesy Moazzam)
 Genus *Pecten* O. F. Müller, 1776
Pecten dorotheae Melvill in Melvill and Standen, 1907
 (NMNH)
 Genus *Haumea* Dall, Bartsch and Rehder, 1938
Haumea minuta (Linnaeus, 1758)
 Subtidal rocks, continental shelf
 (Shah *et al.* 2003 as *Chlamys inaequalvi*, OBIS, 2006)
 Genus *Gloripallium* Iredale, 1939
Gloripallium pallium (Linnaeus, 1758)
 Attached, intertidal rocks, mud, corals
 (Shah *et al.*, 2003; OBIS, 2006)
Gloripallium spiniferum Sowerby, 1835
 Attached, Intertidal rocks
 (Shah *et al.*, 2003)
 Genus *Comptopallium* Iredale, 1939
Comptopallium radula Linnaeus, 1758
 Low tide area
 (Shah *et al.*, 2003)

Family Spondyliidae Gray, 1826
 Genus *Spondylus* Linnaeus, 1758
Spondylus layardi Reeve, 1856
 Rocky shores, corals
 (Melvill *et al.*, 1906; Khan and Dastagir, 1972)



(After Gravely, 1941)

Spondylus candidus Lamarck, 1819
 Intertidal rocks and coral
 (PSF Report, 1977)



(After Tirmizi and Zehra, 1982)
Spondylus linguafelis Sowerby, 1847
 Corals

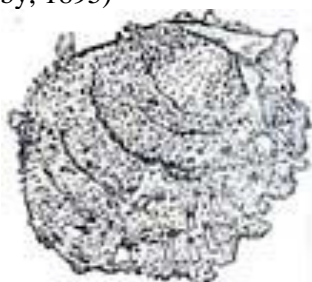
(Dance, 1992)

Spondylus gloriandus Melvill and Standen, 1907

Corals; on dead or other substances (OBIS)

Spondylus exilis Sowerby III, 1895 shell orange and pink near umbo

Deep water, adhering to rocks (Sowerby, 1895)



(After Khan and Dastagir, 1972)

Family Plicatulidae Gray, 1854

Genus *Plicatula* Lamarck, 1801

Plicatula australis Lamarck, 1819

Attached to a hard surface by the right valve.

(Melvill *et al.*, 1906 as *Plicatula depressa* Lamarck in Spondylidae)

Subterclass Heterodonta Neumayr, 1884

Order Gastrochaenida Lange de Morretes, 1949

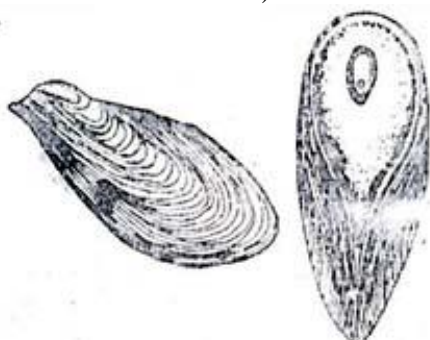
Family Gastrochaenidae Gray, 1840

Genus *Gastrochaena* Spengler, 1783

Gastrochaena cuneiformis Spengler, 1783 10-25mm. reddish brown

At low tide in mud and sand

(Khan and Dastagir, 1972 as *Gastrochaena lamellosa*)



(After Khan and Dastagir, 1972)

Gastrochaena sp.

From rocky shore

(Kazmi and Manning, 2003 as host of pea crab)



Genus *Lamychaena* Freneix, 1979

Lamychaena sp.

Boring in rocks

(AMNH 181372)

Genus *Ruditapes* Chiamenti, 1900

Ruditapes decussatus (Linnaeus, 1758) 39mm.

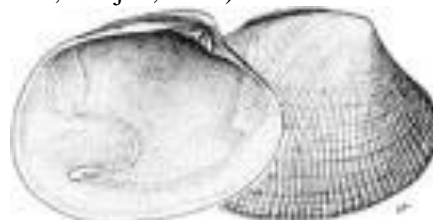
Infaunal in mud or sand

(Melvill, 1906 as *Cryptodon decussatus* Ad.; PSF Report, 1977 as *Venerupis decussata* Linnaeus)

Ruditapes philippinarum (Adams and Reeve, 1850) Extremely variable in colour and pattern, white, yellow or light brown, sometimes with rays, steaks, blotches or zigzags of a darker brown, slightly polished; inside of shell polished white with an orange tint

Mud flats at low tide

(Melvill *et al.*, 1906 as *Tapes (Amygdala) indica*; Ranjha, 1960).



Family Basterotiidae Cossmann, 1909

Genus *Basterotina* Coan, 1999

Basterotia arcuala Melvill, 1898

Commensals with burrowing echiuran worms in mud and sand

(Melvill, 1898)



Order Lucinida Gray, 1854

Family Thyasiridae Dall, 1900 (1895)
 Genus *Leptaxinus* Verrill and Bush, 1898
Leptaxinus indusarium Oliver and Levin, 2006.
 Low oxygen zone , m between 800-1000 m
 (Oliver and Levin, 2006)

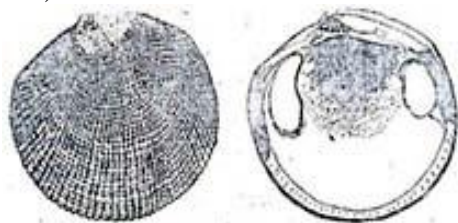


(Source: Amgueddfa Cymru - National Museum Wales, Cardiff)

Family Lucinidae Fleming, 1828
 Genus *Codakia* Scopoli, 1777
Codakia punctata (Linnaeus, 1758) ..25-30mm., white, yellowish within, deep rose round th edge
 Intertidal sand, corals
 (Khan and Dastagir, 1972; OBIS, 2006)

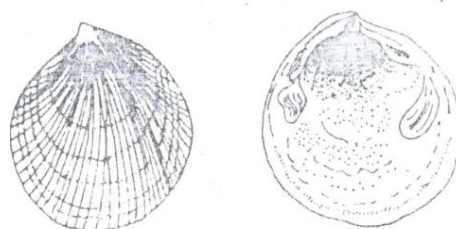


(After Khan and Dastagir, 1972)
Codakia tigerina (Linnaeus, 1758) 60-120mm., dull white
 Intertidal sand, coral reef
 (Melvill and Standen, 1906 as *Lucina* (*C*) *exasperate* Reeve; Khan and Dastagir, 1972)



(After Khan and Dastagir, 1972)

Codakia paytenorum (Iredale, 1927)
 Intertidal sand
 (PARC Report, 1984; OBIS, 2006)
 Genus *Ctena* Morch, 1861
Ctena divergens (Philippi, 1850) 10-20mm., pale yellow
 Intertidal sand , gravel, coral
 (Khan and Dastagir, 1972 as *Codakia divergen*.)



(After Khan and Dastagir, 1972)

Genus *Anodontia* Link, 1807
Anodontia stearnsiana Oyama, 1954
 Muddy bottom
 (PARC Report, 1986)
Anodontia edentula (Linnaeus, 1758)
 Muddy bottom, mangroves
 (SEAFDEC Newsletter, 2000)



Genus *Cardiolucina* Sacco, 1901
Cardiolucina semperiana (Issel, 1869)
 Subtidal in shells, sand
 (Melvill *et al.*, 1906 as *Lucina* (*Cyclas*) *semperiana*; OBIS, 2006)



Genus *Scabrilucina* Taylor and Glover, 2013
Scabrilucina victorialis (Melvill, 1899)
 semitransparent, milky-white shell
 Subtidal, offshore mud, at 128m
 (Melvill, 1899 as *Cryptodon victorialis*)



(Photocourtesy Moazzam)

Genus *Rugalucina* Taylor and Glover, 2019

Rugalucina angela (Melvill, 1899)
Muddy sand or gravel at or below low tide mark at 15 m., on hard sandy mud, dredged at 8 fathoms.
(Melvill, 1899 as *Lucina (Codakia) angela*)



(After Taylor and Glover, 2019)

Rugalucina cypselas (Melvill, 1918)
In mud
(Winckworth collection (NHMUK 20191075); Melvill, 1918 as *Divaricella cypselis* Melvill)
Superfamily Carditoidea Fleming, 1828
Family Carditidae Fleming, 1820
Genus *Venericardia* Lamarck, 1801
Venericardia coreensis Deshayes, 1854
Intertidal
(PARC Report, 1986)
Genus *Cardiocardita* Anton, 1838
Cardiocardita tankervillei (W. Wood, 1828)
Intertidal sand
(Melvill *et al.* 1906 as *Cardita tankervillei*)



Genus *Cardites* Link, 1807
Cardites bicolor Lamarck, 1819 Outer surface with unevenly spotted with dark red on yellowish background Course sand or gravelly bottom
(Khan and Dastagir, 1972 as *Cardita bicolor*; OBIS, 2006)

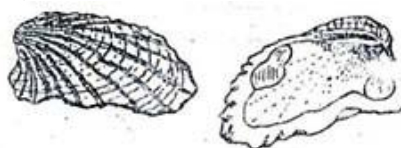


(After Gravely, 1941; After Tirmizi and Zehra, 1984; picture courtesy Moazzam)

Cardites canaliculatus (Reeve, 1843)
Coral sand bottom
(Melvill *et al.* 1906 as *Cardita canaliculata*; OBIS, 2006)



Genus *Cardita* Bruguiere, 1792
Cardita variegata Bruguière, 1792 15-50mm., dull white
Attached, among rocks, coral
Melvill *et al.*, 1906 as *Mytilicardia variegata*; OBIS, 2006)



(After Khan and Dastagir, 1972)
Cardita crassicosta Lamarck, 1819
Among rocks, coral .Benthic; depth range 17 - 77 m.
(Kazmi *et al.*, 2018)



Cardita ffinchi (Melvill, 1898)
Coral sand bottom, 10 fathoms
(Baker as *Mytilicardia crassicostata* in Melvill and Standen, 1906)
Genus *Beguina* Röding 1798
Beguina gubernaculum (Reeve, 1844)
Attached on hard substrates
(PSF Report, 1977)



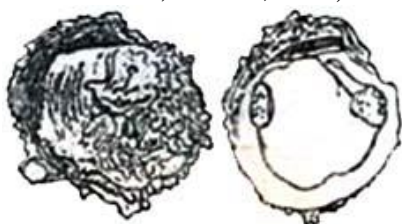
Family Condyllocardiidae Bernard, 1896
Genus *Carditellopsis* Iredale, 1936

Carditellopsis concinna (Melvill, 1918)
Muddy and sandy seabed
(Melvill, 1918 as *Carditella concinna*)
Superfamily Chamoidea Lamarck, 1809

Family Chamidae Lamarck, 1809
Genus *Chama* Linnaeus, 1758
Chama pacifica Broderip, 1835
Benthic; depth range 0 - 30 m. on rocky shore
(Khan and Dastagir, 1972 as *Chama reflexa* Reeve)



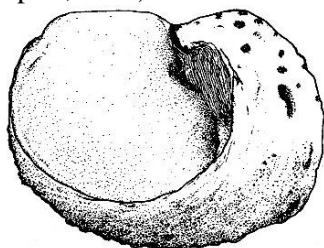
Chama fragum Reeve, 1847 nomen dubium
Rocky shore
(Harvard: MCZ; Ahmed, 1973)



Chama asperella Lamarck, 1819 5x7 cm.

Rocky, shallow water
(Ahmed and Hameed, 1999 as *Chama spinosa* Broderip)

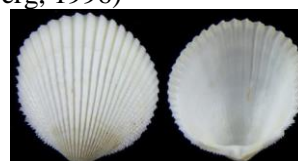
Chama pulchella Reeve, 1846
Sandy distribution: Shallow subtidal
(Khan *et al.*, 1973 as *Pseudochama cristella* Lamarck; OBIS, 2006)
Genus *Pseudochama* Odhner, 1917
Pseudochama corrugata Broderip, 1835
Subtidal
(PSF Report, 1977)



(After Tirmizi and Zehra, 1982)

Order Cardiida Ferussac, 1822

Family Cardiidae Lamarck, 1809
Genus *Trachycardium* Mörch, 1853
Trachycardium orbitum Sowerby, 1833
Intertidal
(Shah, *et al.*, 2003 as *Cardium orbitum*)
Genus *Vasticardium* Iredale, 1927
Vasticardium pectiniforme (Born, 1780)
Rocky shores in sand at low-water mark
shelly gravel, sand, 5–6 m
(Hylleberg, 1996)



Vasticardium assimile (Reeve, 1845)
30-60mm. shell pinkish
Rocky shores in sand at low-water mark
(Melvill *et al.*, 1906 as *Cardium (Trachycardium) assimile*; Khan and Dastagir, 1972 as *Cardium assimile*; OBIS, 2006)

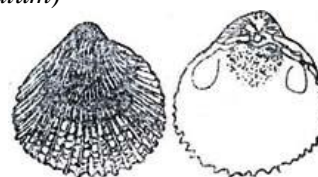


(After Khan and Dastagir, 1972)

Genus *Laevicardium* Swainson, 1840
Laevicardium attenuatum Sowerby, 1840
Pastel yellow to orange
Shallow waters
(Dance, 1992)

Genus *Vepricardium* Iredale, 1929
Vepricardium asiaticum Bruguière, 1792
Intertidal mud flats
(Melvill *et al.*, 1906 as *Cardium (Acanthocardium) asiaticum*; OBIS, 2006)

Vepricardium coronatum (Schröter, 1786) 16-60 mm. yellow with concentric brownish patches
Muddy water along low tide mark
(Khan and Dastagir, 1972 as *Cardium coronatum*)

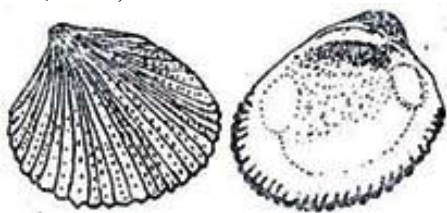


(After Khan and Dastagir, 1972)

Genus *Maoricardium* Marwick, 1944
Maoricardium pseudolima (Lamarck, 1819)

Offshore sand
 (PSF Report, 1977 as *Cardium pseudolima*; OBIS, 2006)

Maoricardium setosum Redfield, 1848
 Littoral sand and mud
 (Melvill *et al.*, 1906 as *Cardium (Cerastoderma) latum*; Khan and Dastagir, 1977 as *Cardium setosum*; OBIS, 2006)



(After Khan and Dastagir, 1972)
Maoricardium pseudolatium Voskuil and Onverwagt, 1991

Mud
 (NNM56511/3 Collected by S. Barkati.)
 Genus *Acrosterigma* Dall, 1900

Acrosterigma impolitum (Sowerby, 1833)
 Intertidal sand, gravel, shelly sand, 5–6 m.
 (Melvill and Standen, 1906 as *Cardium (T.) impolitum* Sowerby; Lemche; 1951; Hylleberg, 1996)

Acrosterigma maculosum (W. Wood, 1815)

Intertidal sand
 (Vidal, 1999)



(Picture Source Poppe, 2015)

Genus *Fulvia* Gray, 1853
Fulvia laevigata (Linnaeus, 1758)
 Sandy and muddy beaches
 (Melvill *et al.*, 1906 as *Cardium (Acanthocardia) pallidum* Reeve and *Cardium (Papyridea) papyraceum*; OBIS, 2006)

Fulvia fragilis (Forsskål in Niebuhr, 1775) whitish yellow externally, with a purple stain only on the umbo and internally white with purple at the posterior third and sometimes at the umbonal cavity

In shallow waters, prefers soft muddy substrates
 (Lemche, 1951 not identified; Hylleberg 1996)



Genus *Fragum* Röding, 1798
Fragum unedo (Linnaeus, 1758)

Shallow water
 (Dance, 1992)

Genus *Lyroardium* Meek, 1876

Lyroardium lyratum Sowerby, 1834
 Offshore
 (Dance, 1992)

Genus *Acanthocardia* Gray, 1851

Acanthocardia aculeata Linnaeus, 1758
 Rocky
 (PARC Report, 1986)



(Delsing, Jan)

Genus *Ciliatocardium* Kafanov, 1974
Ciliatocardium ciliatum (Fabricius, 1780)

Intertidal
 (PARC Report, 1986 as *Clinocardium ciliatum* Fabricius)

Genus *Corculum* Röding, 1798
Corculum cardissa Linnaeus, 1758
 Shallow water, sand
 (Dance, 1992)



Superfamily Tridacnoidea Lamarck, 1819

Family Tridacnidae Lamarck, 1819

Genus *Tridacna* Bruguiere, 1797

Tridacna maxima Röding, 1798

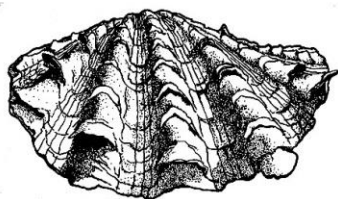
Attached to rocks

(Shah *et al.*, 2003 as *Tridacna maxima*;
OBIS, 2006)

Tridacna crocea Lamarck, 1819 Saffron-
coloured, in wonderful blues and greens,
with just about every other colour mixed
in. Purple, orange and gold often seen,
Boring, infaunal
(PSF Report, 1977)



(From Creative Commons Attribution)



(After Tirmizi and Zehra, 1982)

Tridacna squamosa Lamarck, 1819

Corals

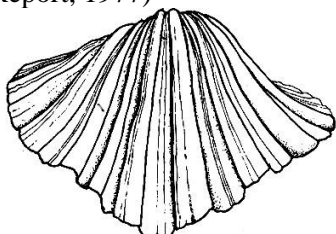
(Dance, 1992)

Genus *Hippopus* Lamarck, 1799

Hippopus hippopus Linnaeus, 1758

Attached on hard substrate and corals

(PSF Report, 1977)



(After Tirmizi and Zehra, 1982)

Superfamily Mactroidea Lamarck, 1809

Family Mactridae Lamarck, 1809

Genus *Mactra* Linnaeus, 1767

Mactra chinensis Philippi, 1846

Intertidal sand and mud

(PARC Report, 1985)

Mactra aequisulcata Sowerby III, 1894

Intertidal sand and mud

(Kazmi *et al.*, 2018)



Mactra grandis Gmelin, 1791

Rocky shores

(Ahmed and Hameed, 1999 as *Mactra*
mera Reeve)

Mactra glabrata Linnaeus, 1767

Intertidal sand

(Melvill, *et al.*, 1906; Melvill and
Standen as *Mactra glabrata?* non Linn.,
Lamy, 1920 doubted and assigned
probably to *M. lilacea*)

Mactra luzonica Reeve, 1854

Rocky shores

(Melvill and Standen, 1844 as *Mactra*
(*Trigonella*)

luzonica; OBIS, 2006)



(Picture source FAO)

Mactra lilacea Lamarck, 1818

Intertidal, subtidal sand

(Melvill *et al.*, 1906 as *Mactra fauroti*;
OBIS, 2006)



Mactra violacea Chemnitz, 1782

Sub littoral sand and mud

(PARC Report, 1986 as *Mactra violacea*
Gmelin; OBIS, 2006)

Mactra ovalina Lamarck, 1818

Sand and mud, subtidal

(PARC Report, 1986 as *Mactra*
angulifera Deshayes; OBIS, 2006)

Mactra antiquata Spengler, 1802

In fine sand and mud, subtidal
(Reeve, 1854 as *Mactra cornea*)
Genus *Mactrotoma* Dall, 1894
Mactrotoma angulifera Deshayes, 1854
Sand and mud, subtidal
(PARC Report, 1986 as *Mactra angulifera*; OBIS, 2006)
Genus *Mactrinula* Gray, 1853
Mactrinula dolabrata (Reeve, 1854)
Sub littoral sand and mud
(PARC Report, 1986 as *Mactra dolabrata*; OBIS, 2006)
Genus *Meropesta* Iredale, 1929
Meropesta pellucida Gmelin, 1791
Intertidal sand, at 10 fathoms, on rocks
(Melvill, *et al.*, 1906, as *Standella (Merope) capillacea* Deshayes; OBIS, 2006)
Meropesta nicobarica Gmelin, 1791
Intertidal mud and sand
Melvill *et al.*, 1906 as *Standella (Merope) aegyptiaca*; OBIS, 2006)
Genus *Lutraria* Lamarck, 1799 -
Lutraria complanata (Gmelin, 1791)
Coastal region, lives buried in the sand.
(Swenen *et al.*, 2001)
Superfamily Solenoidea Lamarck, 1809
Family Solenidae Lamarck, 1809
Genus *Solen* Linnaeus, 1758
Solen guinaicus Cosel, 1993 35-120 mm. reddish brown bands
Muddy and sandy bottom, burrowing. in coarse sandy cum muddy shores
(Melvill, 1898 as *Solen truncatus*; Melvill *et al.*, 1906 as *Solen (Solen) ceylonensis* Leach; Ranjha, 1960; OBIS, 2006; Khan and Dastagir, 1970 ; Moazzam and Ahmed, 1994. as *Solen truncatus*)



(After Khan and Dastagir, 1972)

Solen corneus Lamarck, 1818
Intertidal Mud flats and sand
(Melvill *et al.* 1906, their report possibly based on misidentification of *Solen dactylus* cf Moazzam and Moazzam, 2023)
Solen strictus Gould, 1861
Sandy shores
(Ahmed, 1994)
Solen grandis Dunker, 1862

Shallow subtidal, intertidal sand
(PARC Report, 1986)
Solen cylindraceus Hanley, 1843
Infaunal, estuarine
(Kazmi *et al.*, 2018)



(Picture courtesy Moazzam and Moazzam, 2023)

Solen dactylus Cosel, 1989 Outside of shell uniform ivory white; periostracum light green olive. Interior whitish.
In mud and fine sand with mud and detritus. Tidal flats of lower intertidal zone, delaic region;
(Collected Winckworth, 1832; Cosel, 1989; Moazzam and Ahmed, 1994 as *Solen truncatus*.)



(Picture courtesy Moazzam and Moazzam, 2023)

Solen vagina Linnaeus, 1758
Benthic
(Ghani *et al.*, 2018)

Family Cultellidae Davis, 1835
Genus *Siliqua* Megerle von Muhlfield, 1811
Siliqua radiata Linnaeus, 1758 10-20 mm., marked by broad wedge shaped bands of mauve
Sand and mud in shallow water, only empty shells found
(Melvill *et al.*, 1906 as *Machaera*; Khan and Dastagir, 1972)



(Right image after Gravely, 1941)

***Siliqua polita* (Wood, 1828)**

In intertidal sand
(Melvill and Standen, 1906 as *Machaera polita*.)
Genus *Sinonovacula* Prashad, 1924
Sinonovacula constricta Lamarck, 1818
Intertidal, mud and sand
(PARC Report, 1986, presence of this species doubtful in Pakistan and requires further studies to ascertain its presence here.cf Moazzam and Moazzam, 2023)

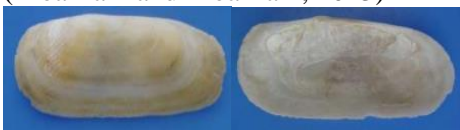
Family Pharidae H. Adams and A. Adams, 1856

Genus *Ensiculus* H. Adams, 1860
Ensiculus cultellus (Linnaeus, 1758)
Mangroves, dredged from 15 to 20 m depth with muddy sand and rocks.
(Moazzam and Ahmed, 1994 as *Cultellus cultellus*)
Superfamily Tellinoidea Blainville, 1814

Family Solecurtidae d'Orbigny, 1846
Genus *Solecurtus* Blainville, 1824
Solecurtus australis (Dunker, 1862)
In sandy or shelly gravel, from the lower shore into the shallow sublittoral
(Kazmi *et al.*, 2018)



Solecurtus subcandidus Sturany, 1899
Sandy shores
(Moazzam and Moazzam, 2023)



Azorinus coarctatus (Gmelin, 1791)
At 80mm depth
(Melvill and Standen, 1908)

Family Tellinidae Blainville, 1814
Genus *Hanleyanus* Huber, Langleit and Kreipl, 2015

Hanleyanus vestalis (Hanley, 1844)
Brackish, fresh
(Melvill and Standen, 1906 as *Tellina vestalis*)
Genus *Macoma* Leach, 1819

Macoma constricta Bruguière, 1792
Rocky shores
(PARC Report, 1986)

Macoma calcarea Gmelin, 1791
Offshore
(PSF Report, 1977)

Macoma secta Conrad, 1837
Mudflats
(PARC Report, 1986 as *Macoma (Rexitherus) secta*)

Macoma blainvillei Melvill and Standen, 1907 nomen nudum
Muddy sand near rocks
(Melvill *et al.*, 1906)

Genus *Psammotreta* Dall, 1900
Psammotreta angulata (Linnaeus, 1767)
nomen dubium 30-35mm.white in colour
At 0-tide level in sandy cum muddy shore
(Melvill and Standen, 1906 as *Tellina angulata* (Linnaeus))

Genus *Pseudotellidora* Huber, Langleit and Kreipl, 2015

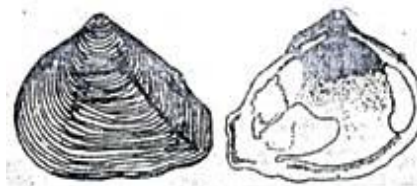
Pseudotellidora pellyana (H. Adams, 1873)
Subtidal on muddy bottom
(Melvill *et al.*, 1907 as *Tellidora pellyana* Adams)

Genus *Gastrana* Schumacher, 1817
Gastrana multangula (Gmelin, 1791)
10-70mm.Brownish grey
In sandy-cum muddy areas
(Khan and Dastagir, 1972)



Gastrana matadoa (Gmelin, 1791) 35-45mm.

In soft sediments in shallow seas
(Melvill and Standen, 1906 as *Gastrana abildgaardiana* (Spengler) and *Gastrana guinaica*; Khan and Dastagir, 1972 as *Macoma polygona* Hanley)



(After Khan and Dastagir, 1972)

Genus *Apolymetis* Salisbury, 1929
Apolymetis plicatus Valenciennes, 1827

Intertidal sand
(PARC Report, 1986 as *A. (Hemimrtus) plicatus*)

Genus *Tellinella* Mörch, 1853
Tellinella rastellum Hanley, 1844

Intertidal sand
(PARC Report, 1986 as *Tellina philippi* Anton; OBIS, 2006)

Tellinella virgata Linnaeus, 1758
Shallow water sand
(PARC Report, 1986 as *Tellina varigata*; OBIS, 2006)



Genus *Serratina* Pallary, 1922
Serratina siamensis (Martens, 1860)
On mud flats at low tide
(Melvill and Standen, 1906 as *Tellina (A) siamensis*)

Serratina capsoides Lamarck, 1818 18-45 mm, white

Intertidal sandy mud at low tide mark
(Melvill, 1896 as *Tellina emarginata* and *Tellina thymares*; Melvill and Standen, 1906 as *Tellina (A) capsoides* Lamarck; Khan and Dastagir, 1972 as *Tellina pristis*; OBIS, 2006)



(After Khan and Dastagir, 1972)

Serratina perplexa (Hanley, 1844)

Intertidal mud flats
(Melvill *et al.*, 1906 as *Tellina (Arcopagia) perplexa*)

Serratina diaphana (Deshayes, 1855)

Mangroves
(Tirmizi and Barkati, 1985 as *Arcopagia (M.) diaphana*)

Genus *Quidnipagus* Iredale, 1929
Quidnipagus palatam Iredale, 1929

Intertidal sand
(Melvill *et al.*, 1906 as *Tellina (Tellinella) rugosa*; OBIS, 2006)



Genus *Cadella* Dall, Bartsch and Rehder, 1938

Cadella obtusalis Deshayes, 1855

Intertidal sand
(Melvill *et al.*, 1906 as *Tellina (Moera) obtusalis*; OBIS, 2006)

Cadella semen Hanley, 1845
Intertidal, shallow subtidal sand
(Melvill *et al.*, 1906 as *Tellina (Moera) semen*; OBIS, 2006)



(Picture source: Poppe and Poppe)

Cadella lechriogramma (Melvill, 1892)

Intertidal
(Melvill *et al.*, 1906 as *Tellina lechriogramma* Melvill; *et al.*; this species superficially resembles with *Donax incarnatus*, may be wrong identification cf. Subrahmanyam, 1949)

Genus *Scutarcopagia* Pilsbry, 1918

Scutarcopagia scobinata Linnaeus, 1758

Intertidal, shallow subtidal
(Melvill *et al.*, 1906 as *Tellina (Arcopagia) scobinata*; OBIS, 2006)



Scutarcopagia linguafelis (Linnaeus, 1758)

Shallow water sand
(Dance, 1992 as *Tellina linguafelis* Linnaeus)

Genus *Iridona* Huber, Langleit and Kreipl, 2015

Iridona methoria (Melvill, 1897)

Muddy sand near rocks
(Melvill, 1897 as *Tellina methoria* Melvill)

Iridona iridescens (Benson, 1842)
Muddy sand near rocks

(Melvill *et al.*, 1906 as *Tellina (Angulus) iridescens*)

Genus *Tellina* Linnaeus, 1758

Tellina iridescens Benson, 1842

Muddy sand near rocks

(Melvill *et al.*, 1906 as *Tellina (Angulus) iridescens*)

Tellina linguaefelis Linnaeus, 1758

Shallow water sand

(Dance, 1992)

Genus *Phylloda* Schumacher, 1817

Phylloda foliacea (Linnaeus, 1758)

orange-pink, with yellow margins

Benthic; depth range 5 - 50 m. In fine clean sandy bottoms

(Rao and Rao, 2000 as *Tellina*

(*Phylloda*) *foliacea* Linnaeus)

Genus *Angulinides* Huber, Langleit and Kreipl, 2015

Angulinides opalinus (Gmelin, 1791)

Mangrove associated

(Rao and Dey, 2000 as *Tellina*

(*Tellinides*) *opalina* Gmelin; Ullah *et al.*, 2015)

Genus *Clathrotellina* Thiele, 1934

Clathrotellina habrotima (Melvill, 1898)

Fine sand bottom, intertidal

(Melvill, *et al.*, 1906 as *Tellina habrotima*)

Genus *Eurytellina* Fischer, 1887

Eurytellina alternata (Say, 1822)

Mangroves

(Tirmizi and Barkati, 1985 as *Tellina alternata* Say)

Eurytellina nitens Deshayes, 1855 .6.9-8mm.

Muddy sand in offshore

(Oliver, 1995 as *Tellina nitens*)

Genus *Indentina* M. Huber, Langleit and Kreipl, 2015

Indentina scalpellum (Hanley, 1844).

Subtidal mudflats

(Melvill *et al.*, 1906 as *Tellina (Angulus) rubella*)

Genus *Pinguitellina* Iredale, 1927

Pinguitellina pinguis (Hanley, 1844)

Subtidal

(Melvill and Standen, 1898 as *Tellina savignyi* H. Adams)

Pinguitellina nux (Hanley, 1844)

Shallow subtidal, intertidal mud, sand.

(Melvill *et al.*, 1906 as *Tellina*

(*Arcopagia*) *nux*)

Genus *Tellinides* Lamarck, 1818

Tellinides sinuatus (Spengler, 1798)

Soft bottom

(Melvill and Standen, 1906 as *Tellina (Tellinides) sinuata*)

Tellinides striatus (Gmelin, 1791)

Fairly deep in soft sediments in shallow seas

Melvill *et al.*, 1906 as *Tellina (Tellinides) ovalis*

Genus *Angulus* Mühlfeld, 1811

Angulus vestalioides Yokoyama, 1920

Shallow water sand and mud

(Melvill *et al.*, 1906 as *Tellina (Tellinides) vestialis* Hanley)

Genus *Leporimetis* Iredale, 1930

Leporimetis papyracea (Gmelin, 1791)

Benthic, usually 0 - 20 m.

(Melvill *et al.*, 1906 as *Tellina (Metis)*

lacunosa Chemn; OBIS, 2006.



Leporimetis obesa (Deshayes, 1855)

Mudflats

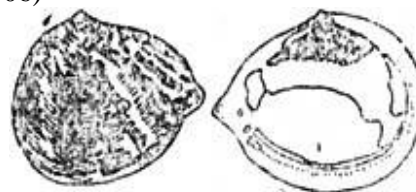
(Melvill *et al.*, 1906 as *Tellina turgida* Deshayes)

Genus *Alaona* Huber, Langleit and Kreipl, 2015

Alaona ala (Hanley, 1845) 20-30mm. white in colour

Creeks in sand, mangroves

(Dey, 1844 as *Macoma ala*; Khan and Dastagir, 1972 as *Tellina ala*; OBIS, 2006)



(After Khan and Dastagir, 1972)

Genus *Arcopagia* Brown, 1827

Arcopagia tokunagai Ikebe, 1936

Sandy shores

(PARC Report, 1986 as *Arcopagia (Merisea) tokunagai*)

Genus *Laciolina* Iredale 1937

Laciolina chloroleuca Lamarck, 1818

Intertidal, Shallow subtidal mud and sand

(PARC Report, 1986)
 Genus *Pseudopsammobia* Huber,
 Langleit and Kreipl, 2015
Pseudopsammobia simplex (G. B.
 Sowerby III, 1894)
 Sandy mud
 (Melvill *et al.*, 1906 as *Gari simplex*,
 OBIS, 2006)



Genus *Psammacoma* Dall, 1900
Psammacoma gubernaculum (Hanley,
 1844)
 Offshore
 (Day, 1981 as *Macoma (Psammacoma)*
truncata (Jonas))

Family Donacidae Fleming, 1828
 Genus *Donax* Linnaeus, 1758
Donax cuneatus Linnaeus, 1758 17-46
 x 11-31 mm. x 7-14 mm
 Exposed intertidal sandy beaches.
 (Arshad *et al.*, 2017)



(Picture source FAO)
Donax denticulatus Linnaeus, 1758
 Exposed intertidal sandy beaches
 (Arshad *et al.*, 2017)
Donax scortum (Linnaeus, 1758) 50-
 70mm. white
 Sandy beaches. Between tide marks
 (Melvill and Standen, 1906)



(Right figure after Tirmizi and Zehra,
 1982)



(Photo courtesy: Aemon Khan)

Donax scalpellum Gray, 1823 15mm
 Sandy beaches, lower littoral zone
 (Melvill and Standen, 1906)



(Picture courtesy Moazzam)
Donax rugosus Linnaeus, 1758
 Sandy beaches
 (PARC Report, 1986) *Donax aperittus*
 Melvill, 1897
 Sandy beaches
 (Melvill *et al.*, 1906 as *Donax (Serrula)*
aperittus; OBIS, 2006)

Donax nitidus Deshayes, 1855 3-
 10mm.
 Sandy areas
 (Melvill *et al.*, 1906 as *Donax (Serrula)*
nitidus; OBIS, 2006)

Donax townsendi Sowerby, 1894 20-
 26mm.
 Buried in sand
 (Melvill *et al.*, 1906 as *Donax (Serrula)*
townsendi)



Donax clathratus Reeve, 1855 12mm.
 In sand on exposed beaches
 (Melvill and Standen., 1906)



(Picture courtesy Moazzam)

Donax hanleyanus Philippi, 1847
 Exposed intertidal sandy beaches
 (Arshad, 2017 unpublished)
Donax owenii Hanley, 1843
 In wet sand at low tide
 (Melvill and Standen, 1906)

Donax pulchellus Hanley, 1843
 Intertidal zone of coastal upwelling sandy
 beaches
 (Ramakrishna and Dey, 2010)

Donax speculum Reeve, 1855

EEZ

(Huber, 2010)

Donax impar Hanley, 1882

Vertically aligned in the sand on exposed beaches, empty shells may be found washed up on the beach, especially at low tide; living animals can often be seen where the waves wash the sand around in the shallowest part of the littoral zone as the tidal level changes

(Hanley, 1882)

Genus *Psammacoma* Dall, 1900

Psammacoma gubernaculum (Hanley, 1844)

Offshore.

(Day, 1981 as *Macoma* (*Psammacoma*) *truncata* (Jonas))



Genus *Iphigenia* Schumacher, 1817

Iphigenia brasiliana Lamarck, 1818

Muddy sand

(PARC Report, 1986)

Family Psammobiidae Fleming, 1828

Genus *Hiatula* Modeer, 1793

Hiatula diphos (Linnaeus, 1771)

Intertidal muddy sand

(Reeve, 1857 as *Soletellina acuminata*;

Khan and Dastagir, 1972; Tirmizi and

Barkati, 1985 as *Soletellina diphos*

Linnaeus).



(After Gravely, 1941)

Hiatula ambigua (Reeve, 1857)

Inhabits tranquil waters in lagoons and estuaries

(Barash and Danin, 1986 as *Soletellina subradiata* (Reeve))



(Photo Source: WMSDB)

Hiatula rosea (Gmelin, 1791)

In tranquil waters in lagoons and estuaries

(Kazmi *et al.*, 2018 as *Soletellina rosea*)



(Photo courtesy: Moazzam)

Hiatula atrata (Reeve, 1857) 16.17 mm.

Intertidal sand.

(PSF Report, 1977 as *Soletellina atrata*)

Genus *Gari* Schumacher, 1817

Gari bicarinata Deshayes, 1855

Mud and coral

(Melvill *et al.*, 1906 as *Gari elegans*;

OBIS, 2006)



Gari pallida Deshayes, 1855

Coarse sand; sand-shell-seagrass; mud flats, depth range of 10 to 150 m.

(Melvill *et al.*, 1906; OBIS, 2006)



(Source World wide seashells collection, 2018)

Gari elongata (Lamarck, 1818)

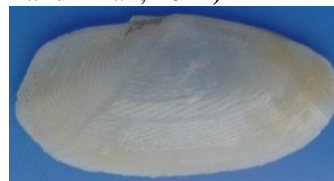
Lives in sand and sandy gravel deposits in a shallow burrow

(Melvill *et al.*, 1906 as *Psammotaea violacea* Lamarck)

Gari amethystus (Wood, 1815)

Lives in sand and sandy gravel deposits in a shallow burrow

(Kazmi and Khan, 2014)

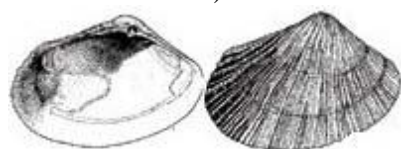


Genus *Asaphis* Modeer, 1793
Asaphis deflorata (Linnaeus, 1758) 47 mm, 60 mm.
 Subtidal shallow sandy and muddy bottom
 (Melvill *et al.*, 1906)



(Picture source FAO)

Asaphis violascens (Forsskål in Niebuhr, 1775) 30-38mm. dull white
 Subtidal shallow sandy and muddy bottom.
 (Khan and Dastagir, 1972 as *Asaphis dichotoma* Anton)



Family Semelidae Stoliezka, 1876
 Genus *Theora* H. Adams and A. Adams, 1856

Theora opalina (Hinds, 1843)
 Estuarine, mangroves
 (Dey, 2008)

Genus *Semele* Schumacher, 1817
Semele striata Reeve, 1853
 Inter tidal sand
 (PARC Report, 1986)



Semele cordiformis Holten, 1802
 On mud flats at low tide
 (Melvill *et al.*, 1906)



Semele crenulata (Reeve, 1853)
 Intertidal sand
 (Melvill *et al.*, 1906 as *Semele cernata*)

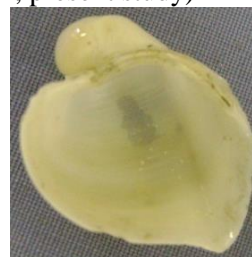


(from www.nmrpics.nl/Semelidae/album/index.htm)

Genus *Abra* Lamarck, 1818
Abra prismatica Montagu, 1808
 Burrows in sand or muddy sand
 (PARC Report, 1986)

Family Glossidae Gray, 1847 (1840)
 Genus *Meiocardia* H. Adams and A. Adams, 1857

Meiocardia vulgaris (Reeve, 1845)
 27.5mm.
 Form offshore waters; soft sediment
 (Moazzam, present study)



(Photo courtesy Moazzam)
 Order Venerida Gray, 1854

Family Trapezidae Lamy, 1920 (1895)
 Genus *Neotrapezium* Habe, 1951
Neotrapezium sublaevigatum (Lamarck, 1819)

Rocky shores, attached, usually to the undersides of rocks and boulders sheltered from strong wave action, and nestling in crevices and amongst clumps of oysters as well as occasionally in burrows of boring bivalves in coral rocks in sheltered areas
 (Melvill *et al.*, 1906 in Cyprinidae; Khan and Dastagir, 1972 as *Libitina vellicata*)



(After Khan and Dastagir, 1972)

Family Ungulinidae H. and A. Adams, 1856

Genus *Diplodonta* Bronn, 1831

Diplodonta rotundata (Montagu, 1803)

Subtidal sandy mud, muddy sand at sublittoral and shallow shelf depths (Melvill *et al.*, 1906 in Lucinidae)



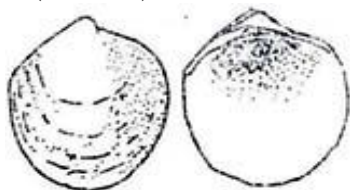
Diplodonta holosphaera Melvill, 1899

Rocky shores at very low tide (Melvill *et al.*, 1906 as *Diplodonta holosphaera* Melvill in Lucinidae)

Genus *Transkeia* M. Huber, 2015

Transkeia globosa (Forsskål in Niebuhr, 1775) 1012mm. bluish-white

Sandy shore at backwater (Khan and Dastagir, 1972 as *Diplodonta globosa* (Forsskal)



(After Khan and Dastagir, 1972)

Genus *Felania* Récluz, 1851

Felania diaphana (Gmelin, 1791)

Subtidal sandy mud (Melvill *et al.*, 1906 in Lucinidae)



Family Veneridae Rafinesque, 1815

Sub Family Petricolinae Deshayes, 1831

Genus *Petricolaria* Stoliczka, 1870

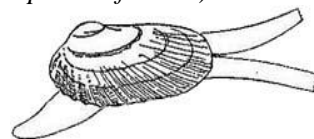
Petricolaria gracilis (Deshayes, 1853)

Subtidal mud (Melvill *et al.*, 1906 as *Petricola gracilis* Deshayes; OBIS, 2006)

Petricolaria pholadiformis (Lamarck, 1818)

Chalky mud, hard clay at infralittoral

(Melvill *et al.*, 1906 as *Petricolapholadiformes*)



Petricolaria serrata (Deshayes, 1853)

Drills itself into wood and blocks of peat (Melvill *et al.*, 1906 as *Petricola serrata* Deshayes)

Genus *Petricola* Lamarck, 1801

Petricola fabagella Lamarck, 1818

Infaunal, boring in limestone (Melvill *et al.*, 1906 as *Petricola hemprichi*; OBIS, 2006)

Petricola monstrosa (Gmelin, 1791)

In sandstones (Melvill and Standen, 1906 as *Venerupis monstrosa*)

Genus *Costellipitar* Habe, 1951

Costellipitar tumidus (Sowerby III, 1895)

Form shallow marine sediments (Melvill and Standen, 1906 as *Meretrix tumida*)

Genus *Venus* Linnaeus, 1758

Venus sinuosa Lamarck, 1818

In sandy and rocky areas near seagrasses and coral rubble (Olivier, 1996)

Genus *Pelecypora* Dall, 1902

Pelecypora ceylonica (Dunker, 1865)

Benthic (Melvill and Standen, 1906 as *Dosinia globa*)



Pelecypora katiawarensis (Fischer-Piette and Métivier, 1971) Outer side of the valve with orange-red tinge in the middle (Fischer-Piette and Métivier, 1971; Moazzam and Moazzam, 2020)



Pelecypora nana (Reeve, 1850)

Burrows vertically in mud and fine sand with mud and detritus.

Tidal flats of lower intertidal zone (Fischer-Piette and Delmas, 1967 as *Dosinia derupta* Römer)



Genus *Tivela* Link, 1807

Tivela stefaninii (Nardini, 1933)

Loose sand, below surface at low tide (Melvill *et al.*, 1906 as *Tivela ponderosa* Koch; OBIS, 2006)



Tivela trigonella (Lamarck, 1818)

Muddy sand (Melvill *et al.*, 1906)

Tivela cf *mulawana* Biggs, 1969

Muddy sand (Kazmi *et al.*, 2018)

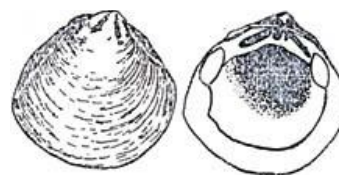


Genus *Meretrix* Lamarck, 1799

Meretrix meretrix (Linnaeus, 1758) 25-60mm. Outside of shell very variable in colour and pattern, under the transparent, pale straw coloured periostracum; basically white or fawn to chestnut brown, plain or variously maculated with darker grey or brown; interior white, sometimes with dark brown along posterodorsal margin.

In sand and muddy-sand bottoms of open coasts. Intertidal and sublittoral waters to a depth of about 20 m.

(Melvill and Standen, 1901 as *Meretrix impudica*, Melvill *et al.*, 1906 as *Meretrix zonaria*, var. of *M. impudica*)

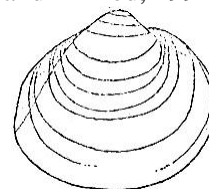


(After Khan and Dastagir, 1972)

Meretrix casta (Gmelin, 1791) 30-70mm.:

Outside of shell variable under the light to dark brown or dirty grey periostracum; basically white, plain or with a few more or less distinct purplish brown rays toward umbones; interior white, dark purplish brown along posterodorsal margin.

At low tide areas in muddy-cum-sandy substratum. in brackish waters of lagoons and estuaries. Intertidal and shallow subtidal waters to a depth of about 5 m. (Moazzam and Ahmed, 1994)



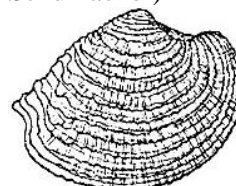
(After Gavely, 1921)

Genus *Antigona* Schumacher, 1817

Antigona lamellaris Schumacher, 1817

10-15mm, creamy white

At low tide marking sand (Khan and Dastagir, 1972 as *Venus lamellaris* Schumacher)



(After Khan and Dastagir, 1972)

Genus *Periglypta* Jukes Brown, 1914

Periglypta reticulata (Linnaeus, 1758)

Intertidal, boring in soft rocks and rocky crevices

(Khan and Dastagir, 1972 as *Venus reticulata*)

Genus *Irus* Schmidt, 1818

Irus irus (Linnaeus, 1758) 20-25 mm.

Intertidal, boring in soft rocks and rocky crevices

(Melvill and Standen, 1906; Khan and Dastagir, 1972 as *Venerupis macrophylla* Deshayes; OBIS, 2006)



(After Gravely, 1941)

***Irus* sp.**

Intertidal, boring in soft rocks and rocky crevices

(Tirmizi and Zehra, 1982)



(After Tirmizi and Zehra, 1982)

Irus vertumnalium (Melvill, 1918)

In rocks

(Melvill, 1918 *Cypricardia vertumnalium* Melvill)

Irus cumingii (Deshayes, 1854)

In rocks

(Melvill *et al.*, 1906 as *Venerupis obesa* Deshayes)

Genus *Venerupis* Lamarck, 1818

Venerupis rugosa (G. B. Sowerby II, 1854)

Infaunal in mud or sand

(Fischer Piette and M etivier, 1971 as *Irus rugosa*)



(After Kazmi *et al.*, 2018)

Venerupis corrugata (Gmelin, 1791)

Mud flats at low tide

(Melvill *et al.*, 1906 as *Tapes*

(*Parembola*) *corrugata* Deshay; Melvill, *et al.*, 1906 as *Tapes* (*Parembola*)

obsoleta)



Venerupis aspera (Quoy and Gaimard, 1835) 4.56 cm. outside variable, cream to fawn, brown or grey, uniform or variegated with various patterns of lighter or darker colours. Umbones frequently hued in pink, yellow, orange, or deep purplish blue. Interior often brightly tinged in yellow, pink, orange, purple, or light bluish grey, paler towards the margins and with deep purple blotches on hinge area

In sandy bottoms, often with pebble. Intertidal and sublittoral to a depth of about 20 m.

(Carpenter and Neim, 1998 as *Ruditapes variegates* (Sowerby))



(Photo source Femorale)

Genus *Paphia* R oding, 1798

Paphia textile (Gmelin, 1791) Outside of shell highly glossy, cream to pinkish brown, with a netted pattern of darker tan to greyish brown zigzag lines; dorsal margins with distant, dark purplish brown, short and transverse lines anterior and posterior to the umbones; interior whitish. In fine sand and mud bottoms. Intertidal and sublittoral to a depth of about 20 m.

Mangroves

(Khan and Dastagir, 1972)



Paphia euglypta Philippi, 1847

Intertidal mud and sand

(Mirza, 1981, unpublished thesis)

Genus *Protapes* Dall, 1902

Protapes monstrosus (R omer, 1870)

Mud flats at low tide

(Melvill *et al.*, 1906 as *Paphia* (*Protapes*) *gallus bombayana* Oliver and Glover)

Protapes gallus (Gmelin, 1791) Outside of shell fawn in colour, with dense, fine zigzag streaks and often four dark brown spotted rays; interior white
Mud flats at low tide. Common in sandy beaches, but also sublittorally in sand and mud to a depth of about 50 m.

(Melvill, 1906 as *Tapes (Textrix) malabarica*; Khan and Dastagir, as *Paphia malabarica*; Pomadakis *et al.*, 2015 as *Paphia (Protapes) cf. gallus*)

Protapes cor (G. B. Sowerby II, 1853) 30-71mm.

Muddy-cum-sandy flats
(Sowerby, 1853; Melvill *et al.*, 1906 as *Tapes (Hemitapes) cor* Sowerby)



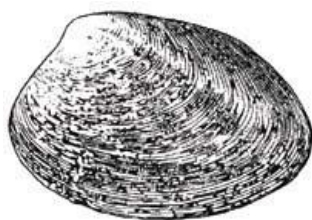
Genus *Tapes* Muhlfeldt, 1811

Tapes sulcosa Philippi, 1847

Mud flats at low tide
(Melvill *et al.*, 1906 as *Tapes (Textrix) sulcosa*)

Tapes literatus (Linnaeus, 1758)

Mud flats at low tide. Benthic; depth range 0 - 20 m.
(Rehman and Barkati, 2012)



(Phot source FAO)

Genus *Polittapes* Chiamenti, 1900

Polittapes aureus (Gmelin, 1791)

Offshore on sand
(Melvill *et al.*, 1906 as *Tapes (Amygdala) florida*)

Genus *Mercenaria* Schumacher, 1817

Mercenaria stimpsoni Gould, 1861 (erroneous identification)

Subtidal mud
(PARC Report, 1985; Nazim *et al.*, 2015)

Mercenaria mercenaria Linnaeus, 1758 (erroneous identification)

Intertidal
(PARC Report, 1986)

Genus *Dosinia* Scopoli, 1777

Dosinia prostrata Linnaeus, 1758

Sandy beaches
(Ahmed and Hameed, 1999)



Dosinia alta (Dunker, 1848) 5.6-9.8mm. Mud flats lower intertidal and subtidal
(Melvill *et al.*, 1906)

Dosinia angulosa Philippi, 1847
Mud flats

(Melvill *et al.*, 1906)

Dosinia amphidesmoides (Reeve, 1850)
Clean and coarse shell sand
(OBIS, 2006)

Dosinia exasperata Philippi, 1847
Offshores mud and sand

(Melvill *et al.*, 1906)

Dosinia histrio Gmelin, 1791

Off shores mud and sand
(Melvill *et al.*, 1906)

Dosinia subrosea Gray, 1835

Off shores mud and sand
(Melvill *et al.*, 1906)

Dosinia biscocta Reeve, 1850

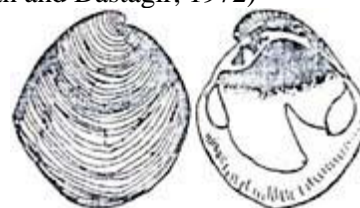
Sand shores
(PSF Report, 1977 as *D. (Phacosoma) biscocta*)

Dosinia penicillata Reeve, 1850

Off shores mud and sand
(Tirmizi and Barkati, 1985 as *D. (Dosinella) penicellata*)

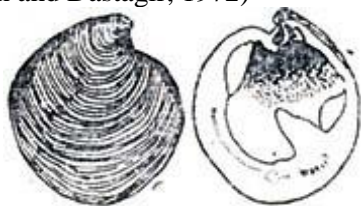
Dosinia cretacea (Reeve, 1850) 9-25mm. shell with alternate concentric shades of brownish red

Off shores mud and sand
(Khan and Dastagir, 1972)



(After Khan and Dastagir, 1972)

Dosinia puella Römer, 1863 taxon inquirendum 16-30mm.dull white or pale Off shores mud and sand (Khan and Dastagir, 1972)



(After Khan and Dastagir, 1972)

Dosinia tumida (Gray, 1838)

Benthic

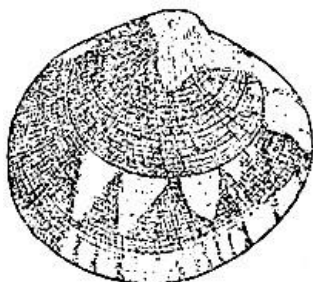
(Fischer-Piette and Delmas, 1967)

Genus *Gafrarium* Roding, 1798

Gafrarium divaricatum (Gmelin, 1791)33 mm.reddishbrown zigzag markings on outer surface

Intertidal sand and gravel

(Melvill and Abercrombie, 1892 as *Circe divaricata*; OBIS, 2006)



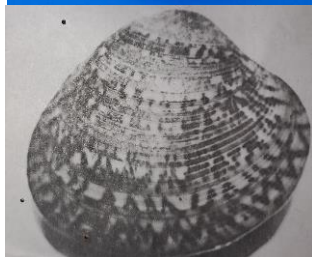
(After Gravely, 1941)

Genus *Circenita* JousSeaume, 1888

Circenita callipyga (Born, 1778) 36-68mm.

Muddy cum sandy shores below 0-tide

(Melvill and Standen, 1906 as *Gafrarium calipygum* (Von Born) and *Lioconcha arabica*)



Genus *Lioconcha* Mörch, 1853

Lioconcha ornata (Dillwyn, 1817) 45mm.

1- 10 fathoms, sand and mud, gravel (Melvill and Standen, 1907 as *Lioconcha picta* (Lamarck)

Genus *Saxidomus* Conrad, 1837

Saxidomus purpurata (Sowerby II, 1852)

Height 75 mm, length 90 mm, width 45 mm. Surface grayish-white, purple interior.

Intertidal to 40 m., sandy mud and gravel (Sowerby II, 1852 as *Tapes purpurata*)

Genus *Clementia* Gray, 1842

Clementia asiatica (Melvill, 1899)

27 -50 m. On muddy, sandy muddy substrata ;at 3-7 fathoms.

(Melvill, 1899 as *Oedalina asiatica*)

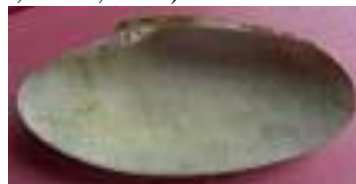


Genus *Paratapes* Stoliczka, 1870

Paratapes undulatus (Born, 1778)

Inter to sub tidal mudflats

(Melvill *et al.*, 1906 as *Tapes (Textrix) textrix*; OBIS, 2006)



Genus *Mysia* Lamarck, 1818

Mysia undata (Pennant, 1777) Up to 38 mm. White or light yellow, periostracum indistinct. Inner surfaces glossy white Burrowing in muddy, coarse bottoms. Offshore, but probably extending little deeper than 50 m.

(Oliver, 1996 as *Venus sinuosa* Pennant)

Family Glauconomidae Gray, 1853

Genus *Glauconome* Gray, 1828

Glauconome cerea Reeve, 1844 dirty whitish, 47 mm.

Mangroves

(Melvill, 1928 as *Tapes oncodes*)

Genus *Placamen* Iredale, 1925

Placamen lamellatum (Röding, 1798) 8-12mm. rust indistinctly marked with rust-brown or falvous white, shining, rayed with purple
In crevices in rock or among oyster
(Khan and Dastagir, 1972 as *Chione calophylla* (Philippi) and *Chione tiara*)



(After Gravely, 1941)

Family Vesicomidae Dall and Simpson, 1901

Genus *Calyptogena* Dall, 1891

Calyptogena makranensis Krylova and Sahling, 2006. 52-82 mm.

Gas hydrants

(Krylova and Sahling, 2006)

Order Myida Stoliczka, 1870

Superfamily Myoidea Lamarck, 1809

Family Myidae Lamarck, 1809

Genus *Mya* Linnaeus, 1758

Mya arenaria Linnaeus, 1758

Intertidal mud and sand

(PSF Report, 1977)



Mya truncata Linnaeus, 1758

Intertidal mud and sand

(PSF Report, 1977)



Family Corbulidae Lamarck, 1818

Genus *Corbula* Bruguière, 1797

Corbula rugifera Adams in Smith, 1903

White in colour

Mud and sand

(Melvill *et al.*, 1906 in Myidae)

Corbula erythraeensis Adams, 1871

6-9mm.

Offshore mud, dredged at 120m.

(Melvill *et al.*, 1906 in Myidae)



Corbula taitensis Lamarck, 1818

Sub littoral mud and sand

(Melvill *et al.*, 1906 as *Corbula modesta* in Myidae; OBIS, 2006)



Genus *Bassina* Jukes-Browne, 1914

Bassina foliacea Philippi, 1846

Sub littoral

(Melvill *et al.*, 1906 as *Anaitis foliacea*; OBIS, 2006)

Genus *Lioconcha* Mörch, 1853

Lioconcha picta Lamarck, 1818

Intertidal sand

(PARC Report, 1986)

Lioconcha fastigiata Sowerby, 1851

Subtidal and intertidal sand

(PARC Report, 1986 as *L. fastigala*; OBIS, 2006)

Lioconcha castrensis Linnaeus, 1758

50mm. shining white, ash or saffron tinged with suffuse chestnut or black zigzag markings

Intertidal sand

(Khan and Dastagir, 1972 as *Circe castrensis*; OBIS, 2006)



(After Khan and Dastagir, 1972)

Genus *Sunetta* Link, 1807
Sunetta scripta (Linnaeus, 1758) 15-50mm. brown chevron shaped colour pattern
 Infaunal, sandy beaches
 (Khan and Dastagir, 1972)



(After Khan and Dastagir, 1972)

Sunetta donacina Gmelin, 1791 5 cm.
 Infaunal, sandy beaches
 (Sowerby, 1895 as *Sunetta kurachensis* Sowerby; OBIS, 2006)
Sunetta solanderii Gray, 1825
 Infaunal
 (Melvill *et al.*, 1906)



(After Femorale, 2011)

Genus *Circe* Schumacher, 1817
Circe scripta Linnaeus, 1758 20-45mm.
 Infaunal, in sand
 (Khan and Dastagir, 1972; OBIS, 2006)



Circ rugifera (Lamarck, 1818)
 Infaunal, in sand
 (Kazmi *et al.*, 2018)

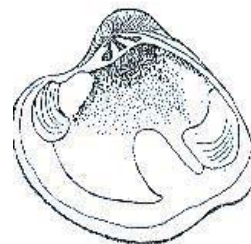


Genus *Pitar* Romer, 1857
Pitar nobilis Reeve, 1849

Muddy cum sandy shores
 (Khan *et al.*, 1973)
Pitar striatum Gray, 1838
 Muddy cum sandy shores
 (PARC Report, 1986 as *Pitar (Pitarina) striatum*)
Pitar lineolatum Sowerby, 1854
 Sandy bottom
 (PARC Report, 1986 as *Pitar (Pitarina) lineolatum*)
 Genus *Ezocallista* Kira, 1959
Ezocallista brevisiphonata (Carpenter, 1864)
 Sandy bottom
 (PARC Report, 1986 as *Callista brevisiphonata* Carpenter)
 Genus *Callista* Poli, 1791
Callista umbonella (Lamarck, 1818)
 Intertidal zone of creek
 (Jahangir *et al.*, 2012)



Callista erycina Linnaeus, 1758 16-33mm. light brown in sand or mud at low tide
 (Khan and Dastagir, 1972 as *Pitar erycina*, OBIS, 2006)



(After Khan and Dastagir, 1972)

Callista festiva (G.B. Sowerby II, 1851)
 Mud creeks
 (Melvill *et al.*, 1906)
Callista florida Lamarck, 1818 59mm.
 Intertidal muddy sand
 (Melvill *et al.*, 1906; OBIS, 2006)
Callista phasianella Deshayes, 1854
 Hard muddy sand
 (Melvill *et al.*, 1906)
 Genus *Katelsia* Römer, 1857
Katelsia japonica Gmelin, 1791
 Intertidal sandy bottom
 (PARC Report, 1986 as *K. (Hemitepeus) japonica*)

Genus *Marcia* Adams and Adams, 1857
Marcia cordata (Forsskål in Niebuhr, 1775): Outside of shell variable, whitish or buff to brown, often with various patterns of faint to well marked darker spots, blotches, radial or oblique rays; interior whitish, sometimes darker coloured on hinge area.

Benthic. Intertidal and shallow subtidal sand.

(Psomadakis *et al.*, 2015)

Marcia hiantina (Lamarck, 1818)

Subtidal, intertidal sand, gravel, mud flats mangroves

(Melvill *et al.*, 1906 as *Tapes*

(*Hemitapes*) *hiantinus*; PARC Report, 1986 as *Katelysia* (*Hemitepeus*) *hiantina*; OBIS, 2006)

Marcia recens (Holten, 1802) 35-73mm. Outside of shell usually beige to light fawn, with a large variety of darker brown or even black rays, blotches, zigzag lines or spots; interior whitish, often tinged purplish blue on hinge area.

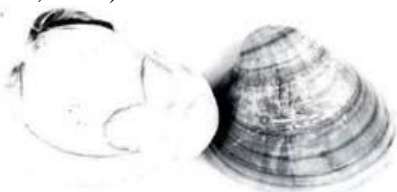
Mud flats. Sandy-cum-muddy at low tide and mangrove areas. Intertidal and sublittoral to a depth of 50 m.

(Melvill *et al.*, 1906 as *Tapes* (*Hemitapes*) *orientalis* Reeve; Ranjha, 1960; Jahangir *et al.*, 2012 as *Marcia marmorata* (Lamarck)



(After Moazzam, 2022)

Marcia opima (Gmelin, 1791) 39-70mm. In sandy-cum-muddy bottoms at 0-m tide (Huber, 2010)



Marcia pinguis Preston, 1953

Mud flats

(Melvill, *et al.*, 1906 as *Tapes* (*Hemitapes*) *pinguis*)

Genus *Amiantis* Carpenter, 1817
Amiantis umbonella (Lamarck, 1818) 33-73 mm.

Sandy-cum-muddy and muddy at low tide

(Jahangir *et al.*, 2012)



Genus *Timoclea* Brown, 1827

Timoclea arakana (Nevill and Nevill, 1871) brown to almost colourless, except for one or two cinereous blotches posterior side, lunule dark brown

Sandy sediments in coastal waters from just offshore to a depth of about 130 m, lives in fine and clean sand, from low tide down to 180 m. Sand and muddy sand On mud and shingle Subtidal

(Melvill, 1897 as *Chione mekranica*; *Timoclea mekranica* and *Timoclea layardi* (Reeve, 1864) as *Chione layardi* may be variations of *Timoclea arakana* cf Oliver, 1995



Timoclea imbricata (Sowerby, 1853)

2.5mm-12mm.

Subtidal sand and muddy sand

(Melvill *et al.*, 1906 as *Chione imbricata*; OBIS, 2006.)



Timoclea cochiniensis (G. B. Sowerby II, 1853) 15cm

Subtidal sand and muddy sand

(Florida Museum of Natural History (UF) *Timoclea cochiniensis* and *T. imbricata* are often mixed up in literature.



(Picture courtesy Gul, 2017)
Superfamily Pholadoidea Lamarck, 1809

Family Pholadidae Lamarck, 1809
Genus *Pholas* Linnaeus, 1758

Pholas dactylus Linnaeus, 1758
Subtidal soft rocks, wood and sand
(Melvill *et al.*, 1906 as *Pholas (Dactylina) dactylus*)



Pholas orientalis Gmelin, 1791 70-75 mm. snowy white
Intertidal infauna, burrows in fine sediments, creeks clay rocks and mud
(Melvill *et al.*, 1906, as *Pholas (Dactylina) orientalis*, Khan and Dastagir, 1972; OBIS, 2006)



Genus *Barnea* Risso, 1826
Barnea birmanica (Philippi, 1849)
Mangroves
(Woodward, 1856 as *Pholas bakeri*)



Genus *Jouannetia* Desmoulins, 1828
Jouannetia cumingii (Sowerby, 1850)
20-38mm.
Boring in muddy rocks. Infaunal
(Khan and Dastagir, 1972; OBIS, 2006)

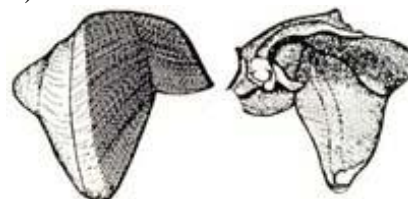


Jouannetia globulosa (Quoy and Gaimard, 1835)
Boring in muddy rocks and corals
(Khan and Dastagir, 1972 in Jouannetidae)

Genus *Penitella* Valenciennes, 1846
Penitella gabbii (Tryon, 1863)
Intertidal limestone
(PARC Report, 1986 as *Pholadidea (Penitella) kamakurensis*)
Genus *Martesia* Sowerby, 1824
Martesia striata (Linnaeus, 1758) 10-20 mm.
Shallow waters, borer in submerged or floating wood
(Khan and Dastagir, 1972)

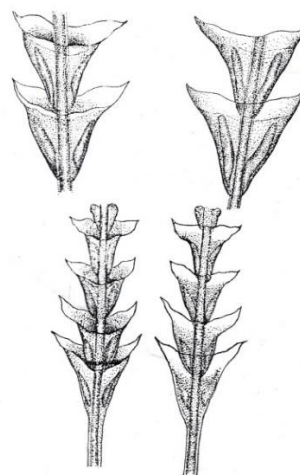


Family Teredinidae Rafinesque, 1815
Subfamily Bankiinae Turner, 1966
Genus *Bankia* Gray, 1842
Bankia rochi Möller, 1931 24.5mm.
Shallow water woods
(Ranjha, 1959; Barkati and Tirmizi, 1988)



(After Tirmizi, 1985 unpublished)

Bankia campanellata Moll and Roch, 1931
Shallow water wood
(Ranjha, no specified date; Niazi, 1973, Tirmizi and Barkati, 1988 as *B. (Bankia) bengalensis* Nair; OBIS, 2006)



Pallets

Bankia bipalmulata (Lamarck, 1801)
 Shallow water wood
 (Niazi, 1973, OBIS, 2006)
 Genus *Nausitora* Wright, 1864
Nausitora dunlopei Wright, 1864.
 Mangrove woods, backwater
 (Niazi, 1973 as *Bankia (Nausitora)*
lanceolata Rajgopal)



(Pallet, after Turner, 1966)

Genus *Dicyathifer* Iredale, 1932
Dicyathifer mannii Wright, 1866 30
 mm.
 Shallow brackish water, mangrove woods
 (Niazi, 1971 as *Teredo (Kuphus) mannii*;
 OBIS, 2006)
 Genus *Teredo* Linnaeus, 1758
Teredo navalis Linnaeus, 1758
 Boring into wood
 (Niazi, 1973 as *Teredo (Teredo) navalis*)



Animal and its wood holes

Teredo furciferavon Martens, 1894
 Mangrove Wood
 (Khan, *et al.*, 1973 as *Teredo, (Teredo)*
parksi; Niazi, 1973 as *T. (Teredo)*
furcillatus; OBIS, 2006)



(Pallet, after Turner, 1966)

Genus *Lyrodus* Gould, 1870
Lyrodus pedicellatus Quatrefages, 1849
 Woods

(Niazi, 1973 as *Teredo (Teredo) indica*,
Teredo (Teredops) samoensis and
Teredo (Teredops) diegensis)



(After Niazi, 1973)
 Superfamily Pandoroidea Rafinesque,
 1815

Family Pandoridae Rafinesque, 1815
 Genus *Pandora* Bruguiere, 1797
Pandora nasuta G.B. Sowerby I, 1830
 Benthic
 (Melvill and Standen, 1906)
Pandora (Pandora) flexuosa Sowerby,
 1820 5.7-11mm.
 Creeks, muddy sand and gravel in
 offshore area, dredged at 10-20m.
 (Melvill *et al.* 1906; Ahmed, 1994 as
Pandora flexuosa; OBIS, 2006)



Superfamily Thracioidea Stoliczka, 1870
 (1839)

Family Thraciidae Stoliczka, 1870
 Genus *Thracia* Sowerby, 1823
Thracia kakumana (Yokoyama, 1927)
 Rocks in offshore waters Lives on sand-
 silt deposits at depths ranging from 8-10
 to 20-25 m.
 (PARC Report, 1986)

Family Laternulidae Hedley, 1918
 Genus *Laternula* Roding, 1798
Laternula anatina (Linnaeus, 1758) 35-
 70mm. silvery white
 Offshore on gravely mud flats
 (Khan and Dastagir, 1972 as *Anatina*
subrostrata)



(After Khan and Dastagir, 1972)

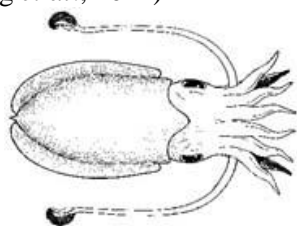
Class Cephalopoda Cuvier, 1795
 Subclass Coleoidea Bather, 1888
 Order Spirulida Stolley, 1919
 Family Spirulidae Owen, 1836
 Genus *Spirula* Lamarck, 1799
Spirula spirula (Linnaeus, 1758) Dark reddish brown. Luminescent. 35-45mm. Mesopelagic, from 600 to 700 m. during the day and found in depths less than 300 m at night. Internal shell of the species very commonly floats ashore onto beaches.
 (Reid, 2005)



Internal shell

Order Sepiida Zittel, 1895

Family Sepiidae Keferstein, 1866
 Genus *Sepia* Linnaeus, 1758
Sepia kobiensis Hoyle, 1885 Reddish brown. Head with V-shape reddish stripe on dorsal margins of eye orbits and with orange stripes extending from posterior end of head to basal portions of arms
 Depth range subtidal to 200 m.
 (Fanning *et al.*, 2011)



Sepia latimanus Quoy and Gaimard, 1832
 Shallow - water species, on coral reefs, living at a depth of up to 30 m.
 (Roper *et al.*, 1984)



(Photo contributed by Moazzam)



Cluster of eggs (after Hornell, 1951)

Sepia pharaonis Ehrenberg, 1831 Pale Brownish or reddish purple; head and arms with transverse zebra stripes
 Usual capture depth 0-120m.
 (Ashraf, 1969; Psomadakis *et al.*, 2015 as *Sepia ramani* Neethiselvan)



(Photo after Moazzam, 2022)

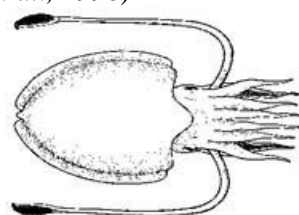
Sepia aculeata Van Hasselt, 1835 [in Férussac and d'Orbigny, 1835
 Usual capture depth 60 m.
 (Ashraf, 1969, Voss *et al.*, 1998)

Sepia prashadi Winckworth, 1936 dorsal mantle with transverse zebra stripes
 Usual capture depth about 50-200m.
 (Roper *et al.*, 1984)

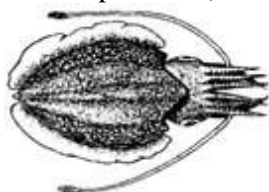


(Photo contributed by Moazzam)

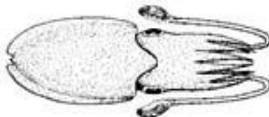
Sepia savignyi Blainville, 1827
 At 25 to 70m depth
 (Voss *et al.*, 1998)



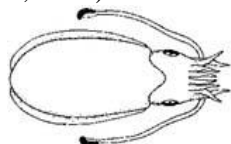
Sepia stellifera Homenko and Khromov, 1984 Dorsal mantle with many small, bright, brown-pink spots, encircled with green-blue rings, the whole pattern resembling a starry sky
Usual capture depth 50-100 m.
(Sweeney and Roper, 1998)



Sepia omani Adam and Rees, 1966 Light brown; dorsal mantle with dark brown transverse stripes
Neretic, 20-201m.depth
(Roper *et al.*, 1984)



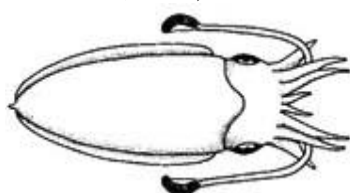
Sepia arabica Massy, 1916 Reddish purple; head with chromatophores concentrated over eye orbits. Dorsal mantle chromatophores are irregularly distributed in patches; base of fins on posterior half with 10 to 12 patches of concentrated reddish purple
At 99-272 m.
(Roper *et al.*, 1984)



Sepia murrayi Adam and Rees, 1966
At 106 m.
(Roper *et al.*, 1984)

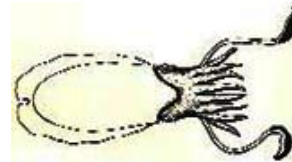


Sepia trygonina (Rochebrune, 1884)
Purplish brown; base of fins in males with a dark purple band
Usual capture depth 20-200m.
(Khromov *et al.*, 1999)

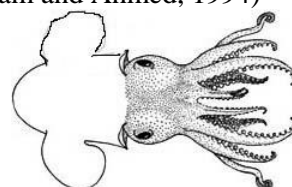


Genus *Sepiella* Gray, 1849

Sepiella inermis (Van Hasselt [inFérussac and d'Orbigny] 1835 Greyish brown; dorsal mantle with more than 7 reddish patches adjacent to base of fins
At about 20-40 m.depth.
(Ashraf, 1969; Voss *et al.*, 1998)

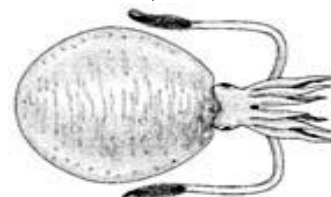


Family Sepiolidae Leach, 1817
Genus *Euprymna* Steenstrup, 1887
Euprymna stenodactyla (Grant, 1833)
Benthic
(Moazzam and Ahmed, 1994)



Order Teuthidea Naef, 1916 nomen dubium
Suborder Myopsida Orbigny, 1841

Family Loliginidae Lesueur, 1821
Genus *Sepioteuthis* Blainville, 1824
Sepioteuthis lessoniana Orbigny, 1826
Brown on the back, with white spots and stripes,
At 100 m depth.
(Roper *et al.*, 1984)



Genus *Uroteuthis* Rehder, 1945
Sub genus *Photololigo* Natsukari, 1984
Uroteuthis (Photololigo) duvaucelii (Orbigny, 1835) 320 mm.
At 30 to 70m. depth
(Ashraf, 1969; Khan *et al.*, 1973 as *Loligo duvauceli*)





(Picture after Moazzam, 2022)

Uroteuthis (Photololigo) vossi (Nesis, 1982) 140 mm.

Inshore

(Jereb and Roper, 2010)

Uroteuthis (Photololigo) singhalensis (Ortmann, 1891) 500mm.

Extends to bottom depths of 220 m.

(Jereb and Roper, 2010)

Uroteuthis (Photololigo) edulis (Hoyle, 1885) 502 mm. for males, 410 mm for females

Inhabits continental shelf waters and winters inshore in shallow water

(Jereb and Roper, 2010)

Genus *Loliolus* Steenstrup, 1856

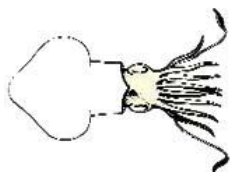
Subgenus (*Loliolus*) Steenstrup, 1856

Loliolus (Loliolus) hardwickei (Gray, 1849) 88 mm.

Littoral

(Ashraf, 1969; Khan *et al.*, 1973 as

Loliolus inverigatoris Goodrich)



(From Tirmizi and Zehra, 1982)

Order Oegopsida Orbigny, 1845

Family Pyroteuthidae Pfeffer, 1912

Genus *Pyroteuthis* Hoyle, 1904

Pyroteuthis margaritifera (Rüppel, 1844)

In upper mesopelagic zone in the daytime then undergo diel vertical migration into epipelagic waters at night

(FAO)



Genus *Pterygioteuthis* Fischer, 1896

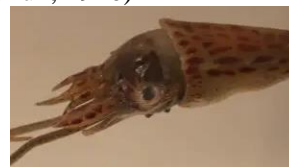
Pterygioteuthis giardi Fischer, 1896

Mesopelagic to the epipelagic zone predominantly oceanic just below the surface to about 500 m.

(FAO)



(After Chun, 1910)



Family Thysanoteuthidae Kefferstein, 1866

Genus *Thysanoteuthis* Troschel, 1857

Thysanoteuthis rhombus Troschel, 1857

mantle intense brown

Deep sea. 2.3 m.

(Moazzam and Ahmed, 1994; Chesalin and Zuyev, 2002 as *Taningia danae* Joubin)



(From Creative Commons Attribution)

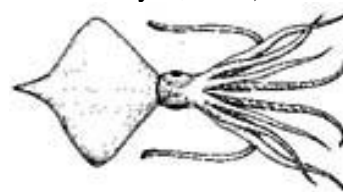
Family Ancistrocheiridae Pfeffer, 1912

Genus *Ancistrocheirus* Gray, 1849

Ancistrocheirus lesueurii (Orbigny, 1842)

Epipelagic, mesopelagic, and bathypelagic

(Chesalin and Zuyev, 2002)



Family Brachioteuthidae Pfeffer, 1908

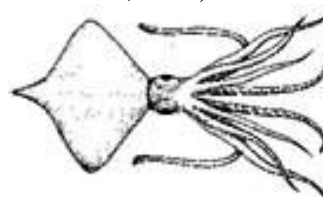
Genus *Brachioteuthis* Verrill, 1881

Brachioteuthis picta Chun, 1910

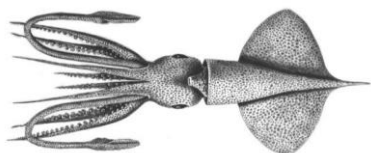
Up to 90 mm. Light purple-brown or chocolate hue

Paralarvae epipelagic and adults lower epipelagic, mesopelagic and bathypelagic.

(Roper and Jereb, 1984)

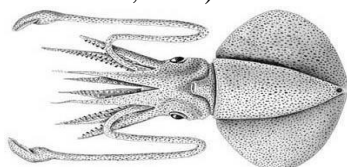


Family Cycloteuthidae Naef, 1923
 Genus *Cycloteuthis* Joubin, 1919
Cycloteuthis sirventi Joubin, 1919 500 mm.
 Lower epipelagic, mesopelagic, rarely bathybenthic
 (Roper and Jereb, 2010)



(Image from Young and Roper 1969)

Genus *Discoteuthis* Young and Roper, 1969
Discoteuthis discus Young and Roper, 1969 90 mm.
 Lower epipelagic to mesopelagic
 (Roper and Jereb, 2010)



(Image from Young and Roper, 1969)

Family Cranchiidae Prosch, 1847
 Genus *Cranchia* Leach, 1817
Cranchia scabra Leach, 1817 150 mm.
 Paralarvae and juveniles epipelagic to upper mesopelagic, adults mesopelagic and bathypelagic
 (Roper and Jereb, 1984)

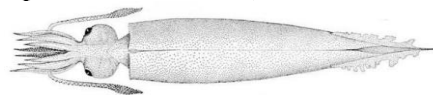


Genus *Liocranchia* Pfeffer, 1884
Liocranchia reinhardti (Steenstrup, 1856) 250 mm.
 Mesopelagic and bathypelagic depths; surface to 1 -200 m.
 (Jereb, 1984)



Genus *Egea* Joubin, 1933

Egea inermis Joubin, 1933 420 mm.
 Mostly found close to land, scattered throughout the open water in the oceans
 (Roper and Jereb, 2010)

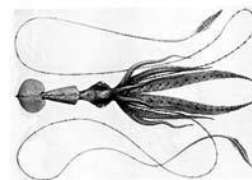


(Image from Young and Mangold 2016)

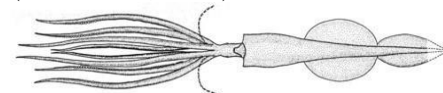
Sandalops melancholicus Chun, 1906 ML 110 mm.
 Epipelagic, mesopelagic and bathypelagic zones,
 (Roper and Jereb, 2010)



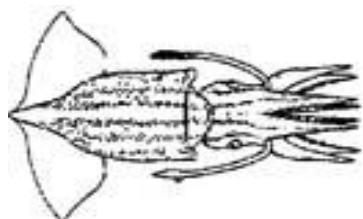
Family Chiroteuthidae Gray, 1849
 Genus *Chiroteuthis* d'Orbigny, 1841
Chiroteuthis veranyi (Ferussac, 1834) 100 to 200 mm.
 Mesopelagic to bathypelagic species as adults
 (Roper and Jereb, 2010)



Genus *Asperoteuthis* Nesis, 1980
Asperoteuthis acanthoderma (Lu, 1977) Up to 800 mm.
 Mesopelagic to bathypelagic
 (Jereb *et al.*, 2016)



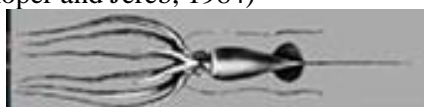
Genus *Grimalditeuthis* Joubin, 1899
Grimalditeuthis bonplandi (Verany, 1839) Up to 250 mm.
 Mesopelagic to bathypelagic
 (Jereb *et al.*, 2016)
 Family Enoploteuthidae Pfeffer, 1900
 Genus *Abralia* Gray, 1849
 Subgenus (*Enigmoteuthis*) Adam, 1973
Abralia (Enigmoteuthis) marisarabica Okutani, 1983
 Epipelagic to mesopelagic
 (Okutani, 1983)



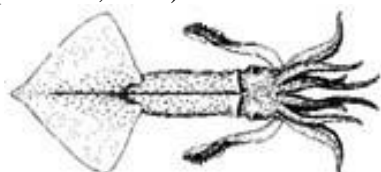
(Image from Zuyev, 2002)

Family Joubiniteuthidae Naef, 1922
Genus *Joubiniteuthis* Berry, 1920
Joubiniteuthis portieri (Joubin, 1916)
105 mm; tail length an additional 155 mm.

Mesopelagic to bathypelagic
(Roper and Jereb, 1984)



Family Onychoteuthidae Gray, 1847
Genus *Onychoteuthis* Lichtenstein, 1818
Onychoteuthis banksi (Leach, 1817)
150m. depth, epipelagic, mesopelagic, bathypelagic
(Roper *et al.*, 1984)



Family Ommastrephidae Steenstrup, 1857
Genus *Ornithoteuthis* Okada, 1927
Ornithoteuthis volatalis (Sasaki, 1915)
In midwater over the slope and seamounts and near the bottom, in upper 300m.
(Dunning, 1998)

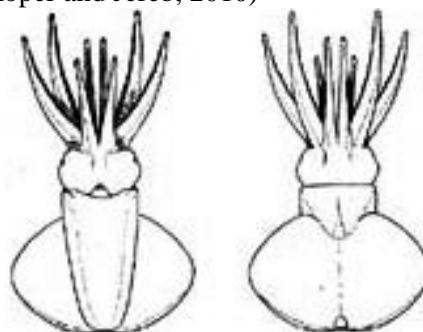


Genus *Sthenoteuthis* Verrill, 1880
Sthenoteuthis oulaniensis (Lesson, 1830)
Epipelagic to mesopelagic and upper bathypelagic oceanic in open waters over great depths of more than 200 to 400 m.
(Fishery Agency of Japan, 1975; Yamanaka *et al.*, 1976 as *Symplectoteuthis oulaniensis*)



(Photo contributed by Moazzam)

Family Octopoteuthidae Berry, 1912
Genus *Octopoteuthis* Rüppell, 1844
Octopoteuthis sicula Rüppell, 1844
Mesopelagic to bathypelagic (to 2 000 m.) during daytime with nocturnal ascent into epipelagic zone
(Roper and Jereb, 2010)



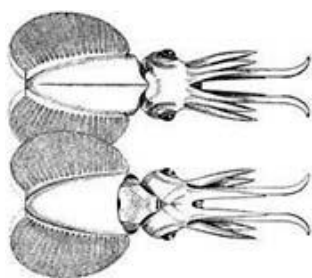
(Image from FAO)

Super order Decapodiformes Young, Vecchione and Donovan, 1998
Order Bathyteuthida Lindgren, 2010
Superfamily Bathyteuthoidea Pfeffer, 1900

Family Bathyteuthidae Pfeffer, 1900
Genus *Bathyteuthis* Hoyle, 1885
Bathyteuthis abyssicola Hoyle, 1885
Maximum length 75 mm. deep maroon-coloured
Between 700 and 2 500 m.
(Roper and Jereb, 2010)

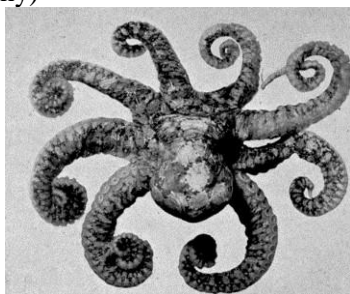


Family Ctenopterygidae Grimpe, 1922
Genus *Ctenopteryx* Appellöf, 1890
Ctenopteryx sicula (Verany, 1851) p to 100 mm.
Paralarvae epipelagic; adults descend to mesopelagic and bathypelagic depths
(Jereb *et al.*, 2016)



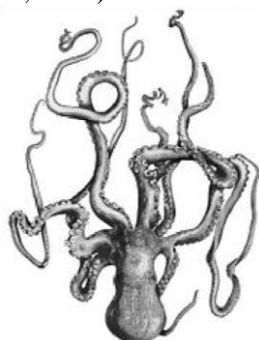
(Drawing taken from Young and Vecchione, 2016)
Order Octopoda Leach, 1818
Superfamily Octopodoidea d'Orbigny, 1840

Family Octopodidae Orbigny, 1840
Genus *Abdopus* Norman and Finn, 2001
Abdopus horridus (d'Orbigny, 1826)
Reefs
(Ashraf, 1969 as *Octopus horridus* Orbigny)



(From Wikimedia)

Genus *Callistoctopus* Taki, 1964
Callistoctopus ornatus (Gould, 1852)
Depths range from 0 to ~10 m.
(Jereb *et al.*, 2016)



Callistoctopus macropus (Risso, 1826)
20cm. Red, with white blotches on body and paired white spots on arms.
Lives near the shore at depths down to about 17 m., in sand, rubble or sea-grass meadows, or buries itself under the sand.
(Bianchi, 1984; Moazzam and Ahmed, 1994 as *Octopus macropus*; frequently incorrectly identified)



Adult and developmental stages



Genus *Amphioctopus* P. Fischer, 1882
Amphioctopus varunae (Oommen, 1971)
125-135m.
(Voight, 1998 as *Octopus varunae* Oommen)



Amphioctopus marginatus (Taki, 1964)
300mm. Pattern of orange-brown to purple with dark reticulations defining distinct patches in irregular longitudinal rows; suckers white to pink contrasting against dark brown to black along leading edge of arms I to III; white triangle below each eye
Depths range from shallow subtidal to at least 190 m. Known from coastal muddy waters on mud and sand substrates
(Silas, 1960 as *Octopus aegina* Gray, 1849, needs to be confirmed fide Pomadakis *et al.*, 2015)



Amphioctopus neglectus (Nateewathana and Norman, 1999)
Depth range unknown
(Moazzam and Ahmed, 1994 as *Octopus membranaceus* (Quoy and Gaimard))



Genus *Octopus* Cuvier, 1797
Octopus vulgaris Cuvier, 1797 Grey,
 yellow, brown
 Benthic, neritic, 0-200m.
 (Ashraf, 1969; Pomadakis *et al.*, 2015 as
Octopus cf vulgaris)



Octopus cyaneus Gray, 1849
 In rock crevices, hidden under an
 overhang, a hiding place among coral
 heads, or a hole excavated in rubble or
 sand
 (Roper *et al.*, 1984)



Genus *Macrotritopus* Grimpe, 1922
Macrotritopus defilippi (Vérany, 1851)
 Yellowish brown
 Shallow sandy area
 (77978.0 collect. Steiner, 1973; Roper *et al.*, 1984 as *Octopus defilippi*)



Genus *Cistopus* Gray, 1849
Cistopus indicus (Rapp in Orbigny,
 1835) benthic, 0-50m on muddy bottom
 (Ashraf, 1969. An unresolved *Cistopus*
 species misidentified as *Cistopus indicus*,
 fide: Roper *et al.*, 2014)

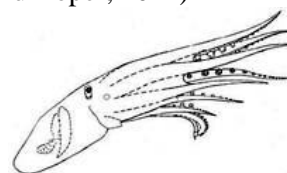


Genus *Teretioctopus* Robson, 1929

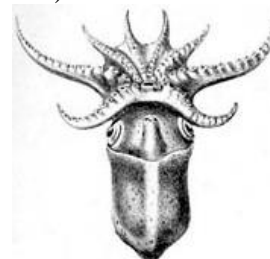
Teretioctopus indicus Robson, 1929
 Depth range to 1 000 m.
 (Robson, 1929)
Tremoctopus violaceus delle Chiaje,
 1830
 In surface to mid-waters
 (Moazzam, 2019)



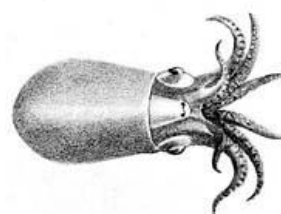
Family Amphitretidae Hoyle, 1886
 Genus *Vitreledonella* Joubin, 1918
Vitreledonella richardi Joubin, 1918
 450 mm.
 Depth range from near the surface to at
 least 1 000 m.
 (Jereb and Roper, 2014)



Genus *Bolitaena* Steenstrup, 1859
Bolitaena pygmaea (Verrill, 1884)
 Abyssopelagic. Depth range from 100 to
 1 400 m.
 (IUCN, 2015)



Genus *Japetella* Hoyle, 1885
Japetella diaphana Hoyle, 1885 160
 mm.
 From 200 to 1 000 m.
 (Silas, 1968)

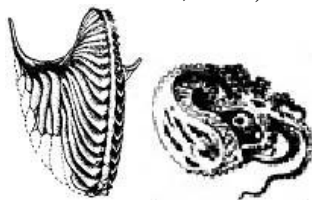


Genus *Amphitretus* Hoyle, 1885
Amphitretus pelagicus Hoyle, 1885
 Transparent, almost colourless
 Depth range from 100 to 2 000 m.
 (Jereb *et al.*, 2016)



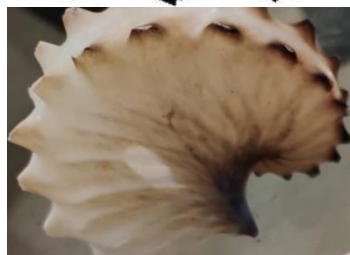
Superfamily Argonautoidea Cantraine, 1841

Family Argonautidae Cantraine, 1841
Genus *Argonauta* Linnaeus, 1758
Argonauta argo Linnaeus, 1758 Female 300 mm. Male length to 15 mm. Body of females purple-blue to wine-red from above, light from below; extended 1st arm flap purple-Red; shell, porcelain-white
Epipelagic (100m. in depth)
(Moazzam and Ahmed, 1994)



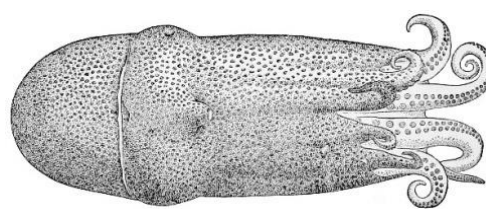
Animal and eggcase

Argonauta hians Lightfoot, 1786 Female 118mm., Male 40mm. Variable from deep maroon to silver; dorsal mantle adorned with large chromatophores, smaller chromatophores present on ventral mental, shell off white to brown
Epipelagic, oceanic.
(Ashraf, 1969)



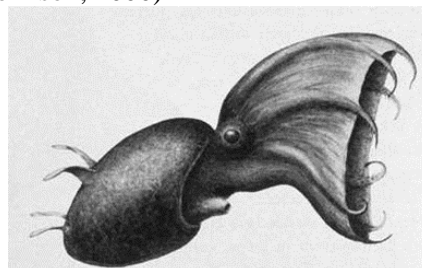
(Photo courtesy: Aemon Khan)

Family Alloposidae Verrill, 1881
Genus *Haliphron* Steenstrup, 1859
Haliphron atlanticus Steenstrup, 1861
Total length of females up to 4 mm Males up to 210 mm.
Pelagic
(Roper *et al.*, 1984)



(Image source: Verill, 1881)

Order Vampyromorpha Robson, 1929
Family Vampyroteuthidae Thiele, in Chun, 1915
Genus *Vampyroteuthis* Chun, 1903
Vampyroteuthis infernalis Chun, 1903
Up to ~300 mm.
Depths range from 600 to 1 200 m.
(Johnson, 2000)



References:

- ABBOTT, R.T., 1960. The genus *Strombus* in the Indo-Pacifiic. Indo-Pacific Mollusca, I (1): 33-146, pls 2-117.
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Phylum Arthropoda

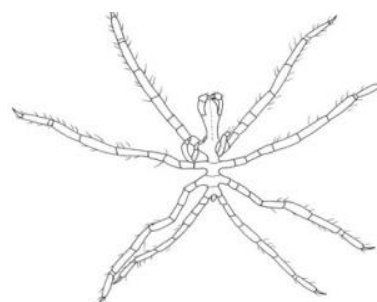
The phylum Arthropoda includes the familiar groups -insects, arachnids, myriapods, crustaceans and a rare one- the Symphyla. They have over a million described species, making up more than 80% of all described living animal species, some of which, unlike most animals, are very successful in dry environments. The word 'marine' is broadly interpreted here as referring to any more or less saline waters, and a 'marine arthropod' as one that spends at least part of its life in association with the marine environment. They include not only true insects, including the Collembola (which are not technically insects, but are closely related), and insect parasites of marine birds and mammals, or living on seaweed. But a few do eat carcasses that wash up on the shore. The majority of these marine insect species live in intertidal or coastal habitats and most of them belong to the orders Hemiptera, Diptera, and Coleoptera.

Other kinds of intertidal air-breathing arthropods are notably spiders, pseudoscorpions, mites and centipedes, which live and feed with, or even on, the insects of marine habitats. The myriapods have been described from seashore sites at different times. However confusion can occur over both the definition of "littoral" and of the halophilic or otherwise status of particular examples. A term such as "littoral Mediterranean" might refer to shoreline species or to species found in ecosystems along the coast and maybe up to a considerable distance/height above it.

The arthropods range in size from the microscopic crustacean *Stygotantulus* up to the giant Japanese spider crab *Macrocheira*.

Subphylum Chelicerata Heymons, 1901
Class Pycnogonida Latreille, 1810
Order Pantopoda Gerstaecker, 1863

Family Phoxichilidiidae Sars, 1891
Genus *Anoplodactylus* Wilson, 1878
Anoplodactylus pycnosoma (Helfer, 1938)
Littoral, on rocks with dense vegetation
Low tide
(CAS: INVERT115019.0F.B. Steiner, 1973)



Anoplodactylus turbidus Stock, 1975

Algae

(Gul and Ghani, 2012)

Anoplodactylus angulatus (Dohrn, 1881)

Algae

(Gul and Ghani, 2012)

Anoplodactylus aff. *nanus* Krapp, Kocak and Katagan, 2008

On *Zoanthus sansibaricus*

(George *et al.*, 2020)

Anoplodactylus sp.

On *Zoanthus sansibaricus*

(George *et al.*, 2020)

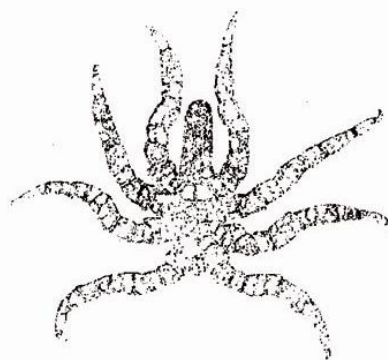
Family Pycnogonidae Wilson, 1878

Genus *Pycnogonum* Brunnich, 1764

Pycnogonum tessellatum Stock, 1968

Offshore

(Stock, 1968; Moazzam and Moazzam, 2003 as *Pycnogonum (Retroviger) tessellatum*)



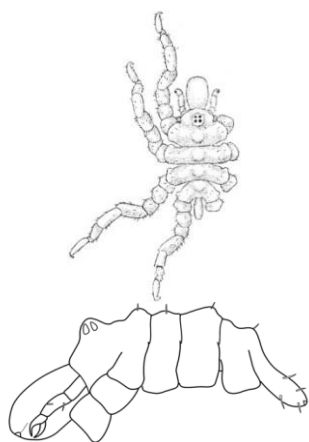
(After Stock, 1968)

Family Callipallenidae Hilton, 1942

Genus *Pigrogromitus* Calman, 1927

Pigrogromitus timsanus Calman, 1927
2.76 mm.

Rocky coast, tide pools, mid tide zone, littoral, seaweeds, sea anemone, wood panels, bare and algae covered rocks, deep sea; on *Zoanthus sansibaricus*
(CAS: INVERT 115012.0 collect. Steiner, 1973, 1975; Moazzam, 1987)



Male (After Calman 1927; George *et al.*, 2020, lateral view)

Family Nymphonidae Wilson, 1878

Genus *Nymphon* Fabricius, 1794

Nymphon setimanus Barnard, 1946

Algae

(Gul and Ghani, 2012)

Nymphon enteonum Child, 2002

Algae

(Gul and Ghani, 2012)

Family Callipallenidae Hilton, 1942

Genus *Propallene* Schimkewitch, 1909

Propallene socotrana Bartolini and Krapp, 2007

Algae

(Gul and Ghani, 2012)

Propallene kempi Calman, 1927

Coastal. Depth range: 0-4m.: among weeds.

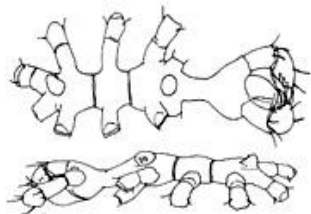
(Moazzam, 1979, abstract)

Genus *Callipallene* Flynn, 1929

Callipallene brevirostris (Johnston, 1837)

Algae

(Gul and Ghani, 2012)



Male trunk, ventral and lateral views (After Gul and Ghani, 2012)

Callipallene dubiosa Hedgpeth, 1949

On rocks with dense vegetation. Low tide. On *Zoanthus sansibaricus*

(CAS: INVERT collector Steiner, 1973)

Callipallene cf. *gabriellae* Correa, 1948

On *Zoanthus sansibaricus*

(George *et al.*, 2020)

Family Endeidae Norman, 1908

Genus *Endeis* Philippi, 1843

Endeis mollis (Carpenter, 1904)

Planktonic, on hydroid colonies

(Gul and Ghani, 2012)

Endeis meridionalis (Böhm, 1879)

On *Zoanthus sansibaricus*

(Gul and Ghani, 2012)

Endeis biseriata Stock, 1968

On rocks with dense vegetation. Low tide

(CAS: INVERT 115026.0 Steiner, 1973)

Family Ammotheidae Dohrn, 1881

Genus *Ammothella* Verrill, 1900

Ammothella appendiculata (Dohrn, 1881)

On algae. On *Zoanthus sansibaricus*

(Gul and Ghani, 2012)

Ammothella tippula Child, 1983

Low tide (0.5 ft)

(CAS: INVERT 115031.0 Steiner, 1973)

Ammothella indica Stock, 1954

On rocks with dense vegetation. Low tide

(CAS: INVERT 116147.0 Steiner, 1973)

Genus *Achelia* Hodge, 1864

Achelia echinata Hodge, 1864

Algae low tide (0.5 ft)

(CAS: INVERT 115022.0 collect.

Steiner, 1973)

Achelia karachiensis George, Siddiqui,

George and Lucena, 2020

On *Zoanthus sansibaricus*

(George *et al.*, 2020)

Achelia sp.

On *Zoanthus sansibaricus*

(George *et al.*, 2020)

Achelia sawayai Marcus, 1940

Algae

(Gul and Ghani, 2012)

Achelia cf. *boschi* Stock, 1992

On Hydroids

(Gul and Ghani, 2012)



Trunk (After Stock, 1992)

Achelia nana (Loman, 1908)

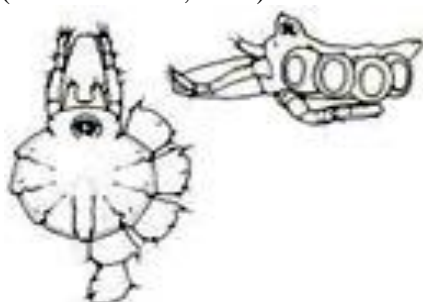
On rocks with dense vegetation. Low tide
(CAS: INVERT 116142.0 collect.
Steiner, 1973)

Genus *Nymphopsis* Haswell, 1885
Nymphopsis acinacispinatus Williams,
1940

On Bryozoa
(Gul and Ghani, 2012)

Genus *Tanystylum* Miers, 1879
Tanystylum bredini Child, 1970

On Algae
(Gul and Ghani, 2012)



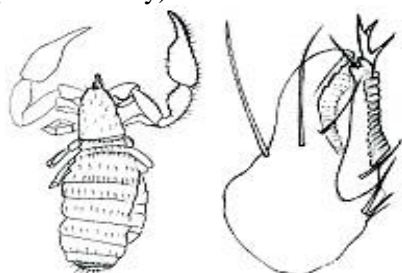
Trunk, ventral and lateral views (After
Muller, 1989)

Class Arachnida Cuvier, 1812
Order Pseudoscorpiones de Geer, 1778
Suborder Iocheirata Harvey, 1992

Family Superfamily Olpioidea Banks,
1895

Family Olpiidae Banks, 1895
Genus *Atemnus* Canestrini, 1884
? Atemnus politus (E. Simon, 1878)

3 mm. Brown.
Intertidal sediment on rocky shore
(Present study)



Order Araneae Clerck, 1757

Family Salticidae Blackwall, 1841
Genus *Menemerus* Simon, 1868

Menemerus nigli Wesolowska and
Freudenschuss, 2012

In rocks near the sea
(Wesolowska and Freudenschuss, 2012,
present study)



Sub class Acari Leach, 1817
Order Sarcoptiformes

Family Fortuyniidae van der Hammen,
1963

Genus *Fortuynia* van der Hammen, 1960
Fortuynia sp.

Rocky coast
(Schuster, 1989)

Fortuynia longiseta Pflugstl, 2015
Intertidal

(Aslam *et al.*, 2019)



(After Aslam *et al.*, 2019)

Super Order Acariformes Zakhvatkin,
1952

Order Prostigmata

Suborder Trombidiformes Reuter, 1909

Family Halacaridae Murray, 1877

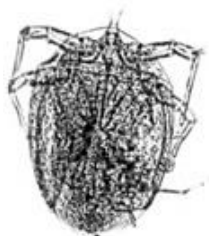
Genus *Scaptognathides* Monniot F., 1972

Scaptognathides sp. 317 mm.

Parasitizing birds, found in sand
(Present study)



Family Histiostomatidae Berlese, 1897
 ? Genus *Histiostoma* Kramer, 1876
 ? *Histiostoma gracilis* Ashfaq, Sarwar
 and Ali, 2000
 Psammobiont
 (Present study)



Family Cheyletidae Leach, 1815
 Lower taxon indetermined
 Psammobiont
 (Present study)

Genus *Lobohalacarus* Viets, 1939
 ? *Lobohalacarus weberi* (Romijn and
 Viets, 1924)
 Psammobiont
 (Present study)



Infraorder? Uropodina Kramer, 1881
 In sand
 (Present study)

Super family Gamasida authority not
 found
 Lower taxa indetermined
 Psammobiont
 (Present study, nymph)



Order Parasitiformes Leach, 1815
 Indetermined taxa
 In sand
 (Present study)

Family Rhodacaridae Oudemans, 1902
 Lower taxon indetermined
 Psammobiont
 (Present study)



Subphylum Myriapoda Latreille, 1802
 Class Chilopoda Latreille, 1817
 Order Scolopendrida Leach, 1815

Family Erythraeidae Oudemans, 1902
 Psammobiont
 (Present study)

Family Scolopendridae Newport, 1844
 Genus *Rhysida* Newport, 1844
 ? *Rhysida longipeslongipes* (Newport,
 1845)
 46 mm.
 Intertidal by breaking open intertidal
 rocks, humid habitat
 (Khanna, 1994; present study)
 Class Symphyla Ryder, 188

Family Scolopendrellidae Bagnall, 1913
 Genus *Remysymphyla* Aubry and
 Masson, 1952

Remysymphyla spinosa Camacho & Vandenspiegel 2012 (Identification to be taken cautiously cf. Edwards, 1990) 1mm
Interstitial in sand
(Kazmi and Naushaba, 2000 as Symphyla; Kazmi, 2002)



Subphylum Hexapoda Blainville, 1816
Class Entognatha Hirst and Maulik, 1926
Order Collembolla Lubbock, 1870
Superfamily Neanuroidea Massoud, 1967

Family Neanuridae Börner, 1901
Genus *Pseudanurida* Schott, 1901
Pseudanurida billitonensis Schott, 1901
2 mm.

Polluted water, virtually terrestrial
(Present study)



Pseudanurida bogoyawlensky (Becker 1905)

Deltaic region
(Aslam *et al.*, 2018)



(After Aslam *et al.*, 2018)

Class Insecta Linnaeus, 1758
Subclass Pterygota Lang, 1888
Order Coleoptera Linnaeus, 1758

Family Cicindelidae Latreille, 1802
Genus *Cicindela* Linnaeus, 1758
Cicindela histrio (Tschitscherine, 1903)
Salt marshes
(Gillett, 1995; Nazim *et al.*, 2009)

Family Buprestidae Leach, 1815
Genus *Chrysochroa* Dejean, 1833
Chrysochroa chinensis Laporte and Gory, 1835
Salt marshes in wood
(Nazim *et al.*, 2009)
Suborder Polyphaga Emery, 1886
Superfamily Hydrophiloidea Latreille, 1802

Family Hydrophilidae Latreille, 1802

Subfamily Hydrophilinae Latreille, 1802
Genus *Berosus* Leach, 1815
Subgenus *Berosus* Leach, 1815
Berosus (Berosus) nigriceps (Fabricius, 1801) Surface pale yellow brown. 1.5-9.0 mm.

Larvae living in stagnant water of mangroves
(Schodl, 1993; present study)



Subgenus *Enoplurus* Hope, 1838

Berosus (Enoplurus) indicus

Motschulsky, 1861

Mangroves

(Schodl, 1992; Darilmaz and Ahmed, 2015)



Berosus (Enoplurus) indiges Schodl, 1992

Deltaic region
(Schoedl, 1992)

Berosus elongatulus philippinus

Schoedl, 1992

Coastal marshes

(Schoedl, 1992)

Superfamily Staphylinoidea Latreille, 1802

Family Hydraenidae Mulsant, 1844

Genus *Ochthebius* Leach, 1815

Ochthebius minabensis Ferro, 1983

Littoral, freshwater and marine coasts
(Jach, 1992)

Ochthebius cf. ***ponticus*** Jenisteia, 1956

Adult littoral freshwater, halophilous, larvae not aquatic

(Present study)

Suborder Adephaga Schellenberg, 1806

Superfamily Byrrhoidea Latreille, 1804

Family Elmidae Curtis, 1830

Genus *Potamophilus* Germar, 1811

Potamophilus species indeterminate
 Clinging to submerged wood
 (Present study)

Family Dytiscidae Leach, 1815
 Genus *Eretes* Laporte, 1833
Eretes griseus (Fabricius, 1781) 10-16 mm.
 In large standing water bodies with sandy or gravely bottom
 (Present study)



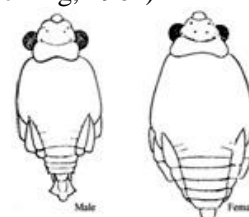
Order Hemiptera Linnaeus, 1758
 Suborder Heteroptera Latreille, 1810

Family Saldidae Amyot and Serville, 1843
 Genus *Micracanthia* Reuter 1912
Micracanthia ornatula (Reuter, 1881)
 Small pools in a mangrove swamp, near water on sandy shores, edges of ponds, bogs, marshes, mud flats
 (Hamid and Sultana, 1972 as *Saldula minor*; Polhemus and Polhemus, 2012)
 Genus *Pentacora* Reuter 1912
Pentacora malayensis (Dover, 1929)
 Damp sand beaches, saline estuaries and mangrove swamps
 (Hamid and Sultana, 1972 as *Saldula korangiensis* Hamid and Sultana)
 Genus *Omania* Horvath, 1915
Omania coleoprata Horvath, 1915
 On rocks piled up in front of a newly constructed sea wall
 (Cheng, 1976)
 Superfamily Gerroidea Leach, 1815

Family Gerridae Leach, 1815
 Subfamily Gerrinae Bianchi, 1896
 Genus *Limnogonus* Stål, 1868
Limnogonus fossarum fossarum Fabricius, 1775
 Brackish pools, stagnant freshwater
 (Present study)
 Genus *Aquarius* Schellenberg, 1800
Aquarius adelaidis Dohrn, 1860
 Intertidal, rocky
 (Buzzetti *et al.*, 2006; Present study)

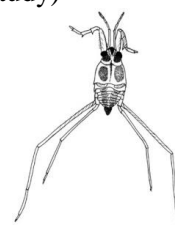


Subfamily Halobatinae Bianchi, 1996
 Genus *Halobates* Eschscholtz, 1822
Halobates germanus White, 1883.
 Pleuston
 (Imms, 1936 as *Halobates sewelli* ref, to change Herring, 1961)



(After Imms, 1936)

Family Veliidae Amyot and Serville, 1843
 Genus *Halovelis* Bergroth, 1893
Halovelis sp. 0.3-0.4 cm.
 On fresh and saline calm water
 (Present study)



Order Diptera Linnaeus, 1758
 Suborder Brachycera (Macquart, 1834)

Family Oestridae Leach, 1815
 Genus *Cephalopina* Strand, 1928
Cephalopina titillator Clark, 1816
 Sandy beaches, parasitizing camels
 (Present study)



Suborder Nematocera Latreill, 1815

Family Tipulidae Latreill, 1802
 Undetermined taxa
 Rocky beach on weeds
 (Present study)

Family Psychodidae Newmam, 1834
 Genus *Pericoma* Walker, 1856
Pericoma fuliginosa (Meigen 1804)
 Where flowing water meets still water on
 the edges of streams
 (Nazim *et al.*, 2009)
 Subphylum Crustacea Brunnich, 1772
 Class Branchiopoda Latreille, 1817
 Subclass Sarsostraca Tasch, 1969
 Order Anostraca Sars, 1867



Male and egg bearing female (After
 Lochhead, 1954)
 Infraorder Onychopoda Sars, 1965

Family Artemiidae Grochowski, 1896
 Genus *Artemia* Leach, 1819
Artemia sp.
 Planktonic, in highly saline water
 (Sultana *et al.*, 1991; Campbell *et al.*,
 1991)



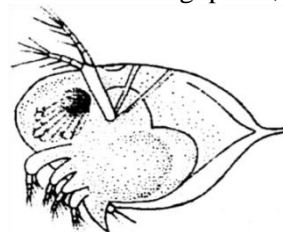
Artemia salina (Linnaeus, 1758)
 Planktonic
 (Ara *et al.*, 1999)
Artemia parthenogenetica Bowen and
 Sterling, 1978
 (Sultana *et al.*, 2000 unaccepted since
 this name encompasses various
 parthenogenetic populations of *Artemia*)



Subclass Phyllopoda Preuss, 1951
 Order Diplostraca Gerstaecker, 1866
 Suborder Cladocera Latreille, 1829
 Infraorder Ctenopoda Sars, 1865

Family Sididae Baird, 1850
 Genus *Penilia* Dana, 1849
Penilia avirostris Dana, 1849 1.5mm.
 Benthic. Inshore water
 (Khan, 1975a; Jehan and Qureshi, 2006)

Family Podonidae Mordukhai-
 Boltovskoi, 1968
 Genus *Evadne* Lovén, 1836
Evadne spinifera Muller, 1867b 0.7mm.
 Surface water occasionally inshore
 (Della Groce and Venugopalan, 1973)



Genus *Pseudevadne* Claus, 1877
Pseudevadne tergestina (Claus, 1877)
 Coastal and open seas
 (Khan, 1975 as *Evadne tergestina*)



Undetermined Podonidae
 In sand
 (Present study)



Class Maxillopoda Dahl, 1956
 Subclass Thecostraca Gruvel, 1905
 Infraclass Cirripedia Burmeister, 1834
 Superorder Rhizocephala Muller, 1862
 Order Kentrogonida Delage, 1884

Family Sacculinidae Lilljeborg, 1860
 Genus *Sacculina* Thompson, 1836

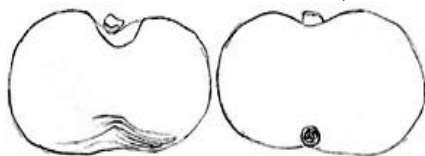
***Sacculina* sp**

Parasitic.Host: *Macromedaeus quinquedentatus* (Crab)

(Tirmizi and Ghani, 1996)

Sacculina leptodiae Guerin-Ganivat, 1911

Parasitic.Host: *Leptodius exaratus* (Crab)
(Moazzam and Moazzam, 2004)



Genus *Heterosaccus* Smith, 1906

Heterosaccus ruginosus Boschma, 1931

Parasitic.Host: *Portunuss sanguinolentus* (Crab)

(Moazzam and Moazzam, 2004)

Genus *Septodiscus* Van Baal, 1937

Septodiscus flabellum Van Baal, 1937

Parasitic.Host: *Petrolisthes rufescens* and *P. boscii* (False crabs)

(Moazzam and Moazzam, 2004)

Family Peltogastridae Lilljeborg, 1860

Genus *Peltogaster* Rathke, 1842

Peltogaster paguri Rathke, 1842

Parasitic.Host: *Striotates perspicax* (Hermit crab)

(Kazmi, 2016)



Externae

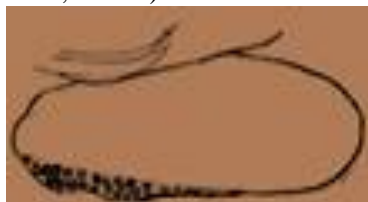
Family Clistosaccidae Boschma, 1928

Genus *Clistosaccus* Lilljeborg, 1861

***Clistosaccus* sp.**

Parasitic.Host: *Areopaguristes perspicax* (hermit crab)

(Kazmi, 2016b)



Externae

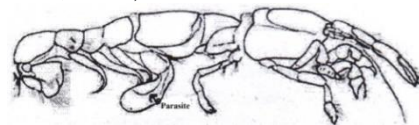
Family Parthenopeidae Rybakov and Hoeg, 2013

Genus ? *Parthenopea* Kossmann, 1874

Parthenopea species indeterminate

Parasitic.Host: *Balsscallichirus masoomi* (ghost shrimp)

(Kazmi, 2016)



Superorder Thoracica Darwin, 1854

Order Pedunculata Lamarck, 1818

Suborder Scalpellomorpha Newman, 1987

Family Lithotryidae Gruvel, 1905

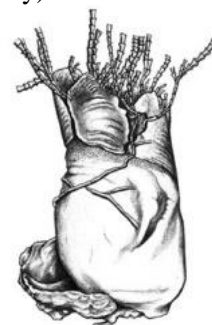
Genus *Lithotrya* Sowerby, 1822

Lithotrya nicobarica Reinhardt, 1850 6-14 mm. Limestone rock, embedded, hanging vertically downward in the rock burrows

(Calman, 1927a)

Lithotrya valentiana (Grey, 1825)

Embedded in sand stone on sandy shore (Present study)



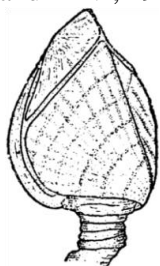
Suborder Lepadomorpha Pilsbry, 1916

Family Lepadidae Darwin, 1852

Genus *Lepas* Linnaeus, 1767

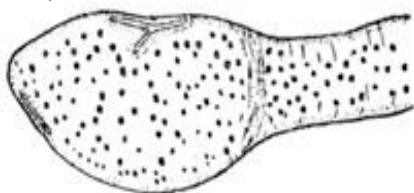
Lepas anserifera Linnaeus, 1767 7-100 mm.

Attached to the underneath surface of the floating objects
(Moazzam and Rizvi, 1978)



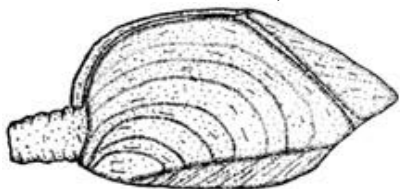
(After Moazzam and Rizvi, 1978)
attached to turtle

Lepas indica Annandale, 1909
Floating wooden flanks
(Stubbing, 1931; Moazzam and Rizvi, 1982 as *Lepas anatifera indica*)
Genus *Conchoderma* Olfers, 1814
Conchoderma hunteri Owen, 1851 5-62 mm. Offshore. Attached to wide variety to habitats
(Stubbing, 1936; Moazam and Rizvi, 1978 as *Conchoderma virgatum forma hunteri*)



(After Moazzam and Rizvi, 1978)

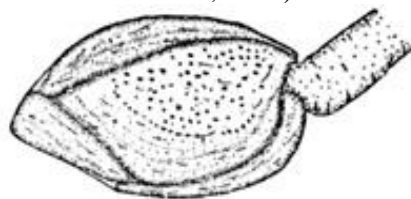
Family Poecilasmatidae Annandale, 1909
Genus *Poecilasma* Darwin, 1852
Poecilasma kaempferidubium Hock, 1907 12-20 mm.
Attached to the body of deep sea decapods at 185-914m.
(Moazzam and Rizvi, 1978)



(After Moazzam and Rizvi, 1978)

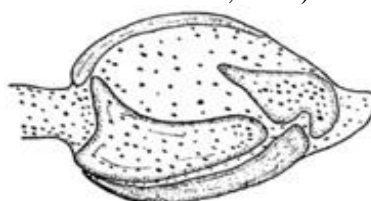
Genus *Trilasmis* Hinds, 1844
Trilasmis minuta Gruvel, 1902 0.5-2.5 mm.
Offshore. Attached to the body of different decapods

(Moazzam and Rizvi, 1978)



(After Moazzam and Rizvi, 1978)

Genus *Octolasmis* Gray, 1825
Octolasmis tridens (Aurivillius, 1893) 2-6 mm.
Mostly found attached to the mouth parts of the decapod crustaceans
(Moazzam and Rizvi, 1978)



(After Moazzam and Rizvi, 1978)

Octolasmis grayii var. pernuda (Annandale, 1909) 3-4mm.
Attached to the scales of sea snakes *Enhydrina*, *Hydrophis* sp.
(Moazzam and Rizvi, 1978)

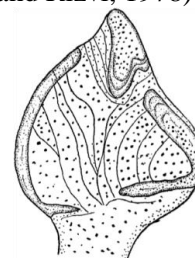


On host snake

(Habitus after Moazzam and Rizvi, 1978)

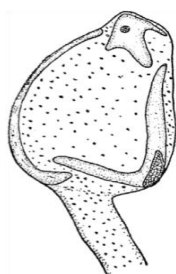
Octolasmis lowei (Darwin, 1852) 2-3 mm.

Found attached to the gills of Decapoda
(Moazzam and Rizvi, 1978)



(After Moazzam and Rizvi, 1978)

Octolasmis aymonini geryonophila Pilsbry, 1907
2-4 mm.
Gills of deep sea crustaceans
(Moazzam and Rizvi, 1978)



(After Moazzam and Rizvi, 1978)

Octolasmis cor Aurivillius, 1892 2-5mm.

Mostly found attached to the mouth parts and gills of the decapod crustaceans (Hashmi and Zaidi, 1965)



Octolasmis bullata (Aurivillius, 1893) 1-3 mm.

Found on the gills of different decapod crustaceans

(Moazzam and Rizvi, 1978 as *Octolasmis angulata forma bullata*)



(After Moazzam and Rizvi, 1978)

Octolasmis warwickii Gray, 1825

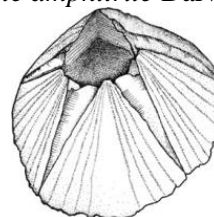
Attached to decapods (Moazzam and Rizvi, 1982)



Order Sessilia Lamarck, 1818
Suborder Balanomorpha Pilsbry, 1916
Superfamily Balanoidea Leach, 1817

Family Balanidae Leach, 1817
Genus *Amphibalanus* Pitombo, 2004
Amphibalanus amphitrite (Darwin, 1854) 0.7-0.8 x .9 -1.1 cm.

Found mostly attached to stones near low tide level on shells or wood (Stubbing, 1936; Hasan, 1963 as *Balanus amphitrite amphitrite* Darwin)



Amphibalanus reticulatus (Utinomi, 1967) 1.7x1.5 cm.

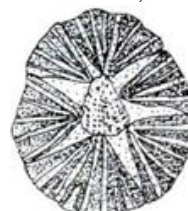
Found attached to crabs, rocks, shells and wood etc.

(Rizvi and Moazzam, 2006 as *Balanus reticulatus* Utinomi)

Genus *Balanus* Da Costa, 1778

Balanus trigonus Darwin, 1854

In intertidal region attached to crustaceans, molluscan shells and underwater submerged structure (Rizvi and Moazzam, 2006)



(After Rizvi and Moazzam, 2006)

Balanus crenatus Bruguière, 1789

On shells

(Imran, 2014, a boreal species distributed in intertidal and sublittoral zones of the North Pacific and the North Atlantic.

Unlikely to occur in Pakistan)

Family Archaeobalanidae Newman and Ross, 1976

Genus *Striatobalanus* Hoek, 1913

Striatobalanus amaryllis (Darwin, 1854)

2.7x3.1 cm. Rosy pink and blue

Found subtidally growing attached to

stones, molluscs specially oysters

(Darwin, 1854; Stubbing, 1931 as

Balanus amaryllis)



Striatobalanus tenuis (Hoek, 1883)
 Found subtidally up to 500m growing attached to gastropods shells
 (Rizvi and Moazzam, 2006 as *Chirona* (*Striatobalanus*) *tenuis* Hoek)



(After Rizvi and Moazzam, 2006)

Genus *Solidobalanus* Hoek, 1913
Solidobalanus socialis (Hoek, 1883)
 Found subtidally, growing attached to molluscs

(Rizvi and Moazzam, 2006)

Genus *Megabalanus* Hoek, 1913

Megabalanus tintinnabulum Linnaeus, 1758 2.7-3 cm.

Found near low water mark in intertidal zone of rocks, shores usually grows in clumps attached to rocks and other submerged structures

(Sagar, 1926; Stubbing, 1936 as *Balanus* (*Megabalanus*) *tintinnabulum*)



Genus *Conopea* Say, 1822

Conopea calceola (Ellis, 1758) 9mm.
 Commensal with gorgonids at 21-14m. depth

(Kazmi, 2001)



Genus *Acasta* Leach, 1817

Acasta species indeterminate
 Commensal, embedded in coenenchyme of gorgonian
 (Present study)



Superfamily Tetraclitoidea Gruvel, 1903

Family Tetraclitidae Gruvel, 1903

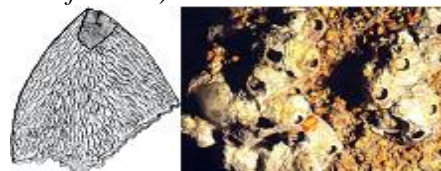
Subfamily Tetraclitinae Gruvel, 1903

Genus *Tetraclita* Schumacher, 1817

Tetraclita squamosa Brugiére, 1789

Intertidal, attached to stones

(Aziz, 1981, unpublished thesis; it may be *T. rufotincta*)



(After Debelius, 2001)

Tetraclita rufotincta Pilsbry, 1916

Bare rocks, oyster shells intertidal region
 (Haq *et al.*, 1978)



(After Rizvi and Moazzam, 2006)

Tetraclita vitiata Darwin, 1854

Littoral depth

CAS: INVERT 18883.0 Steiner, 1973)

Superfamily Chthamaloidea Darwin, 1854

Family Chthamalidae Darwin, 1854

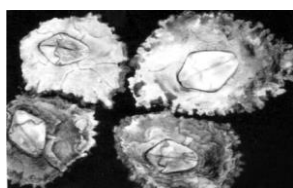
Subfamily Chthamalinae Darwin, 1854

Genus *Chthamalus* Ranzani, 1817

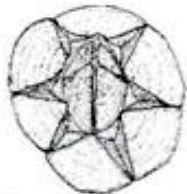
Chthamalus barnesi Achituv and Safrieli, 1980 6 mm X 10-12 mm. Light brown to grey slightly greenish.

Abundant on rocks, shells in supralittoral zone

(Ahmed *et al.*, 1982; Southward and Newman, 2003 as *Chthamalus malayensis* Pilsbry)



Chthamalus challenger Hoek, 1883
Littoral depth
(CAS: INVERT 18879.0 collec. Steiner, 1973)
Subfamily Euraphinae Newman and Ross, 1976
Genus *Microeuraphia* Poltarukha, 1997
Microeuraphia withersi (Pilsbry, 1916)
Growing attached to stems and leaves of mangrove along coastline, highest intertidal levels on intertidal rocks, wharf piles and mangroves
(Rizvi and Moazzam, 2006)



(After Rizvi and Moazzam, 2006)



On mangrove leaf

Microeuraphia permitini (Zevina and Litinova, 1970)
In mid-littoral, high-littoral and rarely the supralittoral zone, on different substrates such as rock, jetties, leaves, stems and aerial roots of mangroves, mollusk and barnacle shells and floating material such as plastic objects
(Southward and Newman, 2003; Shahdadi and Sari, 2011)
Superfamily Coronuloidea Leach, 1817

Family Chelonibiidae Pilsbry, 1916
Subfamily Chelonibinae Pilsbry, 1916
Genus *Chelonibia* Leach, 1817
Chelonibia testudinaria (Linnaeus, 1758) 4-23 x 1-25 mm.
Attached to turtles and pelagic crabs (Florida Museum of Natural History (UF), 1986; Mustaqim and Javed, 1993; Javed and Mustaqim, 1994 as *Chelonibia patula*)



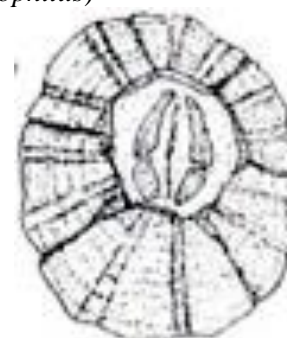
(After Javed and Mustaqim, 1994; After Rizvi and Moazzam, 2006)

Chelonibia caretta Spengler, 1790
Found attached to or embedded in the carapace of marine turtles
(Rizvi and Moazzam, 2006)



(After Rizvi and Moazzam, 2006)

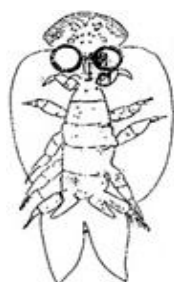
Family Platylepadidae Newman and Ross, 1976
Genus *Platylepas* Gray, 1825
Platylepas ophiophila Lanchester, 1902
Found attached or embedded to the scales of marine snakes
(Kruger, 1912 as *Cryptolepas ophiophilus*)



(After Rizvi and Moazzam, 2006)

Subclass Branchiura Thorell, 1864
Order Arguloida Yamaguti, 1963

Family Argulidae Yamaguti, 1963
Genus *Argulus* Muller, 1785
Argulus sp. 4.5 mm.
Parasitic. Host: *Pampus argenteus* (Fish)
(Ghani and Ali, 2003)



(After Ghani and Ali, 2003)

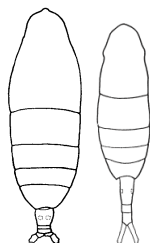
Subclass Copepoda Milne-Edwards, 1840
 Infraclass Neocopepoda Huys and Boxshall, 1991
 Superorder Gymnoplea Giesbrecht, 1882
 Order Calanoida Sars, 1903

Family Spinocalanidae Vervoort, 1951
 Genus *Kunihulsea* Schulz, 1992
Kunihulsea arabica Schulz, 1992
 Epiplanktonic
 (Schulz, 1992)



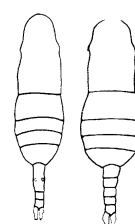
Genus *Euaugaptilus* Sars, 1920

Family Augaptilidae Sars, 1905
 Genus *Augaptilus* Giesbrecht, 1889
Augaptilus longicaudatus (Claus, 1863)
 3.98 mm.
 Pelagic, offshore
 (Ali-Khan and Ali-Khan, 1984)

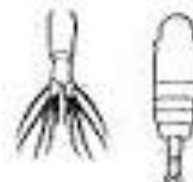


Male and Female

Genus *Euaugaptilus* Sars, 1920
Euaugaptilus hecticus Giesbrecht, 1892
 1.4-1.8mm.
 Pelagic, offshore
 (Ali-Khan, 1983 unpublished thesis; Ali-Khan and Ali-Khan, 1984)



Euaugaptilus latifrons Sars, 1907
 Pelagic
 (Ali-Khan and Ali-Khan, 1984)



Euaugaptilus nodifrons Sars, 1905
 Female 3.0-3 mm, male 4.5mm.
 Bathypelagic, offshore



Genus *Haloptilus* Giesbrecht, 1898
Haloptilus longicornis (Claus, 1863)
 2.04mm

Offshore, bathypelagic
 (Grice and Hulsemann, 1967)

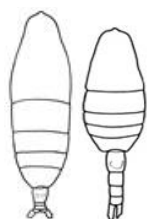
Haloptilus paralongicirrus Park, 1970
 Offshore, bathypelagic
 (Saraladevi, 1977)

Genus *Pseudhaloptilus* Wolfenden, 1911.
Pseudhaloptilus pacificus (Johnson, 1936) 4-7mm.

Offshore, bathypelagic
 (Ali-Khan and Ali-Khan, 1984 as *Pachyptilus pacificus* Johnson)



Family Heterorhabdidae Sars, 1902
 Genus *Heterostylites* Sars, 1920
Heterostylites longicornis (Giesbrecht, 1889) 3.0-3.3mm.
 Bathypelagic Offshore
 (Ali-Khan, 1993b)



Female (After Ali-Khan, 1993)

Genus *Mesorhabdus* Sars, 1905
Mesorhabdus angustus Sars, 1907
 7.0mm. Bathypelagic, offshore
 (Ali-Khan, 1993b)

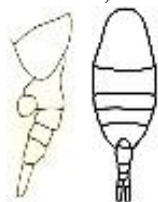


(After Ali-Khan, 1993)

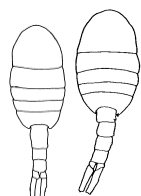
Family Lucicutiidae Sars, 1902
 Genus *Lucicutia* Giesbrecht, 1898
Lucicutia clause Giesbrecht, 1889
 1.6mm.
 Bathypelagic. Reef Associated, estuarine,
 coastal
 (Ali-Khan and Ali-Khan, 1982)



Lucicutia curta Farran, 1905 2.5mm.
 Bathypelagic
 (Grice and Hulsemann, 1967)



Abdomen and animal
Lucicutia flavicornis (Claus, 1863) 1.32mm.
 Bathypelagic, inshore
 (Gololobov and Grobov, 1970)



Lucicutia gausae Grice, 1963 30mm.
 Bathypelagic to inshore shallow water
 (Ali-Khan and Ali-Khan, 1982)



Male and female

Lucicutia grandis (Giesbrecht, 1895) 3-4mm.
 Bathypelagic to inshore shallow water
 (Grice and Hulsemann, 1967)



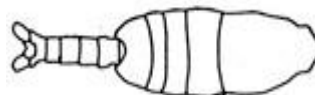
Lucicutia longicornis (Giesbrecht, 1889)
 1.6mm.
 Bathypelagic to inshore shallow water
 (Grice and Hulsemann, 1967)



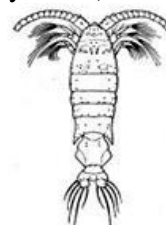
Lucicutia polaris Brodsky, 1950
 3.0mm.
 Bathypelagic to inshore shallow water
 (Ali-Khan and Ali-Khan, 1982)



Family Metridinidae Sars, 1902
 Genus *Pleuromamma* Giesbrecht, 1898
Pleuromamma indica Wolfenden, 1905
 2 mm.
 Epi-benthypelagic
 (Grice and Hulsemann, 1967)



Genus *Gaussia* Wolfenden, 1905
Gaussia sewelli Saraswathy, 1973
 Upper 200 m.
 (Saraswathy, 1973)



Family Nullosetigeridae Soh *et al.*, 1999
 Genus *Phyllopus* Brady, 1883
Phyllopus impar Farran, 1908 2.60 mm.
 Pelagic
 (Ali-Khan, 1998)



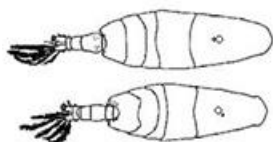
Family Acartiidae Sars, 1900
 Genus *Acartia* Dana, 1846
Acartia (Acartiura) simplex Sars G.O., 1905
 Pelagic
 (Ara, 2018, unpublished)
 Subgenus *Acartia (Odontacartia)* Steuer, 1915
Acartia (Odontacartia) amboinensis Carl, 1907 Pelagic, near shore
 (Haq, *et al.*, 1973)



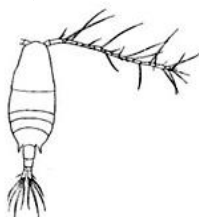
Acartia (Odontacartia) bispinosa Carl, 1907 1.06mm.
 Pelagic, offshore
 (Muniza, 1988 unpublish thesis Mori; Muniza and Kazmi, 2021 as *Acartia hamata*)



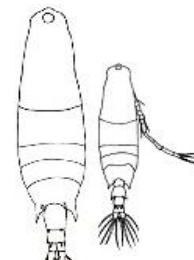
Acartia (Odontacartia) centrura Giesbrecht, 1889
 Mesozooplanktonic
 (Ahmed, 1951)



Acartia (Odontacartia) spinicauda Giesbrecht, 1889
 Pelagic
 (Khan, 1975)

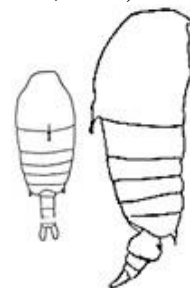


Acartia (Odontacartia) pacifica Steuer, 1915
 Offshore, in channels during S.W. monsoon
 (Khan, 1979)
 Male and female



Subgenus *Acartia (Acanthacartia)* Steuer, 1915
Acartia (Acanthacartia) plumosa T. Scott, 1894, Khans" *A.plumosa* may be *A. tropica* Ueda and Hiromi, 1987)
 (Khan, 1979;

Family Centropagidae Giesbrecht, 1893
 Genus *Centropages* Kroyer, 1849
Centropages dorsispinatus (Thompson and Scott, 1903) 1.6 mm.
 Pelagic, near shore, creeks
 (Ahmed *et al.*, 1972)



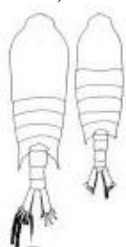
Centropages furcatus Dana, 1849
 1.9mm.
 Pelagic, offshore, shallow water
 (Khan, 1979)



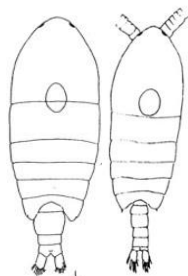
Centropages orsinii Giesbrecht, 1892
 1.7mm.
 Pelagic, near shore to offshore
 (Ali-Khan, 1998)



Centropages tenuiremis (Thompson and Scott, 1903)
Pelagic
(Ahmed *et al.*, 1972)



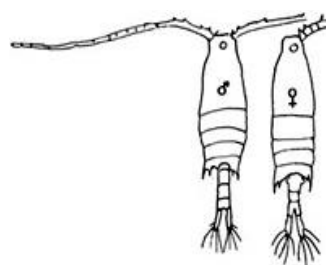
Centropages karachiensis Haq and Fazl-ur-Rehman, 1973
Epipelagic, near shore
(Haq and Fazal-ur-Rehman, 1973)



Female and male (After Haq and Fazal-ur-Rehman, 1973)
Centropages kroiyeri Giesbrecht, 1892
Epipelagic
(Ali-Khan, 1998)



Female
Centropages velificatus (Oliveira, 1947)
Offshore, in channel during S.W. Monsoon
(Khan, 1979)



Centropages chierchiae Giesbrecht, 1889

Planktonic
(Ara, 2018, unpublished thesis)

Centropages alcocki Sewell, 1912

Planktonic
(Ara, 2018, unpublished thesis)

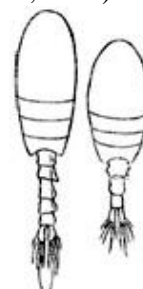
Centropages calaninus (Dana, 1849)

Planktonic
(Ara, 2018, unpublished thesis)

Genus *Isias* Boeck, 1864

Isiastropica (Sewell, 1932)

Pelagic, littoral, brackish
(Ahmed *et al.*, 1972)



Male and female

Family Candaciidae Giesbrecht, 1893

Genus *Candacia* Dana, 1846

Candacia discaudata Scott A., 1909

Planktonic
(Ara, 2018 unpublished thesis)

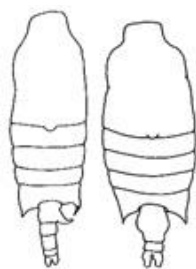
Candacia turberculata Wolfenden, 1905

1.40 mm. Pelagic, offshore
(Ali-Khan, 1995)

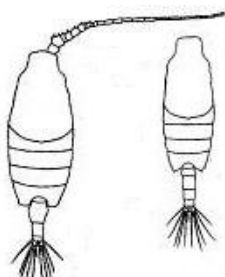


Candacia curta Dana, 1849

1.60mm.
Pelagic, offshore
(Ali-Khan, 1995)



Female and male
Calanopia elleptica (Dana, 1849)
 From stomach of *Benthosoma pterotum*;
 seagrass and coral reef habitats
 (Ali-Khan, 1995; Shoaib and Kazmi,
 2021 as *Paracalanopia truncata*)

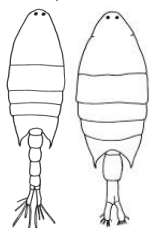


Female and male
Calanopia minor (Dana, 1849)
 Offshore, 0-50 m.
 (Jones, 1966)



Female

Family Pontellidae Dana, 1852
 Genus *Calanopia* Dana, 1852
Calanopia elleptica (Dana, 1849)
 1.60mm.
 Coastal. Epi-mesopelagic
 (Ali-Khan, 1998)

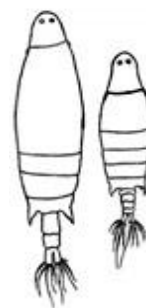


Male and female

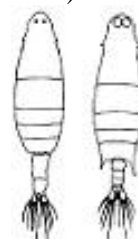
Calanopia minor Scott, 1902 2.5mm.
 Pelagic, coastal and oceanic
 (Ali-Khan, 1998)



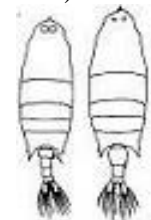
Genus *Labidocera* Lubbock, 1853
Labidocera pectinata Thompson and
 Scott, 1903
 Pelagic, brackish, near shore
 (Cleve, 1903 as *Labidocera similis*)



Female and male
Labidocera minuta Giesbrecht, 1889
 3.0mm.
 Pelagic, inshore, coastal
 (Ali-Khan, 1998)



Female and male
Labidocera acuta (Dana, 1849)
 4.5 mm.
 Near surface
 (Ali Khan, 1998)

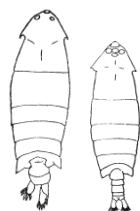


Female and male

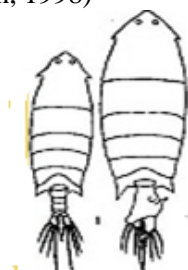
Genus *Pontella* Dana, 1846
Pontella andersoni Sewell, 1912
 Pelagic, neritic, brackish
 (Masihuzzaman, 1973)



Pontella investigatoris Sewell, 1912
 3.30 mm.
 Pelagic
 (Masihuzzaman, 1973; Fazal-ur-Rehman, 1974)



Male and female
 (After Fazal-ur-Rehman, 1974)
Pontella securifer Brady, 1883 4.68mm.
 Epipelagic
 (Ali-Khan, 1998)

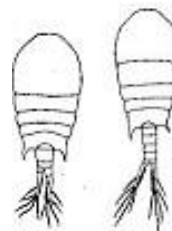


Female and male
Pontella karachiensis Fazal-ur-Rehman, 1973
 Nearshore
 (Fazal-ur-Rehman, 1973a)

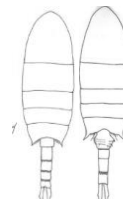
Family Pseudodiaptomidae Sars, 1902
 Genus *Pseudodiaptomus* Herrick, 1884
Pseudodiaptomus aurivillii Cleve, 1901
 Planktonic
 (Ara, 2018 unpublished thesis)
Pseudodiaptomus serricaudatus (Scott, 1894) 1.36 mm.
 Pelagic, coastal, brackish
 (Ali-Khan, 1998)
 Female



Pseudodiaptomus arabicus Walter, 1998
 Planktonic
 (Demersed)
 (Giesbrecht, 1896; Walter, 1998)

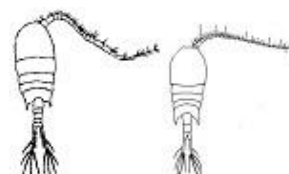


Female and male
Pseudodiaptomus salinus
 At low salinity
 (Walter, 1998)



Male and female
 (After Walter, 1998)

Family Temoridae Giesbrecht, 1893
 Genus *Temora* Baird, 1850
Temora discaudata Giesbrecht, 1889
 1.8 mm.
 Pelagic, nearshore, to offshore
 (Fleminger and Hulsemann, 1973)
 Planktonic
 (Ara, 2018 unpublished thesis)
Temora stylifera (Dana, 1849)
 Offshore, in channel during S.W.
 Monsoon
 (Ahmed *et al.*, 1972 as *Temora dubia*
 (Brady) Masihuzzaman, 1973; Khan, 1975)



Female and male

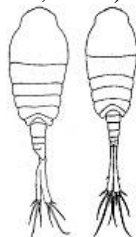
Temora turbinata (Dana, 1849)
1.32 mm.
At low salinity waters .Pelagic, neritic
Pelagic, brackish, inshore
(Khan, 1976)



Genus *Temoropia* Scott T., 1894
Temoropia mayumbaensis Scott, T.,
1894
Bathypelagic, offshore
(Grice and Hulseman, 1967; Ali-Khan,
1998)



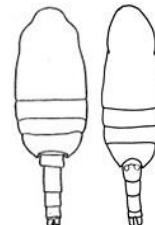
Family Tortanidae Sars, 1902
Genus *Tortanus* Giesbrecht, 1898
Tortanus forcipatus (Giesbrecht, 1889)
Planktonic
(Fazal-ur Rehman, 1973)



Family Clausocalanidae Giesbrecht, 1892
Genus *Clausocalanus* Giesbrecht, 1888
Clausocalanus minor Sewell, 1929 1.2
mm.
Pelagic, offshore. Oceanic waters
(Gololobov and Grobov, 1970)



Clausocalanus furcatus (Brady, 1883)
1.2 mm.
Bathypelagic, near surface, oceanic
(Grice and Hulsemann, 1967; Ahmed *et*
al., 1972)

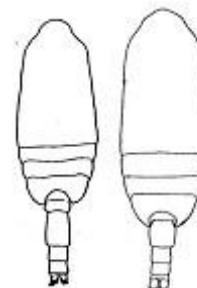


Female and male
Clausocalanus farrani Sewell, 1929
Shelf
(Haq *et al.*, 1973)



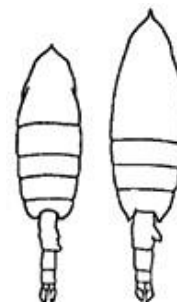
Male

Clausocalanus arcuicornis (Dana, 1849)
Shelf
(Haq *et al.*, 1973)



Female male

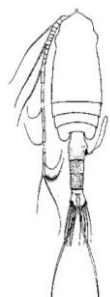
Family Euchaetidae Giesbrecht, 1893
Genus *Euchaeta* Phillipi, 1843
Euchaeta concinna Dana, 1849
2.4 mm.
Pelagic, offshore



Euchaeta rimana Bradford, 1974)
In creeks, offshore
(Haq *et al.*, 1973



Euchaeta plana Mori, 1937
Epipelagic to mesopelagic
(Sewell, 1948 as *Euchaeta murrayi*
Sewell)

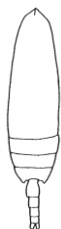


Euchaeta marina (Prestandrea, 1833)
Offshore upper epipelagic
(Ali-Khan, 1993)



Euchaeta indica Wolfenden, 1905
2.4 mm.
Bathypelagic
(Kazmi, 2004)

Family Scolecitrichidae Giesbrecht, 1893
Genus *Scaphocalanus* Sars, 1900
Scaphocalanus magnus (Scott, 1894)
3.33 mm.
Bathypelagic, offshore
(Grice and Hulsemann, 1967)



Genus *Scolecithricella* Sars, 1903
Scolecithricella ctenopus (Giesbrecht,
1888)
1.55 mm.
Pelagic, offshore
(Ali-Khan, 1998)



Scolecithricella paramarginata Schulz,
1991
1.09 mm.
Pelagic, offshore
(Ali-Khan, 1998)

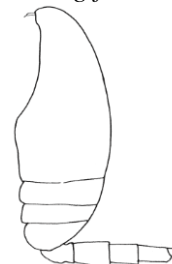


Male

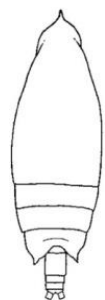
Scolecithricella nicobarica (Sewell,
1929)
Epi and mesopelagic
(Grice and Hulsemann, 1967)



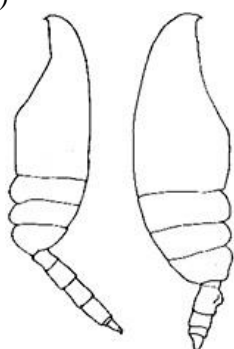
Scolecithricella longifurca (Giesbrecht,
1888) 1.26 mm.
Bathypelagic
(Grice and Hulsemann, 1967 as
Scaphocalanus longifurca (Giesbrecht))



Genus *Scottocalanus* Sars, 1905
Scottocalanus sedatus Farran, 1936
Pelagic
(Ali-Khan, 1998)

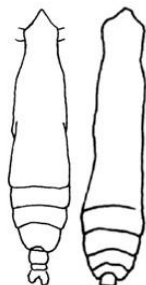


Genus *Pseudoamallothrix*
Vyshkvartzeva, 2000
Pseudoamallothrix longispina (Schulz,
1991) 1.17 mm.
(Ali-Khan, 1998 as *Amallothrix*
longispina)



Female, male

Family Eucalanidae Giesbrecht, 1893
Genus *Eucalanus* Dana, 1852-1853
Eucalanus bungii Giesbrecht, 1893
Planktonic
(Ara, 2018 ,unpublished thesis)
Genus *Pareucalanus* Geletin, 1976
Pareucalanus attenuatus (Dana, 1849)
3.99 mm.
Bathypelagic
(Ali-Khan, 1992 as *Eucalanus*
attenuatus)

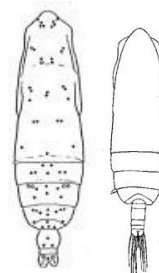


Male and female

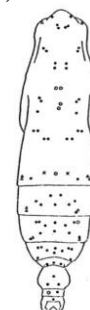
Genus *Subeucalanus* Geletin, 1976
Subeucalanus Crassus (Giesbrecht,
1888) 2.9-3.44 mm.
Pelagic, coastal shelf
(Haq *et al.*, 1973)



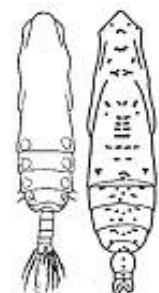
Subeucalanus pileatus (Giesbrecht,
1888)
1.41-1.60 mm.
Pelagic, coastal shelf
(Haq *et al.*, 1973)



Female and male
Subeucalanus subcrassus (Giesbrecht,
1888)
2.0 mm.
Pelagic, coastal, shelf
(Ali-Khan, 1992)

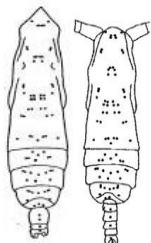


Female
Subeucalanus subtenuis (Giesbrecht,
1888)
2.30-3 mm.
Pelagic, coastal, shelf
(Gololobov and Grobov, 1970)



Male and female

Subeucalanus mucronatus (Giesbrecht, 1888)
 Oceanic
 (Haq *et al.*, 1973)



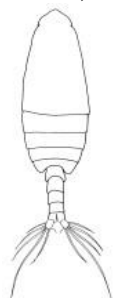
Female and male
 Family Rhincalanidae Geletin, 1976
 Genus *Rhincalanus* Dana, 1853
Rhincalanus nasutus Giesbrecht, 1888
 Epi-bathypelagic
 (Haq *et al.*, 1973; Muniza and Kazmi, 1995)



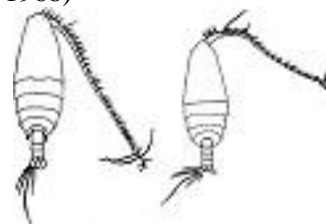
Rhincalanus cornutus (Dana, 1849)
 Meso-bathypelagic, sometimes near the surface. Depth Range 0-2000 m.
 (Sewell, 1947)



Family Calanidae Dana, 1846
 Genus *Canthocalanus* Scott, A., 1909
Canthocalanus pauper (Giesbrecht, 1888) 1.7 mm.
 Bathypelagic, offshore
 (Grice and Hulsemann, 1967)

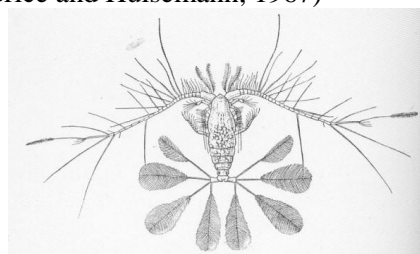


Genus *Undinula* Scott, A. 1909
Undinula vulgaris (Dana, 1849) 3.0 mm.
 Pelagic, nearshore, shallow water
 (Haq, 1968)

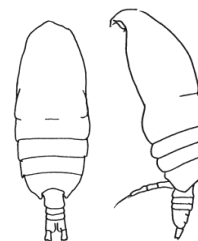


Female and male

Family Paracalanidae Giesbrecht, 1893
 Genus *Calocalanus* Giesbrecht, 1888
Calocalanus pavo (Dana, 1849) 1-2 mm.
 Epipelagic, shallow to deep water
 (Grice and Hulsemann, 1967)



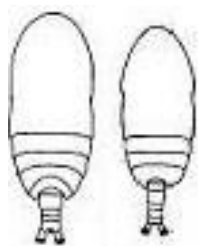
Genus *Acrocalanus* Giesbrecht, 1888
Acrocalanus longicornis Giesbrecht, 1888 0.87 mm.
 Bathypelagic, oceanic
 (Ali-Khan, 1998)



Acrocalanus monachus Giesbrecht, 1888
 2.8 mm.
 Bathypelagic, offshore
 (Ali-Khan, 1998)



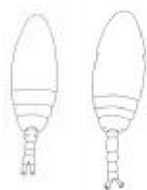
Acrocalanus gracilis Giesbrecht, 1888
 Shelf
 (Gololobov and Grobov, 1970)



Male and female
Acrocalanus gibber Giesbrecht, 1888
 Pelagic
 (Ara, 2018, unpublished thesis)
 Genus *Paracalanus* Boeck, 1865
Paracalanus aculeatus Giesbrecht, 1888
 Shelf, epipelagic
 (Gololobov and Grobov, 1970)

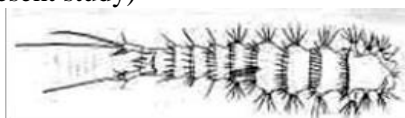


Paracalanus parvus parvus (Claus, 1863)
 Inshore waters
 (Khan, 1979)



Male and female
 Order Harpacticoida Sars, 1903

 Family Ameiridae Boeck, 1865
 Genus *Stenocopia* Sars G.O., 1907
Stenocopia setosa Sars, 1907
 Interstitial. Despite being of marine origin, the genus has successfully colonized freshwater and groundwater habitats, such as springs
 (Present study)



Family Tachidiidae Sars G.O., 1909
 Genus *Euterpina* Norman, 1903
Euterpina acutifrons (Dana, 1847)
 Benthic, sandy beaches
 (Arshad, 2017, unpublished thesis)

Family Canuellidae Lang, 1947
 Genus *Scottolana* Por, 1984
Scottolana longipes (Thompson and Scott, 1903)
 (Kazmi and Naushaba, 2000 as *Cannuella longipes*)

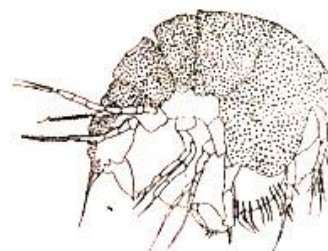
Family Porcellidiidae Boeck, 1865
 Genus *Porcellidium* Sars, 1905
Porcellidium viride (Philippi, 1840) 7 mm.
 Phytal
 (Sadiq, 1993, unpublished thesis as *Porcellidium fimbriatum*; Kazmi, 2004)



Family Dactylopusiidae Lang, 1936
 Genus *Paradactylopodia* Lang, 1944
Paradactylopodia brevicornis (Claus, 1866)
 On *Sargassum* weed
 (Kazmi and Muniza, 2013)



Family Tegastidae Sars, 1904
 Genus *Parategastes* Sars, 1904
Parategastes sp.
 Interstitial
 (Kazmi and Naushaba, 2000)



Family Diosaccidae Sars, 1906
 Genus *Metamphiascopsis* Lang, 1945
Metamphiascopsis hirsutus (Thompson and Scott, 1903) 1.3 mm.
 Inhabiting seaweeds
 (Sadiq, 1993, unpublished thesis)



Family Ectinosomatidae Sars, 1903
 Genus *Microsetella* Brady and Robertson, 1873
Microsetella norvegica (Boeck, 1865)
 Female 0.35 - 0.53mm, Male 0.33 - 0.42 mm
 Found exclusively in the water column.
 Usually found near the surfaces. May occur in brackish waters.
 (Kazmi and Muniza, 1994)



Female, male

Family Leptopontidae Lang, 1948
 Genus *Neoleptastacus* Nicholls, 1945
Neoleptastacus indicus (Rao, 1967)
 Benthic
 (Kazmi and Naushaba, 2000 as *Arenopontiaindica* Rao)
 Genus *Miracia* Dana, 1845
Miracia efferata Dana, 1852
 Pelagic
 (Kazmi and Muniza, 1994)



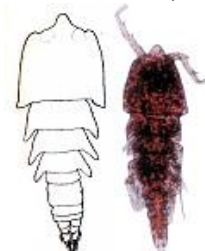
Genus *Macrosetella* Scott, 1909
Macrosetella gracilis (Dana, 1847)
 Coastal
 (Sewell, 1948)



Family Canthocamptidae Sars, 1906
 Genus *Bryocamptus* Chappins, 1928
Bryocamptus sp.
 Psammonic
 (Kazmi and Naushaba, 2000)

Family Paramesochiridae Lang, 1944
 Genus *Emertonia* Wilson, 1932
Emertonia sp.
 (Kazmi, 2004)

Family Clytemnestridae Scott, 1909
 Genus *Clytemnestra* Dana, 1847
Clytemnestra scutellata Dana, 1848
 Pelagic, offshore to inshore in sand
 (Kazmi and Muniza, 1994)



Family Tisbidae Stebbing, 1910
 Genus *Sacodiscus* Wilson, 1926
Sacodiscus littoralis (Sars, 1904) 1.2 mm.
 Phytal
 (Tirmizi and Sadiq, 1995)



Genus *Tisbe* Lilljeorg, 1853
Tisbe sp.
 Interstitial in sand
 (Present Study)
 Genus *Scutellidium* Claus 1866.

Scutellidium plumosum Brady, 1899
Sargassum weeds
(Kazmi and Muneeza, in press)

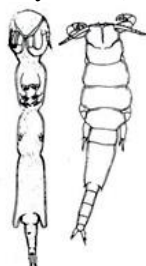


Family Laophontidae Scott, 1905
Genus *Laophonte* Philippi, 1840
Laophonte cornuta Philippi, 1840
Phytal
(Sadiq, 1993)



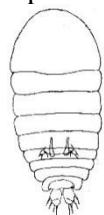
Order Poecilostomatoida Thorell, 1859

Family Shiinoidae Cressey, 1975
Genus *Shiinoa* Kabata, 1968
Shiinoa oclusa Kabata, 1968
Parasitic. Host: *Scomberomorus commerson* (Fish)
(Cressy and Cressy, 1980)

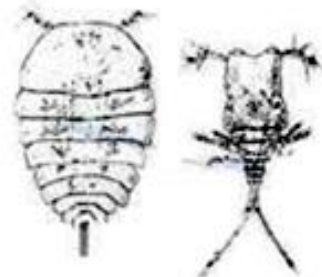


Female (After Balaraman *et al.*, 1983)

Family Sapphirinidae Thorell, 1860
Genus *Sapphirina* Thompson, 1829
Sapphirina gemma Dana, 1852
Parasitic on salps, coastal, inshore
(Muniza, 1988, unpublished thesis)

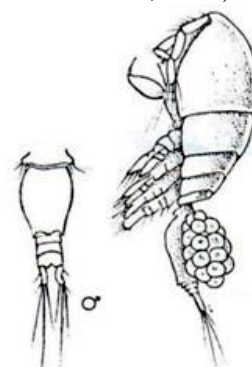


Genus *Copilia* Dana, 1852
Copilia mirabilis Dana, 1852 4.5 mm.
Planktonic
(Kazmi, 2004)

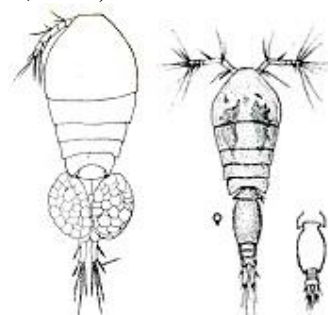


Copilia vitrea (Haeckel, 1864)
Planktonic
(Ara, 2018, unpublished thesis)

Family Oncaidae Giesbrecht, 1893
Genus *Oncaea* Philippi, 1843
Oncaea media Giesbrecht, 1804 8 mm.
Pelagic, benthic in near shore and inshore water
(Kazmi and Naushaba, 2000)

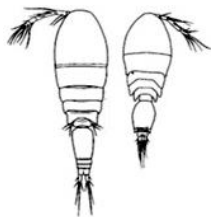


Oncaea venusta Philippi, 1843 1 mm.
Epibenthypelagic, oceanic
(Sewell, 1948)



Oncaea clevei Früchtl, 1923
Planktonic
(Fazeli *et al.*, 2012)
Genus *Triconia* Böttger-Schnack, 1999
Triconia minuta (Giesbrecht, 1893
[«1892»])
(Fazeli *et al.*, 2012 as *Oncaea minuta*)

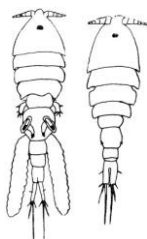
Triconia conifera (Giesbrecht, 1891)
Pelagic, benthic
(Haq *et al.*, 1973 as *Oncaea conifera*
Giesbrecht)



Family Clausidiidae Embleton, 1901
Genus *Conchylurus* Bocquet and Stock,
1957

Conchylurus maximus Reddiah, 1960
2.5 mm.

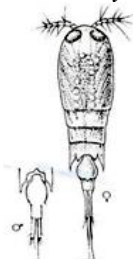
Intertidal zone .Commensal in mantle
cavity of *Sanguinolaria (Stoletellina)*
diphos (Bivalvia)
(Khan, 1977a)



Family Corycaeidae Dana, 1852
Genus *Corycaeus* Dana, 1845
Corycaeus crassiuculus Dana, 1891
Shelf, epipelagic
(Haq *et al.*, 1973)



Genus *Agetus* Krøyer, 1849
Agetus flaccus (Giesbrecht, 1891)
1.6 mm.
Shelf, epipelagic
(Haq *et al.*, 1973 as *Corycaeus flaccus*)

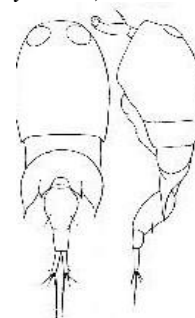


Genus *Ditrichocorycaeus* Dahl, 1912
Ditrichocorycaeus dahli (Tanaka, 1957)
Planktonic
(Ara and Farooq, 2013 as *Corycaeus*
(*Ditrichocorycaeus*) *dahlia*)



(After Ara and Farooq, 2013)

Ditrichocorycaeus asiaticus (Dahl, 1894)
Planktonic
(Farooq *et al.*, 2014 as *Corycaeus*
(*Ditrichocorycaeus*) *asiaticus*)



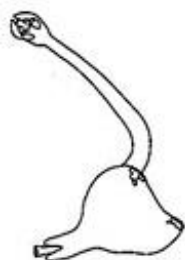
Family Chondracanthidae Milne
Edwards, 1840
Genus *Protochondracanthus* Kirtisinghe,
1950
Protochondracanthus alatus (Heller,
1865)
Parasitic.Host: *Psettodes erumei* (Fish)
(Ghani and Ali, 1996b as
Protochondracanthus psettodes
Kirtisinghe)



(After Ghani and Ali, 1996)
Order Siphonostomatoida Thorell, 1859

Family Lernaepodidae Milne Edwards,
1840
Genus *Clavellisa* Wilson C.B., 1915

Clavellisa ilishae Pillai, 1962
Parasitic.Host: *Tenualosa ilisha* (Fish)
(Batool *et al.*, 2019)



(After Batool *et al.*, 2019)

Family Pseudocycnidae Wilson C.B., 1922
Genus *Pseudocycnus* Heller, 1865
Pseudocycnus appendiculatus Heller, 1865
Parasitic.Host: *Thunnus tonggol* (Fish)
(Cressey and Cressey, 1980)



(After Cressey and Cressey, 1980)

Genus *Cybicola* Bassett-Smith, 1898
Cybicola armata (Bassett-Smith, 1898)
Parasitic.Host: *Scomberomorus commerson* (Fish)
(Cressey and Cressey, 1980 as *Pseudocycnoides armatus* (Bassett-Smith))



(After Cressey and Cressey, 1980)

Family Caligidae Burmeister, 1834

Genus *Tuxophorus* Wilson C.B., 1908
Tuxophorus cervicornis Heegaard, 1962
Parasitic.Host: *Scomberomorus commerson* (Fish)
(Cressey and Cressey, 1980)

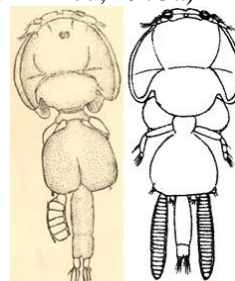


(After Cressey and Cressey, 1980)

Genus *Abasia* Wilson C.B., 1908
Abasia sp.
Parasitic.Host: *Pampus argenteus* (Fish)
(Ghani *et al.*, 1993)
Genus *Caligus* Muleer, 1785
Caligus punctatus Shiino, 1955
Parasitic.Hosts: teleost and elasmobranch Fish
(Tirmizi and Sadiq, 1995)

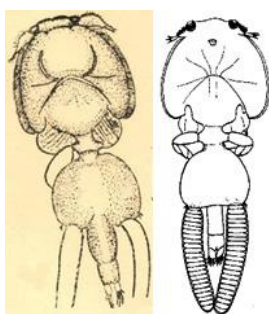


Caligus diaphanus Nordman, 1832
Parasitic.Host: *Pampus argenteus* gill cavity (Fish)
(Niazi and Ahmed, 1973a)

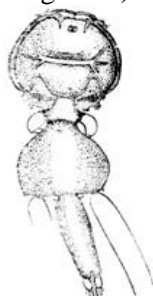


(After Niazi and Ahmed, 1973)

Caligus robustus Basset-Smith, 1898
Parasitic.Hosts: *Argyrops spinifer*, *Caranxs* sp. (Fish)
(Niazi and Ahmed, 1975)



Caligus platytarsis Bassett-Smith, 1898
Parasitic.Hosts: *Mugil cephalus*, *M. speigleri* (Fish)
(Niazi and Ahmed, 1973a as *Caligus bombayensis* Rangnekar)



(After Niazi and Ahmed, 1975)
Caligus longicaudus Basset-Smith 1898
Parasitic.Hosts: *Megalaspis cordyla* and other Fishes
(Niazi and Ahmed, 1973a)

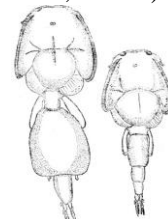


(After Niazi and Ahmed, 1975)
Caligus dakari Van Beneden, 1892
Parasitic.Hosts: *Arius* spp (Fish)
(Niazi and Ahmed, 1973a)



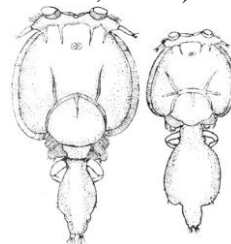
(After Niazi and Ahmed, 1973a)
Caligus cunicephalus Gnanamuthu, 1950

Parasitic.Host: *Trichiurus lepturus* (Fish)
(Niazi and Ahmed, 1973a)



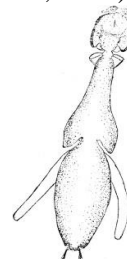
(After Niazi and Ahmed, 1973)

Caligus cordyla Pillai, 1963
Parasitic.Host: *Magalaspis cordyla* (Fish)
(Niazi and Ahmed, 1973a)



(After Niazi and Ahmed, 1973)

Genus *Pseudopetalus* Pillai, 1962
Pseudopetalus formicoides Redkar, Rangnekar and Murti, 1949
Parasitic.Host: *Sardinella longiceps* (Fish)
(Niazi and Ahmed, 1975)



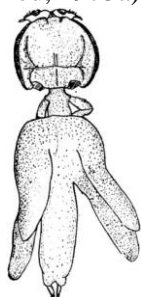
(After Niazi and Ahmed, 1975)

Genus *Parapetalus* Lutken, 1861
Parapetalus hirsutus (Basset-Smith, 1898)
Parasitic.Host: *Eleutheronema tetradactylum* (Fish)
(Niazi and Ahmed, 1973a)



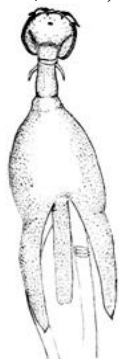
(After Niazi and Ahmed, 1973)

Genus *Synestius* Lutken, 1861
Synestius caliginus Steenstrup and
 Lütken, 1861
 Parasitic.Hosts: *Parasromateus nige*,
Pampus argenteus (Fish)
 (Niazi and Ahmed, 1973a)



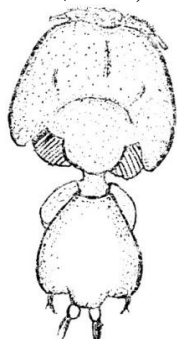
(After Niazi and Ahmed, 1973)

Genus *Caligodes* Heller, 1868
Caligodes laciniatus (Kroyer, 1863)
 Parasitic.Hosts: *Tylosurus strongylurus*
 and *T.leiurus* (Fish)
 (Niazi and Ahmed, 1973)



(After Niazi and Ahmed, 1973)

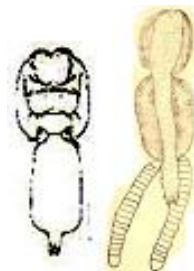
Genus *Lepeophtheirus* Nordman, 1832
Lepeophtheirus plotsoi Barnard, 1948
 Parasitic.Host: *Plotosus lineatuss* (Fish)
 (Niazi and Ahmed, 1973)



(After Niazi and Ahmed, 1975)

Genus *Hermilius* Heller, 1865
Harmilius longicornis Basselt- Smith,
 1898
 2.8 mm.

Parasitic.Host: On gill filament of *Arius*
 sp. (Fish)



(After Niazi and Ahmed, 1975)

Genus *Paralebion* Wilson, 1911
Paralebion elongatus Wilson, 1911
 Parasitic.Host: marine fish
 (Ali, 1995)



Paralebion aliuncus (Rangnekar, 1955)
 5-7 mm.
 Parasitic.Host. *Pampus argenteus* (Fish)
 (Niazi and Ahmed, 1975 as
Diphyllogaster aliuncus)



(After Niazi and Ahmed, 1973)

Family Ergasilidae Burmeister, 1835
 Genus *Nipergasilus* Yamaguti, 1939
Nipergasilus parabora El-Rashidy and
 Boxshall, 2000
 Parasitic.Host: *Valamugil cunnesius*
 (Fish)
 (El-Rashidy and Boxshall, 2000)



(After El-Rashidy and Boxshall, 2000)

Genus *Stellicola* Kossmann, 1877

***Stellicola* sp.**

Symbiotic on *Anthenea rudis*
(Echinodermata)
(Ghory *et al.*, 2018)



(After Ghory *et al.*, 2018)

Family Lernanthropidae Kabata, 1979

Genus *Lernanthropus* de Blainville, 1822

Lernanthropus indicus Pillai, 1967

Parasitic.Hosts: *Otolithes ruber* and
Sphyraena putnamae
(Farooq *et al.*, 2019)

Family Bomolochidae Claus, 1875

Genus *Nothobomolochus* Vervoort, 1962

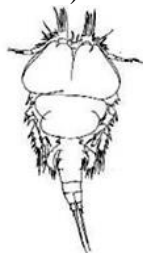
Nothobomolochus kanagurta (Pillai,
1959)

Parasitic.Host: *Pampus argenteus* (Fish)
(Ghani *et al.*, 1993 abstract)

Nothobomolochus tricerus (Basset-
Smith, 1898)

2-3.5mm.

Parasitic.Host: *Pampus argenteus* (Fish)
(Ghani and Ali 2003)



(After Ghani and Ali 2003)

Family Euryphoridae Wilson, 1905

Genus *Gloiopotes* Steenstrup and Lutken,
1861

Gloiopotes ornatus Wilson, 1905 10 mm.

Parasitic.Host: *Thunnus albacares* (Fish)
(Siddiqui and Bilqees, 1995)



(After Siddiqui and Bilqees, 1995)

Gloiopotes americanus Cressey, 1967

7-11 mm.

Parasitic.Host: *Thunnus albacares* (Fish)
(Siddiqui and Bilqees, 1995)



(After Siddiqui and Bilqees, 1995)

Family Penneliidae Burmeister, 1834

Genus *Lernaeenicus* Le Sueur, 1824

Lernaeenicus hemirhamphi Kirtisinghe,
1933

35-42 mm. Light milky, light green

Parasitic.Hosts: *Hemirhamphus*
xanthopterus, *Coryphaena* (Fish)
(Niazi and Ahmed, 1973a)



Animal after Niazi and Ahmed, 1973)

Lernaeenicus longiventris Wilson, 1917

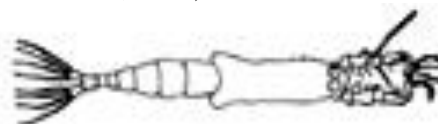
Parasitic.Host: *Mugil cephalus* (Fish)
(Masood *et al.*, 2015)

Genus *Cymbasoma* Thompson, 1888

Cymbasoma rigidum Thompson, 1888
1-7 mm.

Endoparasitic naupliar and planktonic
adult

(Khan *et al.*, 1988)

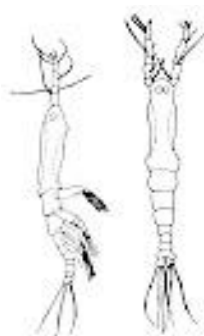


Male (After Khan *et al.*, 1975)

Cymbasoma williamsoni Khan, 1975

Endoparasitic, naupliar and planktonic
adults

(Khan, 1976a)

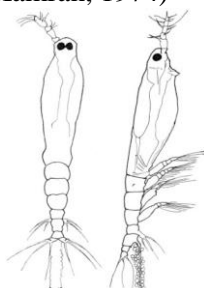


(After Khan, 1976)

Cymbasoma tirmiziae Khan and Kamran, 1974

Endoparasitic, naupliar and planktonic adults

(Khan and Kamran, 1974)



(After Khan and Kamran, 1974)

Superorder Podoplea Giesbrecht, 1882
Order Misophrioida Gurney, 1933

Family Misophriidae Brady, 1878
Genus *Benthomisophria* Sars, 1909
Benthomisophria palliata Sars, 1909
Bathypelagic, offshore
(Ali-Khan, 1993c)



Female and male
Order Cyclopoida Burmeister, 1834

Family Lernaeidae Cobbold, 1879
Genus *Catlaphila* Tripathi, 1960
Catlaphil elongata Tripathi, 1960
Parasitic.Host: *Gibelion catla* (Fish)
(Ho *et al.*, 2009)

Genus *Lamproglena* von Nordmann, 1832

Lamproglena chinensis Yü, 1937

Parasitic.Host: *Pampus argenteus* (Fish)
(Batool *et al.*, 2018)

Family Oithonidae Dana, 1852

Genus *Dioithona* Kiefer, 1935

Dioithona rigida (Giesbrecht, 1896)

Planktonic in backwater in mangrove
(Ara *et al.*, 2017 as *Oithona rigida*)



(After Ara *et al.*, 2017)

Dioithona oculata (Farran, 1913)

Planktonic in backwater in mangrove
(Ara *et al.*, 2017 as *Oithona oculata*)

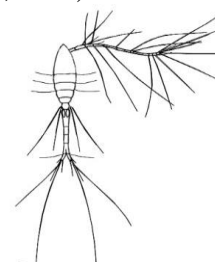


(After Ara *et al.*, 2017)

Genus *Oithona* Baird, 1843

Oithona plumifera Baird, 1843

Shelf, epipelagic
(Haq *et al.*, 1973)



Oithona brevicornis Giesbrecht, 1891

Planktonic in backwater in mangrove
(Ara *et al.*, 2017)

Oithona similis Claus, 1866

Planktonic in backwater in mangrove
(Ara *et al.*, 2017)

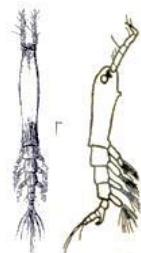
Oithona pseudofrigida Rosendorn, 1917

Planktonic in backwater in mangrove
(Ara *et al.*, 2017)

Oithona attenuata Farran, 1913

Planktonic in backwater in mangrove
(Ara *et al*, 2017)
Order Monstrilloidea Sars, 1901

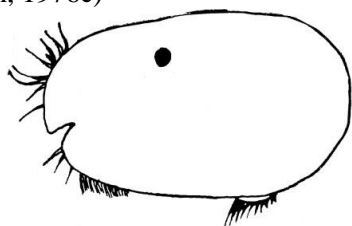
Family Monstrillidae Dana, 1849
Genus *Monstrilopsis* Sars, 1921
Monstrilopsis dubioides Suarez-
Morales, 2004
Planktonic
(Zubairi and Khan, 1973 as
Monstrilopsis dubia (Scott)



(After Zubairi and Khan, 1973)
Class Ostracoda Latreille, 1802
Subclass Podocopa G.O. Sars, 1866
Order Podocopida G.O. Sars, 1866

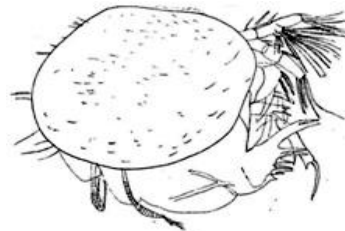
Family Bairdiidae Sars, 1865
Genus *Neonesidea* Maddocks, 1969
Neonesidea phlegeri (Mckenzie and
Swain, 1967)
On rocks with dense vegetation at low
tide
(CAS: INVERT 120542.0 Steiner, 1973)
Subclass Myodocopa Sars, 1866
Order Myodocopida Sars, 1866
Suborder Myodocopina Sars, 1866
Superfamily Cyndroleberidoidea
Muller, 1906

Family Cyndroleberididae Muller, 1906
Subfamily Asteropteroinae Kornicker,
1981
Genus *Asterope* Philippi, 1840
Asterope mariae Baird, 1850 1.8 mm.
Planktonic
(Khan, 1976c)



Sub family Cyndroleberidinae Muller,
1906
Genus *Cyndroleberis* Brady, 1868

Cyndroleberis bacescui Kornicker and
Caraion, 1974 1.8mm.
Algal associated in rocky area
(Kazmi, 2016b)

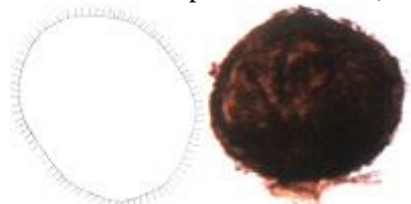


Superfamily Sarsielloidea Brady and
Norman, 1896

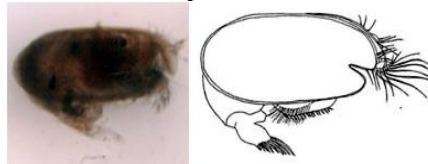
Family Philomedidae Muller, 1906
Genus *Philomedes* Lilljeborg, 1853
Philomedes (Philomedes) lilljeborgi
(Sars, 1928) 1.5-2.5 mm.

Planktonic
(Khan, 1976c)
Family Sarsiellidae Brady and Norman,
1896

Genus *Ancohenia* Kornicker, 1976
Ancohenia hawaiiensis Kornicker, 1976
0.71 mm.
Benthic
(Shahab, 2002, unpublished thesis)



Ancohenia robusta (Brady, 1890)
1.5 mm. Golden yellow
Phytal
(Shazia, 1996, unpublished thesis)

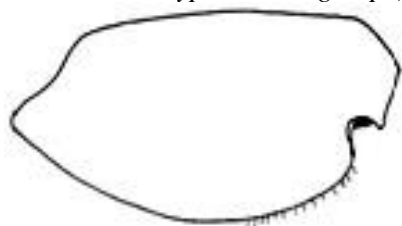


Superfamily Cypridinoidea Baird, 1850

Family Cypridinidae Baird, 1850
Genus *Codonocera* Brady, 1902
Codonocera sp.
Pelagic
(Khan, 1976)
Genus *Cypridina* M. Edwards, 1840
Cypridina dentata (Muller, 1906) 1-2.7
mm.

Planktonic, from marine to fresh water

(Khan, 1976c as *Cypridina megalops*)



Cypridina sinuosa (Mueller, 1906)

1.2 mm.

Planktonic

(Khan, 1976c as *Pyrocypris sinuosa*

Muller)



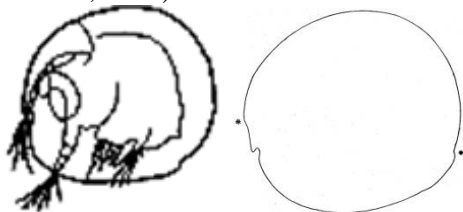
Genus *Gigantocypris* Muller, 1895

Gigantocypris mullerii Skogsberg, 1920

17 mm.

Planktonic, bathypelagic

(Cannon, 1940)



(After Cannon, 1940)

Order Halocyprida Dana, 1853

Suborder Halocypridina Dana, 1853

Superfamily Halocypridoidea Dana, 1853

Family Halocyprididae Dana, 1853

Genus *Conchoecia* Dana, 1849

Conchoecia sp 0.6 mm.

(Shahab, 2002, unpublished thesis)



Genus *Euconchoecia* Müller, 1890

Euconchoecia aculeata (Scott, 1894)

Planktonic, hyposaline

(IndoOBIS)

Genus *Proceroecia* Kock, 1992

Proceroecia procera (Müller, G. W., 1894)

Neritic, planktonic

(IndoOBIS)

Genus *Conchoecetta* Claus, 1890

Conchoecetta giesbrechti (Müller, 1906)

Individuals can grow to 2.3 mm.

Pelagic

(IndoOBIS)

Genus *Orthoconchoecia* Granata and

Caporiacco, 1949

Orthoconchoecia atlantica (Lubbock,

1856)

Pelagic

(IndoOBIS)

Genus *Metaconchoecia* Howe, 1955

Metaconchoecia rotundata (Müller, G.

W., 1890)

Pelagic

(IndoOBIS)

Genus *Halocypris* Dana, 1853

Halocypris inflata Dana, 1849 32mm.

Planktonic

(IndoOBIS)

Genus *Paraconchoecia* Claus, 1891

Paraconchoecia decipiens (Müller,

G.W., 1906)

Planktonic

(IndoOBIS)

Genus *Mikroconchoecia* Claus, 1891

Mikroconchoecia curta (Lubbock, 1860)

Planktonic

(IndoOBIS)

Family Deeveyidae Kornicker and Iliffe, 1985

Genus *Spelaeoecia* Angel and Iliffe, 1987

Spelaeoecia sp. 0.89 mm.

Benthic

(Present study)



Suborder Cypridocopina Jones, 1901

Superfamily Pontocypridoidea Muller, 1894

Family Pontocyprididae Muller, 1894

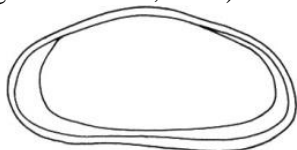
Genus *Agelaiocypris* Mostafawi, 2000

Agelaiocypris pellucida Mostafawi, 2000

4 mm.

Littoral, 10-95m., subfossil

(Maddock, 1969 as *Argilloecia?* sp5, Ref. to change Mostafawi, 2000)



Class Malacostraca Latreille, 1802
Subclass Phyllocarida Packard, 1879
Order Leptostraca Clause, 1880

Family Nebaliidae Samouille, 1819
Genus *Nebalia* Leach, 1814
Nebalia dahli Kazmi and Tirmizi, 1989.
6.25 mm.
Backwaters, planktonic at 8-10 m.
(Kazmi and Tirmizi, 1989, 1992)



Male, female

Subclass Hoplocarida Calman, 1904
Order Stomatopoda Latreille, 1817
Suborder Unipeltata Letreukke, 1825
Superfamily Lysiosquilloidea Giesbrecht, 1910

Family Nanonnosquillidae Manning, 1980
Genus *Bigelowina* Schotte and Manning, 1993
Bigelowina phalangium (Fabricius, 1798) 52 mm.
Benthic
(Tirmizi and Manning, 1968 as *Acanthosquilla acanthocarpus* (Claus, 1871)



Family Lysiosquillidae Giesbrecht, 1910
Genus *Lysiosquilla* Dana, 1852
Lysiosquilla tredecimdentata Holthuis, 1941
120-259 mm.
Benthic
(Beg, 1954 as *L. maculata* Fabricius)

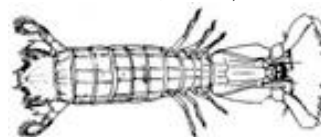


Superfamily Squilloidea Latreille, 1802

Family Squillidae Latreille, 1802
Genus *Clorida* Eydoux and Souleyet, 1842

Clorida latreillei Eydoux and Souleyet, 1842

Benthic
(Tirmizi and Kazmi, 1981)



Clorida microphthalmalma (H. Milne-Edwards, 1837) 32 mm.

Benthic
(Wood-Mason, 1895; Kemp, 1913)



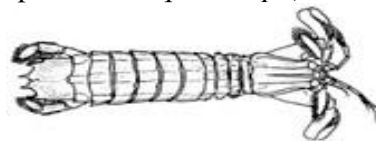
Genus *Cloridopsis* Manning, 1968
Cloridopsis scorpio (Latreille, 1825) 72 mm. Epibenthic, offshore
(Kemp, 1913; Beg, 1954)



Cloridopsis immaculata (Kemp, 1913)
Benthic, offshore
(Kemp, 1913)



Genus *Miyakella* Ahyong and Low, 2013
Miyakella nepa (Latreille, in Latreille, Le Peletier, Serville and Guérin, 1828)
69-150 mm.
Epibenthic, offshore
(Kemp, 1913 as *Squilla nepa*)

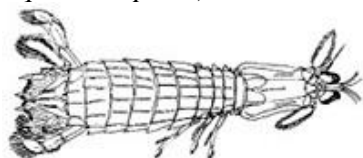


Genus *Oratosquillina* Manning, 1995
Oratosquillina interrupta (Kemp, 1911)
38-160 mm.

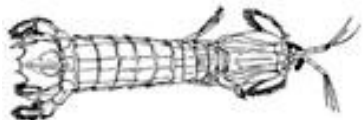
Epibenthic, offshore
(Kemp, 1913; Beg, 1954 as *Squilla interrupta*)



Holding yellow egg mass
Genus *Erugosquilla* Manning, 1995
Erugosquilla hesperia (Manning, 1968)
90 mm. Epibenthic, shallow sublittoral zone
(Tirmizi and Manning, 1968 as *Oratosquilla hesperia*)



Genus *Harpisquilla* Holthuis, 1964
Harpisquilla raphidea (Fabricius, 1798)
55-262 mm.
Benthic, sandy muddy substrate in shallow coastal waters including estuaries and embayments from intertidal to 293m.
(Kemp, 1913 as *Squilla raphidea*; Tirmizi and Manning, 1968)



Harpisquilla harpax (de Haan, 1844)
142 mm.
Epibenthic, offshore
(Tirmizi and Manning, 1968)

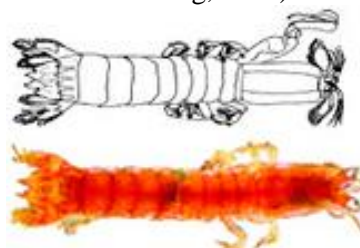


Superfamily Gonodactyloidea
Giesbrecht, 1910

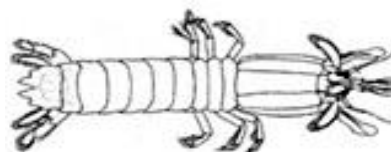
Family Gonodactylidae Giesbrecht, 1910
Genus *Gonodactylus* Berthold, 1827
Gonodactylus botti Manning, 1975 43-78 mm.
Intertidal, in rocks
(Beg, 1954 as *Gonodactylus chiragra* (Fabricius))



Gonodactylus smithii Pocock, 1893
74 mm.
Intertidal, in rocks
(Tirmizi and Manning, 1968)



Genus *Gonodactylellus* Manning, 1995
Gonodactylellus lanchesteri (Manning, 1967) 30mm.
Intertidal, in rocks
(Kemp, 1913 as *Gonodactylus spinosus*)



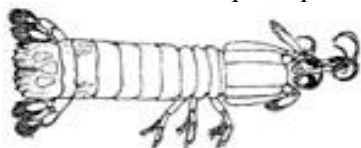
Gonodactylellus demanii (Henderson, 1893) 22mm.
Intertidal, in rocks
(Kemp, 1913; Tirmizi and Manning, 1968 as *Gonodactylus demani*)
Gonodactylellus annularis Erdman and Manning, 1998
Intertidal rocks, inhabit coral rubble at 3-50 m; common below 10 m, in cobbles and boulders
(Kazmi, 2016 as *Gonodactylellus affinis* (deMan))



Family Odontodactylidae Manning, 1980
Genus *Odonotodactylus* Bigelow, 1893
Odonotodactylus scyllarus (Linnaeus, 1758)

In reef
(Ali, 2006)

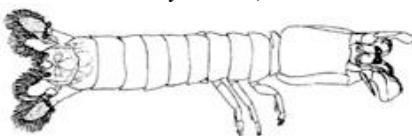
Family Protosquillidae Manning, 1980
Genus *Haptosquilla* Manning, 1969
Haptosquilla pulchella (Miers, 1880) 28-45mm.
Subtidal, in rocks
(Tirmizi, 1966 as *Protosquilla pulchella*)



Haptosquilla glabra (Lenz, 1905) 27-42mm.
Subtidal, in rocks
(Tirmizi, 1966 as *Protosquilla lenzi* Holthuis)

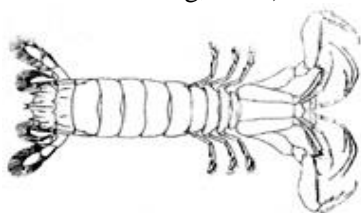


Family Takuidae Manning, 1995
Genus *Mesacturoides* Manning, 1976
Mesacturoides fimbriatus Lenz, 1905 15-38mm. Pale rust brown mottled with purple
Subtidal, in rocks; in association with live corals
(Tirmizi and Kazmi, 1980 as *Mesacturoides raymondi*)



Superfamily Eurysquilloidea Ahyong and Harling, 2000

Family Eurysquillidae Manning, 1977
Genus *Manningia* Serene, 1962
Manningia amabilis Holthuis, 1967 37mm.
Benthic, 22-335m., offshore
(Tirmizi and Manning, 1968)



(After Holthuis, 1967)

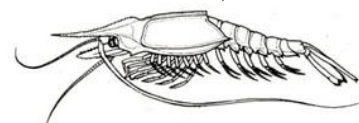
Subclass Eumalacostraca Grobben, 1892
Super order Syncarida Packard, 1885
Order Bathynellacea Chappuis, 1915

Family Parabathynellidae Noodt, 1965
Genus *Habrobathynella* Schminke, 1973
Habrobathynella indica Reddy and Schminke, 2005
Hyporheic in brackish to fully saline water in lakes, groundwater or in caves
(Qureshi and Khatoon, 2015)
Superorder Peracarida Calman, 1904
Order Lophogastrida Sars, 1870

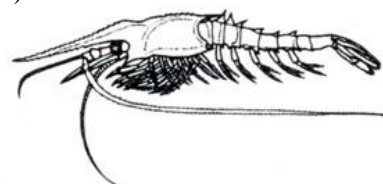
Family Gnathophausiidae Udrescu, 1984
Genus *Gnathophausia* Willemoes-Suhm, 1873
Gnathophausia zoea Willemoes -Suhm, 1875
400-6050m.
(W.M. Tattersall, 1939)



Genus *Neognathophausia* Petryashov, 1992
Neognathophausia gigas (Willemoes-Suhm, 1875) 26 mm.
Bathypelagic 300-4453m
(W.M. Tattersall, 1939 as *Gnathophausia gigas* Willemoes-Suhm)



Genus *Fagegnathophausia* Petryashov, 2015
Fagegnathophausia gracilis (Willemoes-Suhm, 1875) 78 mm.
Bathypelagic
(W.M. Tattersall, 1939) as *Gnathophausia gracilis* Willemoes-Suhm)

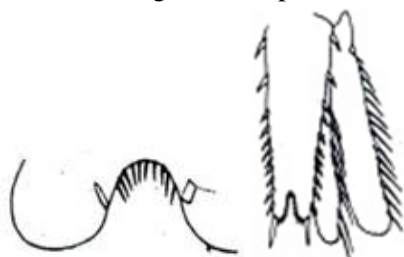


Order Mysida Haworth, 1825

Family Mysidae Haworth, 1825
 Subfamily Gastrosaccinae Norman, 1968
 Genus *Eurobowmaniella* Murano, 1996
Eurobowmaniella muticus (W.M. Tattersall, 1915) 4 to 8 mm.
 Bathypelagic, clayey silty, littoral
 (Kazmi *et al.*, 1992 as *Gastrosaccus muticus*)

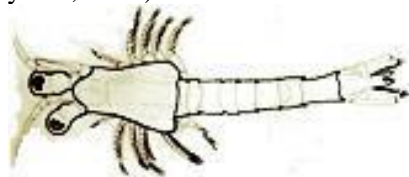


Anterior margin of carapace

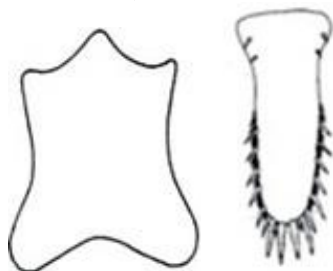


Posterior margin of carapace, telson
 (After Kazmi *et al.*, 1992)

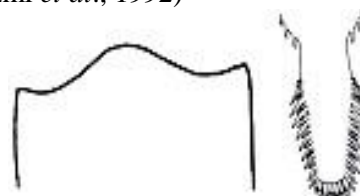
Genus *Anchialina* Norman and Scott, 1906
Anchialina typica (Krøyer, 1861)
 Near surface-150m, oceanic, hypoplanktonic; fine and medium sand; silty bottom; associated with corals, sponges and artificial substrates; in weeds
 (Nayeem, 1987)



Subfamily Mysinae Haworth, 1825
 Genus *Acanthomysis* Czerniavsky, 1882
Acanthomysis quadrispinosa Nouvel, 1965
 Near shore
 (Rafi, 1988, unpublished thesis; Nayeem *et al.*, 1992)



Carapace , Telson
Acanthomysis indica (W. M. Tattersall, 1922)
 4–7 mm.
 Bathypelagic, littoral
 (Kazmi *et al.*, 1992)



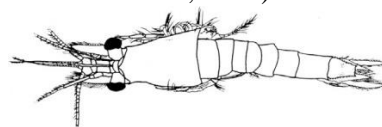
Anterior margin of carapace, telson
 (After Kazmi *et al.*, 1992)

Acanthomysis pelagica (Pillai, 1957)
 4-5 mm.
 Bathypelagic, 18 m, clayey silty littoral
 (Kazmi *et al.*, 1992)



Telson, anterior margin of carapace
 (After Kazmi *et al.*, 1992)

Genus *Indomysis* Tattersall, 1914
Indomysis annandalei W. M. Tattersall, 1914
 8 mm.
 Backwaters, pelagic, euryhaline
 (Kazmi and Tirmizi, 1995)



Subfamily Boreomysinae Holt and Tattersall, 1905

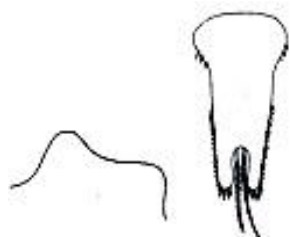
Genus *Boreomysis* Sars, 1869
Boreomysis verrucosa W.M. Tattersall, 1939
 Mesopelagic
 (W.M. Tattersall, 1939)



Telson, uropod and carapace
 Subfamily Leptomysinae Czerniavsky, 1882

Genus *Afromysis* Zimmer, 1916
Afromysis macropsis W.F. Tattersall, 1922

Bathypelagic, littoral
(Rafi, 1988, unpublished thesis, Nayeem
et al., 1992)



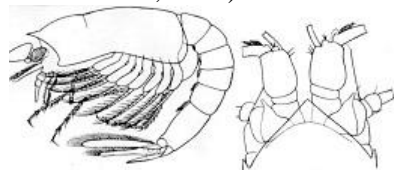
Anterior margin of carapace, telson
Genus *Nouvelia* Bacescu and Vasilescu,
1973

Nouvelia natalensis Bacescu and
Vasilescu, 1973
0.5 m, remains in puddles after ebb
(Moazzam, 1986 as *Nouvelia natalensis*
mombasae, abstract only)
Genus *Mesopodopsis* Zerniavisky, 1882
Mesopodopsis orientalis (W. Tattersall,
1908)
In creeks to almost fresh water
(Kazmi and Sultana, 2015)



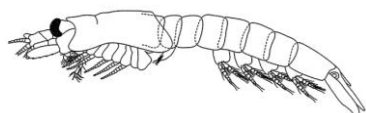
Anterior margin of carapace, telson
Subfamily Erythropinae Hansen, 1910
Genus *Dactylamblyops* Holt and
Tattersall, 1906

Dactylamblyops murrayi W.M.Tattersall,
1939
Mesopelagic 500-? 1200 m.
(W. H. Tattersall, 1939)

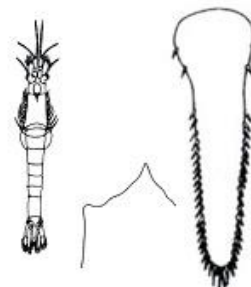


Animal and anterior region
(After W. H. Tattersall, 1939)

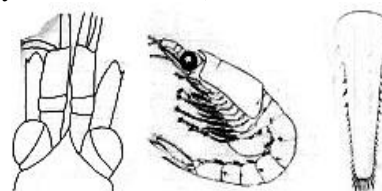
Genus *Eyrthrop* G.O. Sars, 1869
Eyrthrop minutus Hansen, 1910
From 0-93.5m., coastal shallow-water
form, found often among weed
(Rafi, 1988, unpublished thesis)



Subfamily Siriellinae Czerniavsky, 1882
Genus *Siriella* Dana, 1850
Siriella gracilis Dana, 1852
Littoral, epipelagic
(Nayeem *et al.*, 1992)



Animal, anterior margin of carapace and
telson
Siriella thompsonii H.M.Edward, 1837
Epipelagic form in offshore waters to
mesopelagic
(Nayeem *et al.*, 1992)



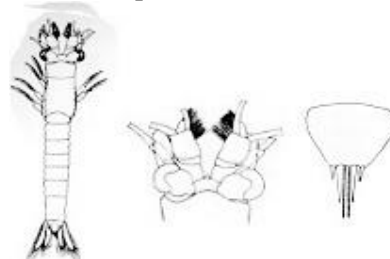
Front, animal and telson

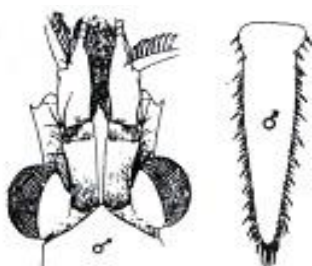
Siriella affinis Hansen, 1910
Littoral, mesopelagic in coral reef areas,
from weeds
(Nayeem, 1987)



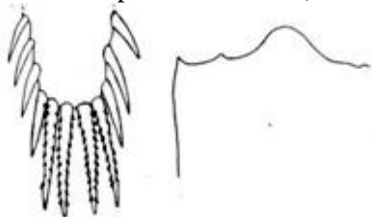
Front and telson

Siriella aequiremis Hansen, 1910
Epipelagic-?>4m, oceanic
(Rafi, 1988, unpublished thesis)

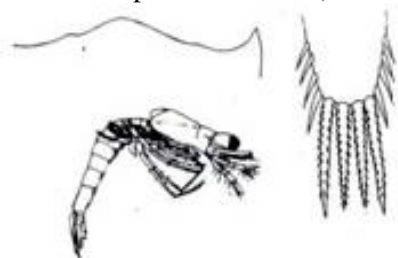




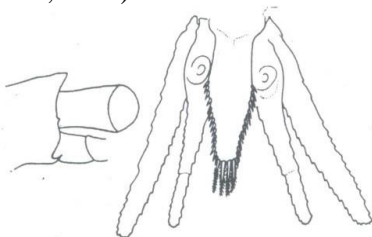
Male, female telsons and fronts
Siriella quilonensis Pillai, 1961
 Epipelagic
 (Moazzam, 1983, abstract only)
 Subfamily Rhopalophthalminae Hansen, 1910
 Genus *Rhopalophthalmus* Illig, 1906
Rhopalophthalmus tattersallae Pillai, 1961
 Coastal, sometimes in the inshore plankton
 (Rafi, 1988, unpublished thesis)



Telson and anterior margin of carapace
Rhopalophthalmus macropsis Pillai, 1964
 Estuarine, brackish or coastal waters
 (Rafi, 1988, unpublished thesis)



Animal, telson and anterior margin of carapace
Rhopalophthalmus kempfi O. Tattersall, 1957
 2-4m muddy bottom
 (Nayeem, 1987)



Front and telson

Order Amphipoda Latreille, 1816
 Suborder Hyperiidea H. M. Edward, 1830

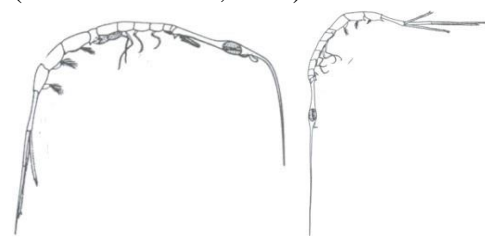
Family Hyperiidae Dana, 1852
 Genus *Themisto* Guérin, 1825
Themisto gaudichaudii Guérin, 1825
 Pelagic
 (Kazmi and Bano, 2011)

Family Lestrigonidae Zeidler, 2004
 Genus *Phronimopsis* Claus, 1879
Phronimopsis spinifera Claus, 1879
 Pelagic; depth range 0 - 500 m.
 (Kazmi and Bano, 2011)
 Superfamily Scinoidea Bowman and Gruner, 1973

Family Scinidae Stebbing, 1888
 Genus *Scina* Prestandrea, 1833
Scina tullbergi (Bovallius, 1885)
 transparent red
 Pelagic
 (Vinogradov *et al.*, 1996)
 Superfamily Platysceloidea Bate, 1862

Family Lycaeidae Claus, 1879
 Genus *Brachyscelus* Bate, 1861
Brachyscelus globiceps (Claus, 1879)
 Pelagic, depth range 0-500 m.
 (Barnard, 1937)
 Genus *Thamneus* Bovallius, 1890
Thamneus rostratus Bovallius, 1887
 (Barnard, 1937 as *Thamneus platyrhynchus*)

Family Oxycephalidae Bate, 1861
 Genus *Rhabdosoma* Adams and White, 1847
Rhabdosoma whitei Bate, 1862
 9-24 mm.
 Planktonic, inshore, depth range 0-200m.
 (Bano and Kazmi, 2012)



Female, male

Rhabdosoma armatum (H. Milne Edwards, 1840)

Planktonic
(Nair and Jayalakshmy, 1992)



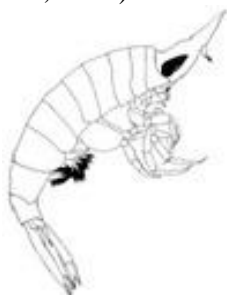
Rhabdosoma brevicaudatum Stebbing, 1888

Planktonic
(Nair and Jayalakshmy, 1992)
Genus *Simorhynchotus* Stebbing, 1888
Simorhynchotus antennarius (Claus, 1871)
(Barnard, 1937)



Genus *Oxycephalus* H. Milne-Edwards, 1830

Oxycephalus clausi Bovallius, 1890
Planktonic
(Nayeem *et al.*, 1993)



Oxycephalus piscator Milne-Edwards, 1840

Planktonic
(Nayeem *et al.*, 1993)



Head and telson (After Nayeem *et al.*, 1993)

Genus *Leptocotis* Streets, 1878
Leptocotis tenuirostris (Claus, 1887) 9 mm.
Planktonic
(Barnard, 1937)



Telson and head (After Nayeem *et al.*, 1993)

Genus *Glossocephalus* Bovallius, 1887
Glossocephalus milneedwardsi Bovallius, 1887 12 mm.
Planktonic 500 m head telson
(Nayeem *et al.*, 1993)



(After Nayeem *et al.*, 1993)
Genus *Streetsia* Stebbing, 1888
Streetsia challengerii Stebbing, 1888
Planktonic, 3.8 mm
(Barnard, 1937)



Animal, head and telson
(After Nayeem *et al.*, 1993)
Streetsia mindanaonis (Stebbing, 1888)
Planktonic
(Nayeem *et al.*, 1993)



Telson and head (After Nayeem *et al.*, 1993)

Streetsia porcella (Claus, 1879)
Planktonic
(Barnard, 1937)
Streetsia steenstrupi (Bovallius, 1887)
Planktonic
(Nayeem *et al.*, 1993)



Head and telson (After Nayeem *et al.*, 1993)

Genus *Tullbergella* Bovallius, 1887
Tullbergella cuspidata Bovallius, 1887
6 mm.

Planktonic, inshore
(Nayeem *et al.*, 1993)



Telson and head (After Nayeem *et al.*, 1993)

Genus *Cranocephalus* Bovallius, 1890
Cranocephalus scleroticus (Streets, 1878)

Pelagic; depth range 0 - 200 m.
(Nayeem *et al.*, 1993)



Head and telson (After Nayeem *et al.*, 1993)

Superfamily Phronimoidea Rafinesque, 1815

Family Lestrigonidae Zeidler, 2004
Genus *Lestrigonus* Milne-Edwards, 1830
Lestrigonus bengalensis Giles, 1888

Upper epipelagic
(Bowman and McGuinness, 1989)

Lestrigonus crucipes (Bovallius, 1889)
Upper epipelagic

(Bowman and McGuinness, 1989)

Lestrigonus macrophthalmus (Vosseler, 1901)

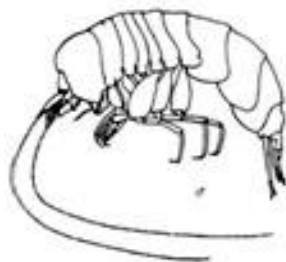
Upper epipelagic

(Bowman and McGuinness, 1989)

Lestrigonus schizogeneios (Stebbing, 1888)

Inhabits upper 200 m.

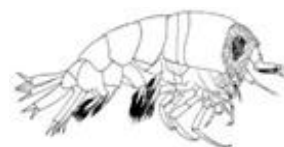
(Barnard, 1937 as *Hyperia promontorii* Stebbing)



Genus *Themistella* Bovallius, 1887
Themistella fusca (Dana, 1853)

Planktonic

(Bowman and McGuinness, 1982)



Genus *Hyperietta* Bowman, 1973

Hyperietta vosseleri (Stebbing, 1904)

Planktonic

(Bowman and McGuinness, 1989)

Hyperietta stebbingi Bowman, 1973

Planktonic

(Bowman and McGuinness, 1989)

Hyperietta stephensi Bowman, 1973

Planktonic

(Bowman and McGuinness, 1989)

Hyperietta vosseleri (Stebbing, 1904)

Planktonic

(Bowman and McGuinness, 1989)

Genus *Hyperioides* Chevreux, 1900

Hyperioides sibaginis (Stebbing, 1888)

Planktonic

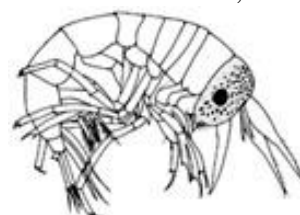
(Bowman and McGuinness, 1989)

Genus *Phronimopsis* Clause, 1879

Phronimopsis spinifera Clause, 1879

Planktonic

(Bowman and McGuinness, 1989)



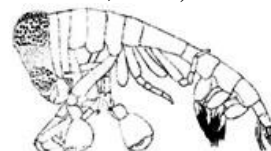
Family Phronimidae Rafinesque, 1815

Genus *Phronima* Latreille, 1802

Phronima colletti Bovallius, 1887

Epipelagic, planktonic

(Bano and Kazmi, 2005)



Phronima atlantica Guérin, 1836

Pelagic; depth range 0 - 1500 m.

(Barnard, 1937)

Phronima sedentaria Barnard, 1937

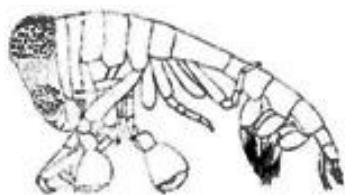
Associated with gelatinous zooplankton, such as pelagic tunicates

(Barnard, 1937)

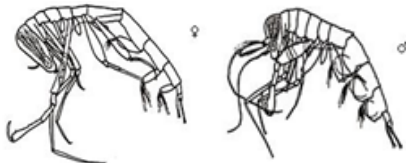
Phronima bowmani Shih, 1991

Associated with gelatinous zooplankton, such as pelagic tunicates

(Bowman and McGuinness, 1989)



Genus *Phronimella* Claus, 1872
Phronimella elongata (Claus, 1862)
 Pelagic; depth range 0 - 200 m.
 (Barnard, 1937)



Family Phrosinidae Dana, 1853
 Genus *Anchylomera* Milne-Edwards, 1830
Anchylomerablossevilli Milne-Edwards, 1830
 Planktonic
 (Barnard, 1937)



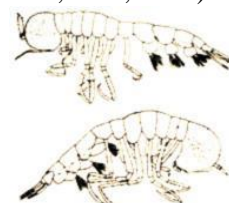
Genus *Phronsina* Risso, 1822
Phronsina semilunata Risso, 1822
 Planktonic
 (Bano and Kazmi, 2008)



Superfamily Lanceoloidea Bowman and Gruner, 1973
 Family Microphasmidae Stephensen and Pirlot, 1931
 Genus *Microphasma* Woltereck, 1909
Microphasma agassizi Woltereck, 1909
 Bathypelagic
 (Vinogradov *et al.*, 1996)

Family Lanceolidae Bovallius, 1887
 Genus *Lanceola* Say, 1818
Lanceola sayana Bovallius, 1885

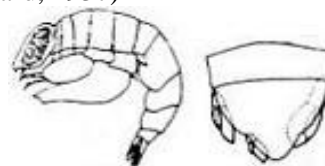
(Barnard, 1937)
Lanceola loveni Bovallius, 1882
 Living at greater depths
 (Vinogradov *et al.*, 1996)
Lanceola felina Bovallius, 1885
 In surface layers
 (Vinogradov *et al.*, 1996)
 Genus *Scypholanceola* Woltereck, 1905
Scypholanceola agassizi Woltereck, 1909
 At greater depth
 (Vinogradov *et al.*, 1996)
 Superfamily Vibilioidea Dana, 1853
 Genus *Lycaea* Dana, 1852
Lycaea pulex Marion, 1874
 Planktonic
 (Barnard, 1937)
 Family Paraphronomidae Bovallius, 1887
 Genus *Paraphronima* Claus, 1879
Paraphronima gracilis Clause, 1879
 Near shore during north east monsoon at day time
 (Barnard, 1937; Nair, 1977)



Female and male (After Nair, 1977)
Paraphronima crassipes Claus, 1879
 Pelagic; depth range 0 - 1500 m.
 (Nair, 1977)



Male, female
 Family Parascalidae Bate, 1862
 Genus *Thyropus* Dana, 1852
Thyropus sphaeroma (Claus, 1879)
 Length to 7 mm.
 Pelagic; depth range 0 - 200 m.
 (Barnard, 1937)



Animal and telson
 Suborder Senticaudata Lowry and Myers, 2013

Pavorder Corophiida Leach, 1814
(sensu Lowry and Myers, 2013)

Family Aoridae Stebbing, 1899
Genus *Grandidierella* Coutière, 1904
Grandidierella trispinosa Bano and Kazmi 2010
Estuarine, builds U-shaped tubes on muddy substrates
(Bano and Kazmi, 2010)



Infraorder Corophiida Leach, 1814
(sensu Lowry and Myers, 2013)
Parvorder Caprellidira Leach, 1814

Family Ischyroceridae Stebbing, 1899
Genus *Erichthonius* Milne-Edwards, 1830
Erichthonius punctatus (Bate, 1857)
Infralittoral, forms muds of muddy tubes on various substrata, circalittoral creeks
(Ahmed, 1976 as *Podoceros brasiliensis*)



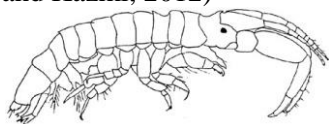
Family Corophiidae Leach, 1814
Genus *Monocorophium* Bousfield and Hoover, 1997

Monocorophium acherusicum (Costa, 1851)

Infralittoral, among algae, tunicates, polyzoa, on installations
(Ahmed, 1976 as *Corophium acherusicum*)

Monocorophium insidiosum (Crawford, 1937)

Infralittoral in brackish water building mud tubes on algae
(Bano and Kazmi, 2012)



Genus *Apocorophium* Bousfield and Hoover, 1997

Apocorophium acutum (Chevreux, 1908)

Algal
(Bano and Kazmi, 2012)



Genus *Hirayamaia* Bousfield and Hoover, 1997

Hirayamaia tirmiziae Bano and Kazmi, 2008

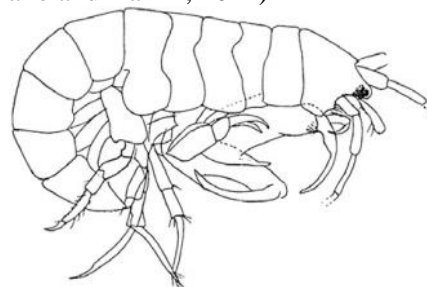
Brackish
(Bano and Kazmi, 2008)

Genus *Jassa* Leach, 1814

Jassa falcata (Montagu, 1808)

Builds open-ended mud and silt tubes on solid substrata in strong tidal and wave currents

(Bano and Kazmi, 2012)



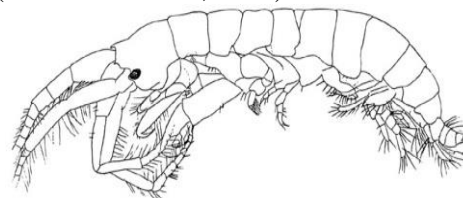
Genus *Cerapus* Say, 1817

Cerapus oceanicus Lowry, 1985

Algal tube
(Bano and Kazmi, 2010)

Cerapus tubularis Say, 1817

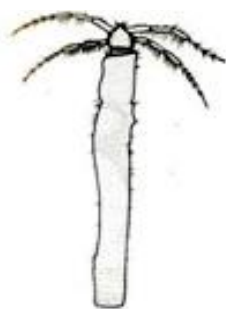
Algal tube
(Bano and Kazmi, 2012)



Genus *Notopoma* Lowry and Berents, 1996

Notopoma crassicornis (Bate, 1857)

In rock pools among hydroids in membranous tubes
(Yaqoob, 1971 unpublished thesis)



Family Ampithoidae Stebbing, 1899
Genus *Plumithoe* Barnard and Karaman, 1991

Plumithoe hirsutus (Ledoyer, 1978)

Epipelagic

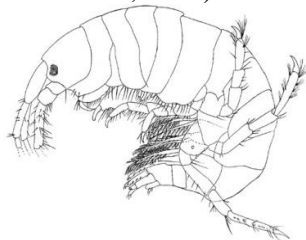
(Bano and Kazmi, 2012)

Genus *Cymadusa* Sabigny, 1816

Cymadusa filosa Savigny, 1816

Phytoplankton, utilizes *Ulva lactuca* for tube construction

(Ahmed, 1976 as *Grubia filosa*; Javed, 1983; *Cymadusa filosa*, in fact a species complex Ref. Peart, 2004)

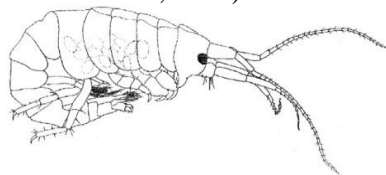


Genus *Ampithoe* Leach, 1814

Ampithoe ramondi Audouin, 1826

Algae from rocky area

(Kazmi and Bano, 2003)



Genus *Sunamphitoe* Spence Bate, 1857

Sunamphitoe spuria (Krapp-Schickel, 1978)

Algae

(Bano and Kazmi, 2012 as *Ampithoe spuria* Krapp-Schickel)

Genus *Plumithoe* Barnard and Karaman, 1991

Plumithoe hirsutus (Ledoyer, 1978)

Algae

(Kazmi and Bano, 2003 as *Ampithoe hirsuta* Ledoyer)

Pavorder Caprellidira Leach, 1814 (sensu Lowry and Myers, 2013)

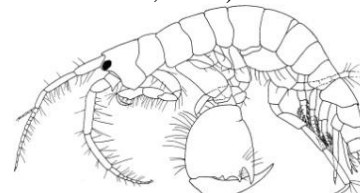
Family Isaeidae Dana 1853

Genus *Cheiriphotis* Walker, 1904

Cheiriphotis megacheles Giles, 1885

Benthic

(Bano and Kazmi, 2012)



Family Caprellidae Leach, 1814

Genus *Hemiaegina* Mayer, 1890

Hemiaegina minuta Mayer, 1890 7mm.

Subtidal, some times as entangled mass

(Sadiq, 1993, unpublished thesis)



Genus *Dodecas* Stebbing, 1883

Dodecas elongata Stebbing, 1883

Littoral depth

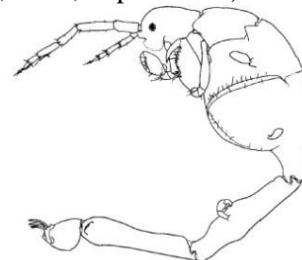
(CAS: INVERT F.B. Steiner 22 October 1973)

Genus *Pseudocaprellina* Sundara Raj, 1927

Pseudocaprellina pambanensis Sundara Raj, 1927

In seaweeds

(Sadiq, 1993, unpublished)

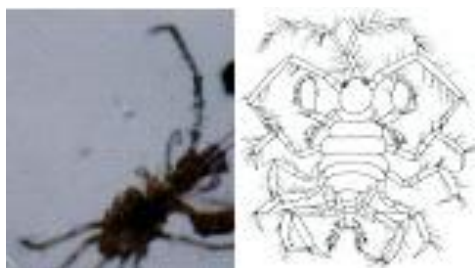


Family Podoceridae Leach, 1814

Genus *Laetmatophilus* Bruzelius, 1859

Laetmatophilus paradurbanensis Bano and Kazmi, 2004

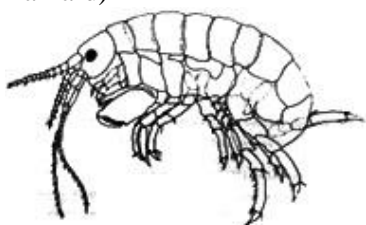
Commensal on algae on crabs, gorgonids (Bano and Kazmi, 2004)



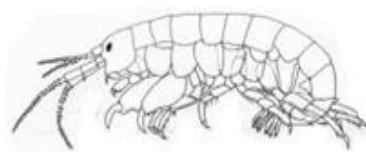
Superfamily Photoidea Boeck, 1871

Family Photidae Boeck, 1871
 Genus *Latigammaropsis* Myers, 2009
Latigammaropsis sp.
 Egg pouch of *Dorippoides nudipes*
 (Kazmi 1993 as *Gammaropsis atlantica*,
 abstract)
 Infra order Talitrida Rafinesque, 1815
 Pavorder Talitridira Rafinesque, 1815
 Superfamily Talitroidea Rafinesque,
 1815

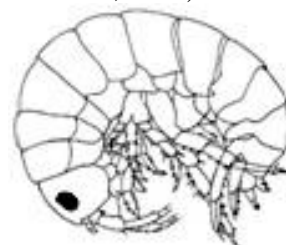
Family Hayalidae Bulycheva, 1957
 Genus *Parhyale* Rathke, 1837
Parhyale hawaiiensis (Dana, 1853)
 Algal biotopes, infralittoral
 (Ahmed, 1976 as *Hyale hawaiiensis*)
 Genus *Ptilohyale* Bousfield and
 Hendrycks, 2002
Ptilohyale plumicornis (Heller, 1866)
 On decaying mangrove leaf, in shallow
 waters
 (Bano and Kazmi, 2012 as *Parhyale*
pulmicornis)
 Genus *Apothyale* Bousfield and
 Hendrycks, 2002
Apothyale ayeli (J.L. Barnard, 1955)
 10 mm.
 Phytal
 (Sadiq, 1993 unpublished thesis as *Hyale*
ayeli Barnard)



Genus *Protohyale* Bousfield and
 Hendrycks, 2002
Protohyale rubra (Thomson, 1879) 9-
 11 mm. Yellow.
 Phytal
 (Sadiq, 1993 unpublished thesis as *Hyale*
rubra (Thompson))



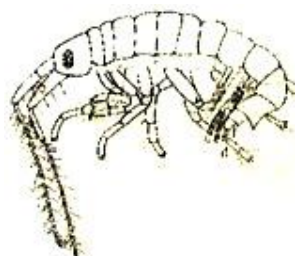
Family Talitridae Rafinesque, 1815
 Genus *Talorchestia* Dana, 1852
Talorchestia martensi Weber, 1795
 On beaches, burrowing in fine sand,
 under seaweed
 (Ahmed, 1976)
Talorchestia deshayesii (Audouin, 1826)
 Burrowing in fine sand, under seaweed
 stranded ashore
 (Bano and Kazmi, 2012)



Suborder Amphilochidea Boeck, 1871
 Infraorder Lysianassida Dana, 1849
 Parvorder Synopiidira Dana, 1852
 Family Dexaminidae Leach, 1814
 Genus *Polycheria* Haswell, 1879
Polycheria atoll Walker, 1905
 Commensal on unidentified ascidian
 (Kazmi, 2016)



Host



Habitus

Family Cyproideidae Barnard, 1974
 Genus *Cyproidea* Haswell, 1880
Cyproidea ornata Haswell, 1880
 Phytal, littoral
 (Bano and Kazmi, 2012)



Family Urothoidae Bousfield, 1978

Genus *Urothoe* Dana, 1852

Urothoe spinidigitus Walker, 1904

Fine sediment
(Ahmed, 1976)

Urothoe grimaldi Chevreux, 1895

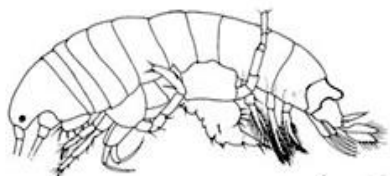
Fine sediment
(Bano and Kazmi, 2012)

Family Ampeliscidae Costa, 1857

Genus *Ampelisca* Kroyer, 1842

Ampelisca brevicornis A. Costa, 1853

Sand bottom, detritic muddy bottom
(Bano and Kazmi, 2018)



Ampelisca scabripes Walker, 1904

Sand bottom, detritic muddy bottom
(Bano and Kazmi, 2015, abstract)

Genus *Byblis* Boeck, 1871

Byblis lepta (Giles, 1888)

Muddy or detritus bottoms
(Ahmed, 1976)

Byblis integritelson Bano And
Kazmi, 2018

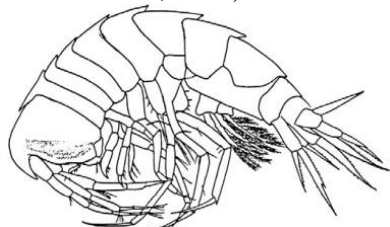
(Bano And Kazmi, 2018)

Family Synopiidae Dana, 1853

Genus *Ilerastroe* Barnard, 1972

Ilerastroe ilergetes (Barnard, 1964)

Deep sea, on muddy bottom
(Bano and Kazmi, 2012)



Genus *Synopia* Dana, 1852

Synopia ultramarina Dana, 1852

Planktonic
(Barnard, 1937)

Superfamily Lysianassoidea Dana, 1849

Family Cyphocarididae Lowry and
Stoddart, 1997

Genus *Cyphocaris* Boeck, 1871

Cyphocaris faurei Barnard, 1916

Bathypelagic
(Barnard, 1937)

Family Lysianassidae Dana, 1849

Genus *Shoemakerella* Pirlot, 1936

Shoemakerella cubensis (Stebbing,
1897)

Near shore

(Ahmed, 1976 as *Shoemakerella nasuta*)

Genus *Arugella* Pirlot, 1936

Arugella ewa (J.L. Barnard, 1970)

Rock pools under stones

(Yaqoob, 1971, unpublished thesis)

Family Uristidae Hurley, 1963

Genus *Stephonyx* Lowry and Stoddart,
1989

Stephonyx arabiensis Diffenthal and
Horton, 2007

Deep sea at 1864 m.

(Diffenthal and Horton, 2007)

Family Podoprionidae Lowry and
Stoddart, 1996

Genus *Podoprion* Chevreux, 1891

Podoprion addyi Horton, 2005

At 1185 m.

(Horton, 2005)

Family Hirondeleidae Lowry and
Stoddart, 2010

Genus *Hirondelella* Chevreux, 1889

Hirondelella sindhusagar Horton and
Thurston, 2009

Deep Sea, at 1182, 1184 and 1864 m off
the coast

(Horton and Thurston, 2009)

Family Isaeidae Dana, 1853

Genus *Photis* Kroyer, 1838

Photis longicaudata (Bate and
Westwood, 1862)

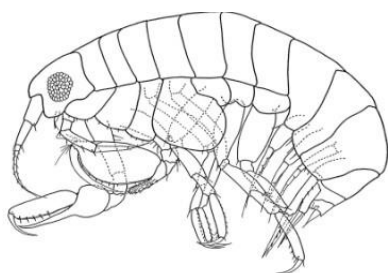
Infralittoral, among algae
(Ahmed, 1976)

Family Leucothoidae Dana, 1852

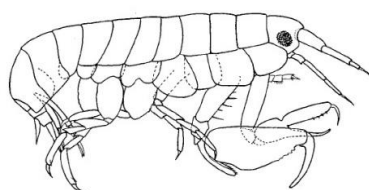
Genus *Leucothoe* Leach, 1814

Leucothoe furina Savigny, 1817

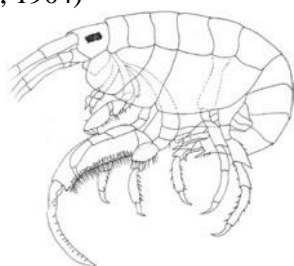
Endocommensal in ascidians
(Kazmi, 1993)



Leucothoe spinicarpa Abildgaard, 1789
Subtidal to over 100 m commensal in sponges, tunicates, algae. *Aplysia* (Ahmed, 1976)



Family Stenothoidae Boeck, 1871
Genus *Stenothoe* Dana, 1852
Stenothoe gallensis Walker, 1904
Intertidal
(Walker, 1904)

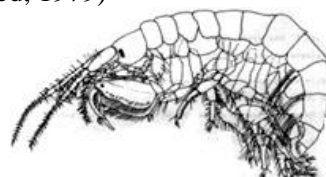


Infra order Hadziida S. Karaman, 1943
Pavorder Hadziidira Karaman, 1932
Superfamily Hadzioidea Bousfield, 1983

Family Maeridae Krapp-Schickel, 2008
Genus *Quadrivisio* Stebbing, 1907
Quadrivisio bengalensis Stebbing, 1907
Near shore
(Ahmed, 1976)

Genus *Elasmopus* Costa, 1853
Elasmopus japonicus Stephensen, 1932
Infratidal Littoral (0 to 30 m)
(Javed, 1987)

Elasmopus pecteniscrus (Bate, 1862)
Infratidal, among algae or on shelly bottom
(Ahmed, 1979)

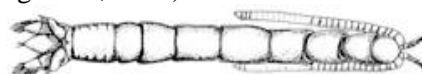


Elasmopus rapax Costa, 1853
Littoral (0 to 30 m.)
(Yaqoob, 1971, unpublished thesis)
Genus *Anelasmopus* Oliveira, 1953
Anelasmopus kraui Oliveira, 1953
Littoral (0 to 30 m.), intertidal to 3 m., brackish, among algae
(Yaqoob, 1971, unpublished thesis)
Order Isopoda Latreille, 1817
Suborder Anthuridea Monod, 1922

Family Paranthuridae Menzies and Glynn, 1968
Genus *Paranthura* Bate and Westwood, 1868
Paranthura latipes Barnard, 1955
Associated with algae, intertidal
(Javed and Yasmeen, 1992)



(After Javed and Yasmeen, 1992)
Family Anthuridae Leach, 1814
Genus *Caenanthura* Kensley, 1978
Caenanthura indica Negoescu, 1980
At 19-110 m. Calcareous, soft bottom, with tubes of *Ampelisca*
(Negoescu, 1980)



(After Negoescu, 1980)

Genus *Cyathura* Norman and Stebbing, 1886
Cyathura francispori Negoescu, 1981
Intertidal to rocks and sand, weed covered
(CAS: INVERT 25255.0 Steiner, 1973; Wagele, 1984)



(After Wagele, 1984)
Suborder Asellota Latreille, 1802

Superfamily Janiroidea Sars, 1897

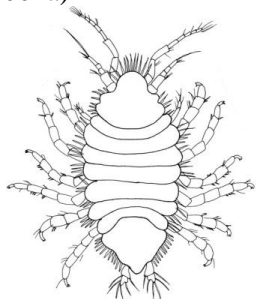
Family Santiidae Wilson, 1987

Genus *Halacarsantia* Wolff, 1989

Halacarsantia sp. near *ovata* Shimomura and Ariyama, 2004

Benthic, phytal

(Kazmi, 2001a)



Family Joeropsididae Nordenstam, 1933

Genus *Joeropsis* Koehler, 1885

Joeropsis karachiensis Kazmi and Yousuf, 2002

3.0 mm.

In sabellarid worm reef

(Kazmi and Yousuf, 2003)



polychaete reef

(After Kazmi and Yousuf, 2003)

Joeropsis curvicornis Nicolet, 1849

Phytal, intertidal

(Ghani, 2003)

Genus *Carpias* Miller, 1941

Carpias algicola (Miller, 1941)

Phytal

(Ghani, 2003a)



Suborder Epicaridea Latreille, 1831

Superfamily Bopyroidea Rafinesque, 1815

Family Entoniscidae Kossmann, 1881

Genus *Micippion* Shiino, 1942

Micippion asymmetricus Shiino, 1942

Parasitic. Host: *Charybdis feriata* (crab)

(Mushtaq *et al.*, 2016)

Family Bopyridae Rafinesque, 1815

Subfamily Argeininae Markham, 1947

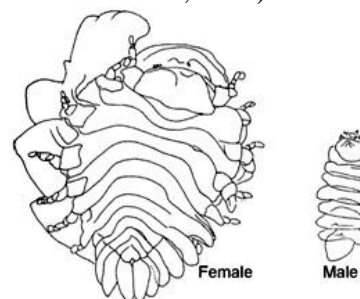
Genus *Argeiopsis* Kensley, 1974

Argeiopsis kensleyi Boyoko and Kazmi, 2005

Parasitic. Host: *Microprosthema validum*

(Stenopoid shrimp)

(Boyoko and Kazmi, 2005)



(After Boyoko and Kazmi, 2005)

Subfamily Athelginae Codreanu and Codreanu, 1956

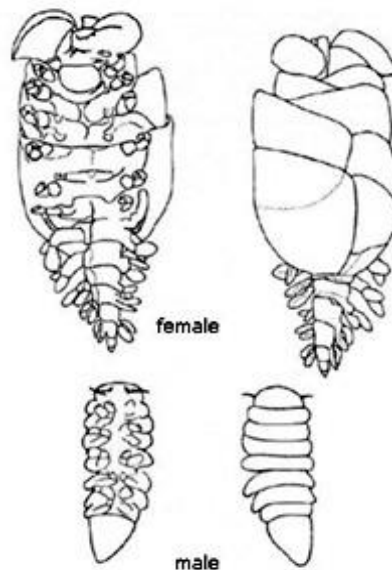
Genus *Allathelges* Kazmi and Markham, 1999

Allathelges pakistanensis Kazmi and Markham, 1999

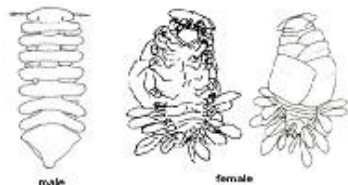
Parasitic. Host: *Areopaguristes perspicax*

(Hermit crab)

(Kazmi and Markham, 1999)



Genus *Parathelges* Bonnier, 1900
Parathelges neotenuicaudis
 (Shyamasundari, Hanumantha Rao, Jalajakumari and Mary, 1993) 10 mm.
 Parasitic.Host: *Pagurus kulkarnii* (Hermit crab)
 (Kazmi and Markham, 1999)



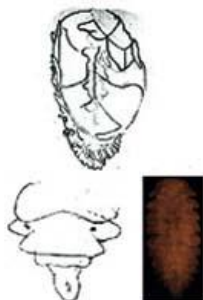
(After Kazmi and Markham, 1999)

Genus *Pseudostegias* Shiino, 1933
Pseudostegias ashooae Kazmi, 2016
 Parasitic.Host: *Areopaguristes perspicax*
 (Hermit crab)
 (Kazmi, 2016)

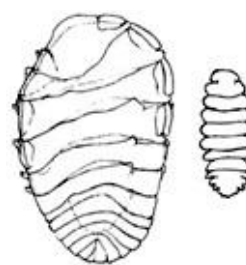


Female

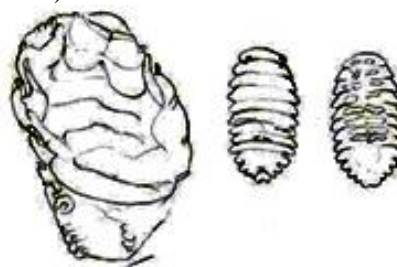
Subfamily Bopyrinae Rafinesque, 1815
 Genus *Parabopyrella* Markham, 1985
Parabopyrella indica Chopra, 1923
 Parasitic.Host: *Synalpheus tumidomanus*
 (Shrimp)
 (Chopra, 1923 as *Bopyrella deformansindica*; Kazmi *et al.*, 2002)



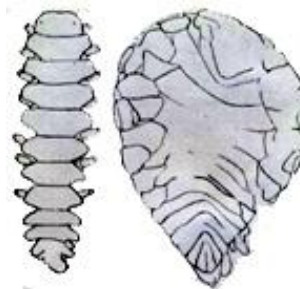
Female, Male, male tail
Parabopyrella mortenseni Nierstrasz and Brandis
 (Chopra, 1930)
 Parasitic.Host: Alpheids and hippolytids.
 (Shrimp)
 (Qazi, 1959 as *Bopyrella nierstraszi*
 Incorrect identification .Ref Markham, 1985)



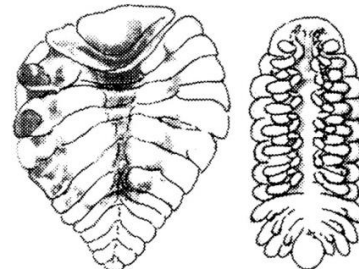
Parabopyrella saronae (Bourdon and Bruce, 1979) 12x8 mm.
 Parasitic.Host: *Saron marmoratus*
 (Shrimp)
 (Ghani and Tirmizi, 1993 as *Bopyrella saronae*)



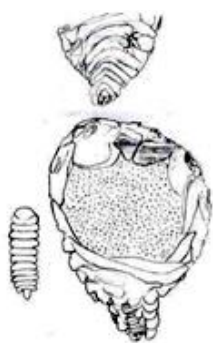
Genus *Probopyrus* Giard and Bonnier, 1888
Probopyrus prashadi (Chopra, 1923)
 Parasitic.Host: *Parapeneopsis stylifera*
 (Shrimp)
 (Shireen, unpublished thesis, 1997 as *Palaegyge prashadi* Chopra)



Probopyrus pica Chopra, 1923
 Parasitic.Host: *Palaemon* sp. (Shrimp)
 (Qazi, 1959 as *Palaegyge pica*)



Female and male (After Chopra, 1923)
Probopyrus alcocki (Chopra, 1923)
 Parasitic.Host: *Palaemon* sp.
 (Yaqoob 2006 as bopyrid; Kazmi, 2016)



Genus *Bopyrina* Kossmann, 1881
Bopyrina ocellata (Czerniavsky, 1868)
 Parasitic.Hosts: *Latreutes cf.anoplonyx*,
Hippolyte ventricosa (shrimps)
 (Kazmi, 2016)



Genus *Bopyrella* Bonnier, 1900
Bopyrella tanytelson Markham, 1985
 Parasitic.Host: *Alpheus* sp.(shrimp)
 (Kazmi, 2016)
 Subfamily Keponinae Boyko, Moss,
 Williams and Shields, 2013
 Genus *Apocepon* Nierstrasz and Brender
 a Brandis,
 1930
Apocepon sp.
 Parasitic.Host: *Coleusia biannulata*
 (crab)
 (Kazmi *et al.*, 2002 as *Dactylocepon* sp.)



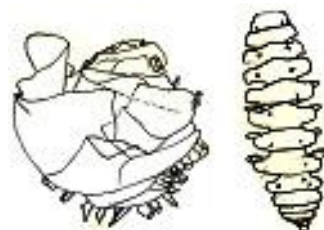
Male (After Kazmi, 2016)

Genus *Hypocepon* Nierstrasz and
 Brender a Brandis,
 1930

Hypocepon enoensis Nierstrasz and
 Brender à Brandis, 1930
 Parasitic.Host: *Nepinnotheres villosulus*
 (crab)
 (Siddiqui, 2012)
 Genus *Cancricepon* Giard and Bonnier,
 1887
Cancricepon pilumnopousiae Kazmi,
 2016
 Parasitic. Host: *Pilumnopeus convexus*
 (crab)
 (Kazmi, 2016)

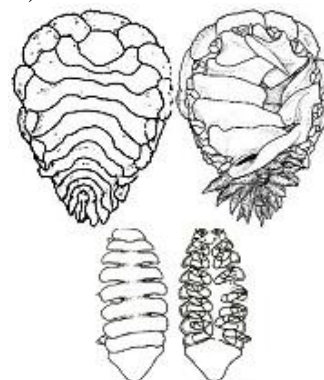


Female, dorsal view



Female ventral view, male (After Kazmi,
 2016)

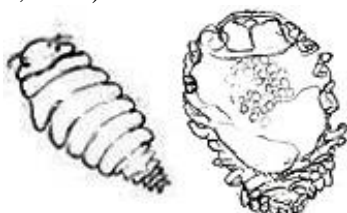
Subfamily Orbioninae Codreanu, 1967
 Genus *Parapenaon* Richardson, 1904
Parapenaon expansa Bourdon, 1979
 Female 21 mm, Male 6 mm.
 Parasitic.Host: *Penaeus* spp. (Shrimp)
 (Qazi, 1959 as *Epipenaon qadrii* Qazi,
 Kazmi *et al.*, 2012 as *Parapenaon*
japonica)



Parapenaeon sp.
Parasitic.Host: not noted
(Kazmi, 2016)

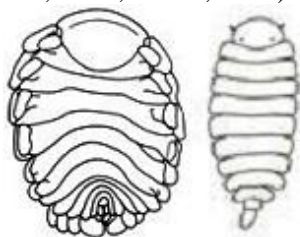


Female (After Kazmi, 2016)
Subfamily Pseudioninae Codreanu, 1967
Genus *Parapagurion* Shiino, 1933
Parapagurion farooqi Kazmi 2016
Parasitic.Host: *Areopaguristes perspicax*
(hermit crab)
(Kazmi, 2016)

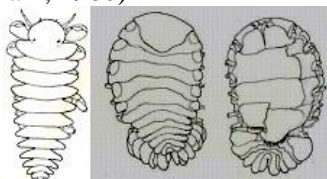


Female, male (AfterKazmi, 2016)

Genus *Aporobopyrina* Shiino, 1934
Aporobopyrina lamellata Shiino, 1934
Parasitic.Host: *Petrolisthes rufescence*
(False crab)
(Markham, 1980, Ghani, 1996)



Female and male (After Markham, 1980)
Genus *Aporobopyrus* Nobili, 1906
Aporobopyrus ryukuensis Shiino, 1939
Parasitic.Host: *Petrolisthes boscii* (False crab)
(Markham, 1980)



Male, female (After Markham, 1980)

Aporobopyrus megacephalon (Nierstrasz and Brender A Brandis, 1929)

Parasitic.Host: *Petrolisthes* sp. (False crab)



(Ahmed and Mustaquim, 1974; Kazmi *et al.*, 2002)

Genus *Progebiophilus* Codreanu and Codreanu, 1963

Progebiophilus assisi Kazmi and Bourdon, 1997

Parasitic.Host: *Upogebia assisi* (Ghost shrimp)
(Kazmi and Bourdon, 1997)



Genus *Upogebiophilus* Nobili, 1906
Upogebiophilus sp.
Parasitic.Host: *Upogebia quddusiae*
(Ghost shrimp)
(Ghani, 1995)



Male head, female and male tail (After Ghani, 1995)

Genus *Asymmetrione* Codreanu, Codreanu and Pike, 1965

Asymmetrione sp.
Parasitic.Hosts: *Diogenes custos* and *Diogenes planimanus* (Hermit crabs)
(Kazmi *et al.*, 2002)



Asymmetrione inrani Kazmi, 2016
Parasitic. Host: *Diogenes* spp
(Kazmi, 2016 uncertain >taxon inquirendum)



Subfamily Hemiarthrinae Markham, 1972
Genus *Apophrixus* Nierstrasz and Brender à Brandis, 1931
Apophrixus afzali Kazmi, 2016
Parasitic. Host: *Diogenes violaceus* (Hermit crab)
Parasitic. Host: *Alpheus* shrimp
(Kazmi, 2016)



(After Kazmi, 2016)

Genus *Pseudionella* Shiino, 1949
Pseudionella raboae Kazmi, 2016
Parasitic. Host: *Areopaguristes perspicax* (Hermit crab)
(Kazmi, 2016)



Female



Male

Suborder Flabellifera Sars, 1882

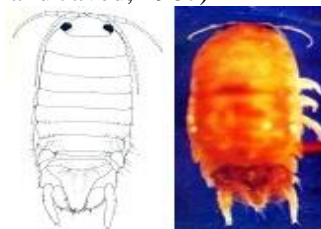
Family Limnoriidae White, 1850
Genus *Limnoria* Leach, 1813
Limnoria lignorum Rathke, 1799
At 0-20 m, wood and seaweed boring
(Anwarullah, 1971)
Limnoria bombayensis Pillai, 1961
Phytoplankton, boring
(Kazmi and Yousuf, 2013)

Family Cirolanidae Dana, 1852
Genus *Exciorolana* Richardson, 1912
Exciorolana orientalis Dana, 1853
Intertidal, rocky sandy region dorsal view
(Yasmeen, 2002)



(After Yasmeen, 2002) male

Genus *Atarbolana* Bruce and Javed, 1987
Atarbolana exoconta Bruce and Javed, 1987
4.7 mm. Intertidal
(Bruce and Javed, 1987)



(After Bruce and Javed, 1987)

Atarbolana makranensis Khalaji-Pirbalouty, Naderloo, and Keikhosravi, 2015
Intertidal
(Khalaji-Pirbalouty *et al.*, 2015 from Iranian Makran. presumably to occur in Pakistan)



(After Khalaji-Pirbalouty *et al.*, 2015)

Atarbolana setosa Javed and Yasmeen, 1989
Associated with algae
(Javed and Yasmeen, 1989)



Atarbolana concinna Yasmeen, 2004
4.5-6 mm.
Intertidal zone, rocky area
(Yasmeen, 2004)



Male (After Yasmeen, 2004)

Atarbolana dasycolus Yasmeen, 2004
Intertidal
(Yasmeen, 2004)
(Bruce and Javed, 1987; *A. dasycolus* is based on no more than small male of *A. setosa* and therefore is a junior synonym of *A. setosa*)



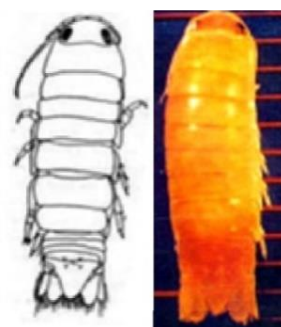
Male (After Yasmeen, 2004)

Genus *Cirolana* Leach, 1818
Cirolana brucei Javed and Yasmeen, 1995
Intertidal, from hard substratum
(Javed and Yasmeen, 1995)

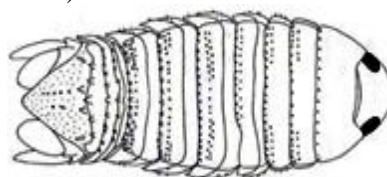


After Javed and Yasmeen, 1995

Cirolana manorae Bruce and Javed, 1987
Intertidal, associated with algae
(Bruce and Javed, 1995)

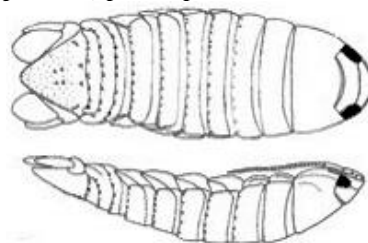


Cirolana hirsuta (Yasmeen, 2005)
Intertidal zone
(Yasmeen, 2005 as *Anopsilana hirsuta* Yasmeen)



Male (After Yasmeen, 2005)

Cirolana pentaspinula (Yasmeen, 2008)
Waters near mangrove area
(Yasmeen, 2008 as *Cirolana* (*Anopsilana*) *pentaspinula* Yasmeen)



(After Yasmeen, 2008)

Genus *Natatolana* Bruce, 1981

Natatolana insignis Hobbins and Jones, 1993
Demersal; depth range 148 - 1825 m.
(Yasmeen, 2004)



Male (After Yasmeen, 2004)

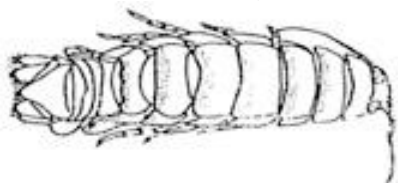
Genus *Neocirolana* Hale, 1925
Neocirolana arabica Javed and Yasmeen, 1990
Intertidal, in dead barnacles, holes of stones
(Javed and Yasmeen, 1990)



(After Javed and Yasmeen, 1990)

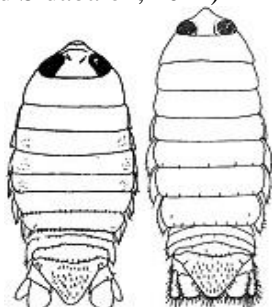
Genus *Eurydice* Leach, 1815
Eurydice pulchra Leach, 1815
 Sandy
 (Arshad, 2017)

Family Corallanidae Hansen, 1890
 Genus *Argathona* Stebbing, 1905
Argathona muraeneae (Bal and Joshi, 1959) 16-30 mm. Reddish brown.
 Parasitic. Hosts: *Epinephelus chlorostigma* and *Argyropsis spinifera* (Fish)
 (Ghani and Shireen, 1995)



(After Ghani and Shireen, 1995)

Genus *Lanocira* Hansen, 1890
Lanocira gardineri Stebbing, 1904 4-6 mm.
 Intertidal in rock crevices
 (Javed and Yasmeen, 1990; Javed and Yasmeen, 2000 as *Lanocira wowine*
 Yasmeen and Javed, 2000; doubtful Ref. Bruce and Sidabalok, 2011)



(After Javed and Yasmeen, 1990, 2000)

Genus *Anilocra* Leach, 1818

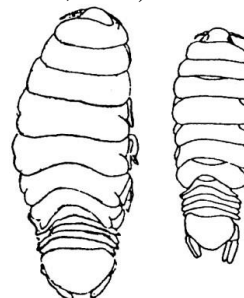
Anilocra dimidiata Bleeker, 1857 35 mm. Light yellow.
 Parasitic host not given
 (Shireen, 2001)



Anilocra cavicauda Richardson, 1910 34 mm x 10.25 mm.
 Parasitic. Host: *Nematolosa nasus* (Fish)
 (Karim, 1975)

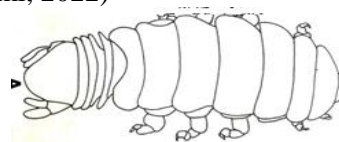


Genus *Catoessa* Schiodte and Meinert, 1884
Catoessa ambassae Bruce, 1990 7-9 mm.
 Parasitic. Hosts: *Chorinemus sp.* and *Carangoides malabaricus* (Fish)
 (Ghani and Ali, 1998)



Female and male (After Ghani and Ali, 1998)

Catoessa gruneri Bowman and Tareen, 1983 14 mm.
 Parasitic. Host: *Selar malam*, gill cavity *Alepes melanoptera*, *Alepes djedaba* and *Scomberoides tala* (Fish)
 (Kazmi, 2022)



Male

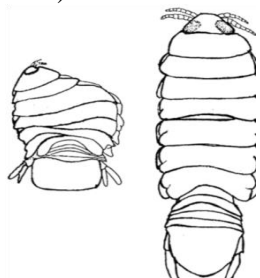
Genus *Cymothoa* Fabricius, 1783
Cymothoa eremita (Brunnich, 1783) 32.00 mm (female), 12.00 mm (male)
 Parasitic. Host: *Parastromateus niger* (Fish)
 (Shireen, 2000)



(Line drawing after Martin, 2016)

Genus *Elthusa* Schiodte and Meinert, 1881

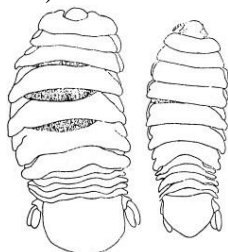
Elthusa raynaudii Milne Edwards, 1840
16-21 mm. Parasitic, host: *Nematolosa nasus* (Fish)
(Shireen, 2001)



Female and male (After Shireen, 2001)

Genus *Joryma* Bowman and Tareen, 1983

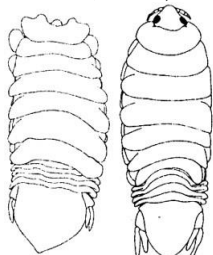
Joryma engraulidis (Barnard, 1936) 10 mm (Male) 24 mm (Female).
Parasitic. Host: *Sardinella* spp (Fish)
(Shireen, 2000)



(After Shireen, 2000)

Joryma sawayah Bowman and Tareen, 1983

Parasitic. Host: *Sardinella* spp. (Fish)
(Ghani and Shireen, 2000)

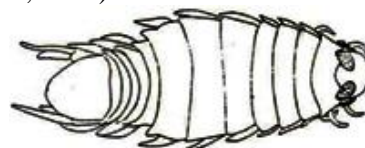


(After Ghani and Shireen, 2000)

Genus *Mothocya* Costa in Hope, 1851

Mothocya karobran Bruce, 1986

Parasitic. Host: *Strongylura leiura* (Fish)
(Bruce, 1986)



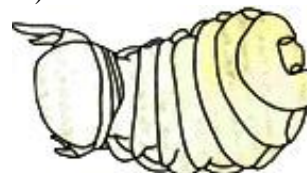
Mothocya renardi (Becker, 1857) 8 mm x 7 m.

Parasitic. Hosts: *Rachycentron canadus* (Fish)

(Karim, 1975 as *Irona renardi*)



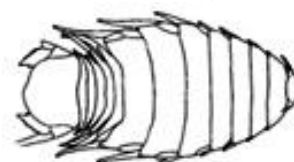
(Host fish photo contributed by Moazzam)



Genus *Nerocila* Leach, 1818

Nerocila kiswa Bowman and Tareen, 1983 25.00 mm. (Female)

Pelagic while young, parasitic as adults in *Johnius* and *Otolithes* (Fish)
(Shireen and Ghani, 2000)



(After Shireen and Ghani, 2000)

Nerocila phaiopleura Bleeker, 1857
20 mm. Light yellow.

Pelagic while young, as adults
Parasite of *Chiracetrus nudus* (Fish)
(Shireen, 2001)

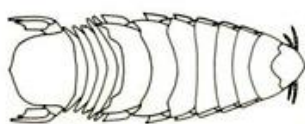


(After Shireen, 2001)

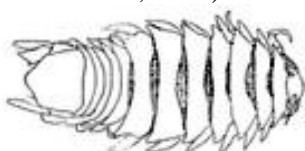
Nerocila orbignyi Guerin Meneville, 1832

Parasitic. Host: *Tachysurus maculatus* (Fish)

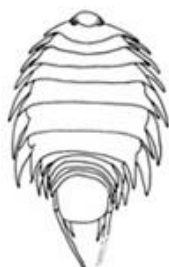
(Present study)



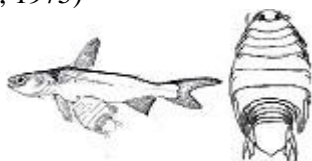
Nerocila barramundae Bruce, 1987 mm.
Parasitic.Hosts: *Pseudarius jella*, *Arius thalassinus* and *Aroides dussumieri* (Fish)
(Shireen and Ghani, 2000)



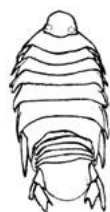
(After Shireen and Ghani, 2000)
Nerocila depressa Milne Edward, 1840 mm. Parasitic.Hosts: *Mugil*, *Lumbrina dussumeri* (Fish)
(Joshi, 1959, Karim, 1975 as *Nerocila pigmentata*)



Nerocila serra Schiodte and Meinert, 1881 Transparent white. 27 mm. Pelagic while young, adult parasitic.Hosts: *Mugil dussumeri maculatus* *Pseudarius jella*, *Netuma thalassinus*, *Hexanematichthy sona* (Fish)
(Karim, 1975)



On host, detached
(After Shireen and Ghani, 2000)
Nerocila sigani Bowman and Tareen, 1983
Parasitic, host: *Netuma thalassius* (Fish)
(Ghani, 2003)

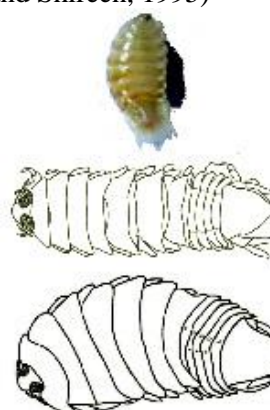


(After Ghani, 2003)

Genus *Norileca* Bruce, 1990
Norileca borealis Javed and Yasmeen, 1999
25mm.
Parasitic.Host: *Rastrelliger kanagurta* (Fish)
(Javed and Yasmeen, 1999)



(After Javed and Yasmeen, 1999)
Norileca indica (Milne Edwards, 1840)
28-32 mm.
Parasitic.Hosts: *Rastrelliger kanagurta* and *Decapterus russelli* (Fish)
(Ghani and Shireen, 1995)



(Photo contributed by Moazzam)
Female and male (After Ghani and Shireen, 1995)
Norileca triangulata (Richardson, 1910)
17-26 mm. Parasitic.Host: *Rastrelliger kanagurta* (Fish)
(Ghani and Ali, 1998)



(Photo contributed by Moazzam; line drawing after Ghani and Ali, 1998)

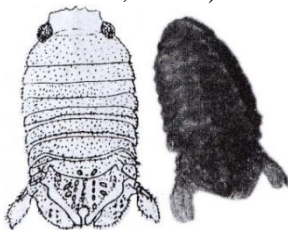
Family Gnathiidae Leach, 1814
Genus *Gnathia* Leach, 1814
Gnathia arabica Schotte, 1995

Sublittoral. Semiparasitic
(Schotte, 1995)
Genus *Paragnathia* Omer-Cooper and
Omer-Cooper, 1916
***Paragnathia* sp.**
Juveniles as parasites, adults in rock
crevices
(Ghory *et al.*, 2010)



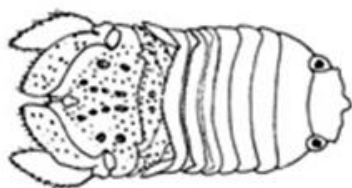
Zuphea larva and paraniza larva

Genus *Dynamenella* Hansen, 1905
Dynamenella bullejiensis Javed and
Ahmed, 1988
Intertidal zone, algae
(Javed and Ahmed, 1988a)



Male (After Javed and Ahmed, 1988a)

Dynamenella granulata Javed and
Ahmed, 1988
Intertidal zone, algae
(CAS: INVERT 25225.0F.B. Steiner,
1973; Javed and Ahmed, 1988a)

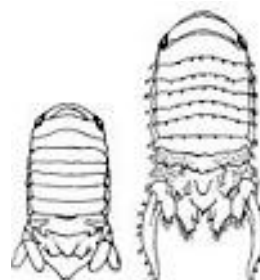


Male

Family Sphaeromatidae Latreille, 1825
Genus *Cerceis* H. Milne-Edwards, 1840
Cerceis insolita Yousuf, 2011
Intertidal zone
(Yousuf, 2011)
Cerceis biformina Javed and Yousuf,
1996
Algae floating in the intertidal pool
(Javed and Yousuf, 1996)



Genus *Afrocerceis* Müller, 1995
Afrocerceis kenyensis Müller, 1995
Littoral depth
(CAS: INVERT 185628.0F.B. Steiner,
1973; Ghani and Schotte, 2009)
Genus *Paracerceis* Hansen, 1905
Paracerceis sculpta Holmes, 1904
Intertidal zone
(Yasmeen and Javed, 2001)



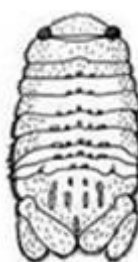
Male, female (After Yasmeen and Javed, 2001)

Genus *Paradella* Harrison and Holdich,
1982
Paradella dianae (Menzies, 1962)
Intertidal algae and mud
(Javed and Ahmed, 1987)



(After Javed and Ahmed, 1987)

Genus *Paraimene* Javed and Ahmed,
1988
Paraimene tuberculata Javed and
Ahmed, 1988
3-3.6 mm.
Intertidal on algae in pools
(Javed and Ahmed, 1988b)



Male (After Javed and Ahmed, 1988)

Genus *Sphaeromopsis* Holdich and Jones, 1973

Sphaeromopsis minutus Javed and Yousuf, 1995

Intertidal zone

(Javed and Yousuf, 1995a)



(After Javed and Yousuf, 1995)

Sphaeromopsis petita Javed and Yousuf, 1997 nom.nud

Intertidal zone

(Javed and Yousuf, 1997. Present species is incorrectly placed in present genus, being most similar to species of Cassidinidea (WoRMS))



(After Javed and Yousuf, 1997)

Sphaeromopsis serriguberna Holdich and Harrison, 1981.

Intertidal sand

(Javed and Yousuf, 1995a)



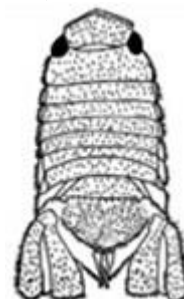
(After Javed and Yousuf, 1995)

Genus *Dynoides* Barnard, 1914

Dynoides amblysinus (Pillai, 1954)

Intertidal rocks, under smallstones

(Javed and Yousuf, 1995b as *Clanella amblysinina* Pillai)



(After Javed and Yousuf, 1995)

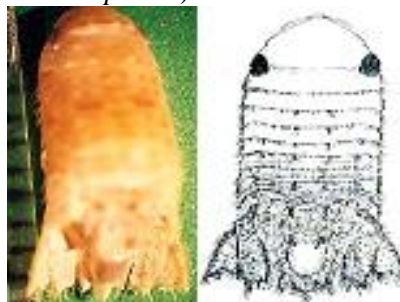
Genus *Cymodoce* Leach, 1814

Cymodoce manorii (Nooruddin, 1965)

Intertidal rocks, algae floating in intertidal pool

(Nooruddin, 1965 as *Cerceis manorii*

Nooruddin; Yousuf and Javed, 2001 as *Cymodoce spinula*)



Male (After Yousuf and Javed, 2001); male (After Nooruddin, 1965)

Cymodoce bicarinata Stebbing, 1905

Intertidal rocks

(Nooruddin, 1965)

Genus *Paracilicæa* Stebbing, 1910

Paracilicæa keijii Javed, 1990 10 mm.

(Male) 8 mm. (Female)

Associated with algae, rocky intertidal

(Javed, 1990)

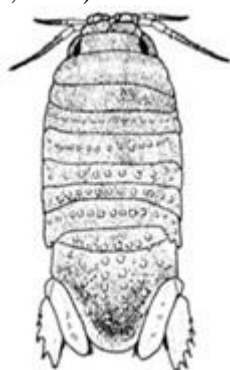


Male (After Javed, 1990)

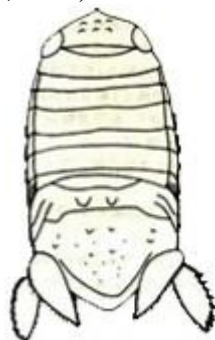
Genus *Cilicæa* Leach, 1818
Cilicæa sp.
 Low tide (0.5 ft)
 (CAS: INVERT 25332.0 Steiner, 1973)
 Genus *Sphaeroma* Bosc, 1802
Sphaeroma terebrans Bate, 1866 8-10 mm.
 Intertidal, boring in wood and soft rocks
 (Barkati and Tirmizi, 1990)



(After Barkati and Tirmizi, 1990)
Sphaeroma walkeri Stebbing, 1905
 6-8 mm.
 Estuarine to marine, 0.5 m.
 (Nooruddin, 1960)



Sphaeroma triste Heller, 1865
 Rocky ledge
 (Nooruddin, 1960)



Suborder Microcerberidea Lang, 1961

Family Microcerberidae Karaman, 1933
 Genus *Coxicerberus* Waegle, Voelz and McArthur, 1995

Coxicerberus predatoris (Gnanamuthu, 1954) 1.0 mm.
 Interstitial coastal sand
 (Kazmi and Naushaba, 2000 as *Coxicerberus* sp.)

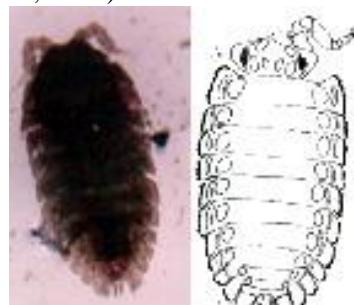


Order Oniscidea Latreille, 1802
 Infraorder Ligiamorpha Vandel, 1943

Family Ligiidae Leach, 1814
 Genus *Ligia* Fabricius, 1798
Ligia sp. 20-30 mm.
 Supralittoral zone
 (Kazmi *et al.*, 2002 as *Ligia exotica*, may be a new species, or most presumably *Ligia persica* /*Ligia yemensis* Khalaji-Pirbalouty and Wagele, 2014)



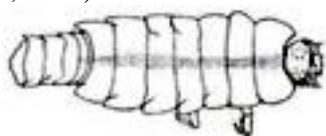
Family Detonidae Budde-Lund, 1906
 Genus *Armadilloniscus* Uljanin, 1875
Armadilloniscus mekranensis Kazmi, 2005
 Coastal area
 (Kazmi, 2004)



Family Olbrinidae Vandel, 1973
 Genus *Olbrinus* Budd-Lund, 1913

Olbrinus ormaraensis Kazmi, 2005

Coastal debris
(Kazmi, 2004)



Family Trachelipodidae Stronhal, 1953

Genus *Hemilepistus* Budd-Lund, 1885

Hemilepistus klugii Brandt, 1833

Terrestrial, coastal area

(Barnard, 1935)

Suborder Valvifera Sars, 1882

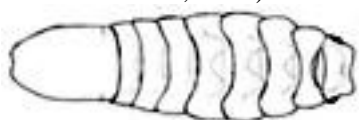
Family Idoteidae Samouelle, 1819

Genus *Synidotea* Harger, 1878

Synidotea fecunda Javed and Yasmeen, 1994

Phytal

(Javed and Yasmeen, 1994)



Synidotea indica H. Milne Edwards, 1840

Associated with algae, intertidal zone
(Javed and Yasmeen, 1994)

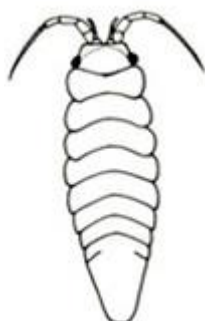


(After Javed and Yasmeen, 1994)

Synidotea variegata Collinge, 1917 9-10 mm.

Rocky pool

(Nooruddin, 1960)



(After Javed and Yasmeen, 1994)

Synidotea hirtipes (Milne-Edwards, 1840)6-8 mm. Blackish to slaty grey

Intertidal, 5-200m, rocky

(Nooruddin, 1960)



Order Tanaidacea Dana, 1849

Suborder Tanaidomorpha Sieg, 1980

Superfamily Paratanaoidea Lang, 1949

Family Leptocheliidae Lang, 1973

Genus *Chondrochelia* Gutu, 2016

Chondrochelia savignyi (Kroyer, 1842)

Benthic, pelagic

(Kazmi and Siddiqui, 1992 as

Leptochelia sp.)



Suborder Apseudomorpha Sieg, 1980

Superfamily Apseudoidea Leach, 1814

Family Kalliapseudidae Lang, 1956

Genus *Pakistanapseudes* Bacescu, 1978

Pakistanapseudes leptochelatus

Bacescu, 1978 4-4.6 mm.

Sediments

(Bacescu, 1978)

Genus *Cristapseudes* Bacescu, 1980

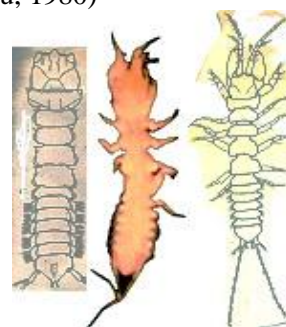
Cristapseudes omercooperi Larward,

1954

5mm.

Sediment

(Bacescu, 1980)



Male and female

Family Pagurapseudidae Lang, 1970
 Genus *Pagurapseudes* Whitelegge, 1901
Pagurapseudes setulosa Kazmi and Siddiqui, 2001 2.63 mm. Dark chocolate brown
 In empty gastropod shells
 (Kazmi and Siddiqui, 2001)

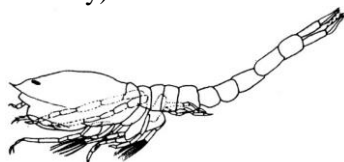


Order Cumacea Kroyer, 1846

Family Bodotriidae Scott, 1901
 Genus *Cuma* Milne-Edwards, 1828
Cuma scorpoides (Montagu, 1804)
 Buried in sand
 (Khan and Khan, 1975 as *Bodotria scorpoides*)



Genus *Bodotria* Goodsir, 1843
Bodotria arenosa Goodsir, 1843
 Associated with algae
 (Present study)



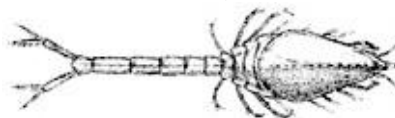
Genus *Iphinoe* Bate, 1856
Iphinoe dayi Jones, 1960
 Buried in sand
 (Khan and Khan, 1975)



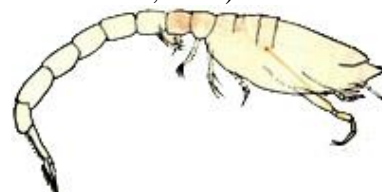
Genus *Eocuma* Marcusen, 1894
Eocuma longicorne Calman, 1907 5 mm.
 Sediment
 (Present study)



Family Nannastacidae Bate, 1866
 Genus *Cumella* Sars, 1864
Cumella pygmaea Sars, 1864
 Buried in sand
 (Khan and Khan, 1975)



Family Leuconidae G.O. Sars, 1878
 Genus *Leucon* Kroyer, 1846
Leucon acutirostris G.O. Sars, 1864
 Planktonic
 (Khan and Khan, 1975)



(After Khan and Khan, 1975)

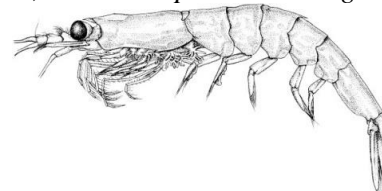
Genus *Campylaspis* G.O. Sars, 1864
Campylaspis sp.
 Offshore detritus
 (Present study)



Superorder Eucarida Calman, 1904
 Order Euphausiacea Dana, 1852

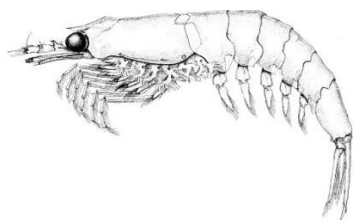
Family Euphausiidae Holt and Tattersall, 1905

Genus *Euphausia* Dana, 1852
Euphausia sibogae Hansen, 1908
 8-11 mm. Planktonic
 (Khan, 1980 as *Euphausia distinguenda*)

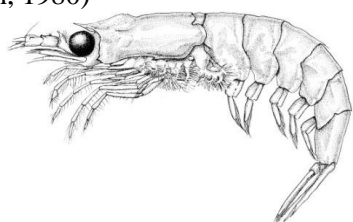


(After Brinton, 1976)

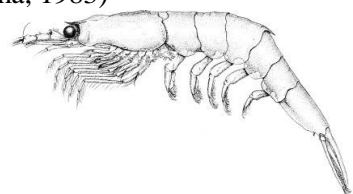
Euphausia diomedae Ortmann, 1894
 10-16 mm.
 Upper layer, Planktonic
 (Khan, 1980 as *E. diomediae*)



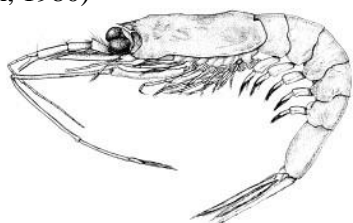
(After Brinton, 1976)
Euphausia sanzoi Torelli, 1934
 15-18 mm.
 Planktonic
 (Khan, 1980)



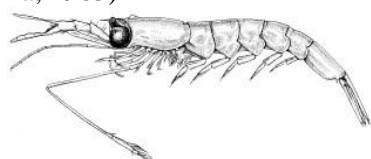
(After Brinton, 1976)
Euphausia pseudogibba Ortmann, 1893
 Planktonic
 (Fatima, 1983)



(After Brinton, 1976)
 Genus *Nematoscelis* G.O.Sars, 1883
Nematoscelis gracilis Hansen, 1910
 11-15.5 mm.
 Upper layer, Planktonic
 (Khan, 1980)

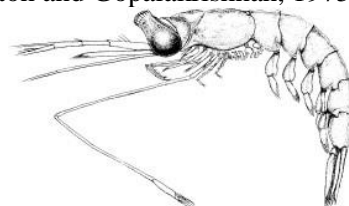


(After Brinton, 1976)
 Genus *Stylocheiron* G.O.Sars, 1883
Stylocheiron carinatum G.O. Sars, 1883
 6-12 mm.
 Planktonic
 (Fatima, 1983)

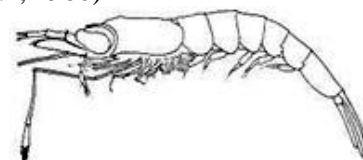


(After Brinton, 1976)

Stylocheiron affine (Indo Australin form) G.O. Sars, 1883-7 mm.
 Planktonic
 (Brinton and Gopalakrishnan, 1975)

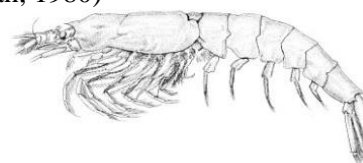


(After Brinton, 1976)
Stylocheiron indicus Silas and Mathew, 1967
 8-14 mm.
 Planktonic
 (Khan, 1980)



Genus *Pseudeuphausia* Hansen, 1910
Pseudeuphausia latrifrons (G. O. Sars, 1883)
 Neretic
 (Gopalakrishnan and Brinton, 1973)

Family Bentheuphausiidae Colosi, 1971
 Genus *Bentheuphausia* G. O. Sars, 1885
Bentheuphausia amblyops (G.O.Sars, 1885)
 Deep sea
 (Khan, 1980)



(After Brinton, 1976)

Order Decapoda Latreille, 1802
 Suborder Dendrobranchiata Bate, 1888
 Superfamily Penaeoidea Rafinesque, 1815

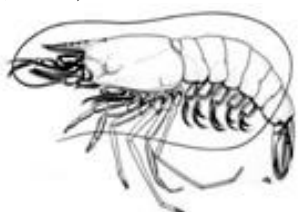
Family Aristeidae Wood-Mason in Wood-Mason and Alcock, 1891
 Genus *Aristeus* Duvernoy, 1840
Aristeus alcocki Ramadan, 1938 Pink with reddish bands on the posterior border of all abdominal segments
 On muddy bottoms, at depths between 270 and 1086 m.

(Psomadakis *et al.*, 1915)



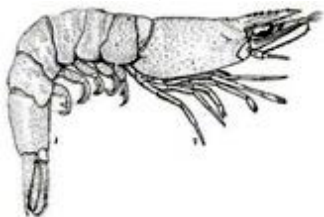
Family Penaeidae Rafinesque, 1815
Genus *Megokris* Pérez Farfante and
Kensley, 1997

Megokris granulatus (Haswell, 1879)
Benthic; depth range 5 - 81 m.
(Chanda, 2015)

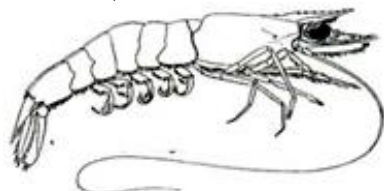


Subfamily Penaeinae Burkenroad, 1934
Genus *Metapenaeopsis* Bouvier, 1905
Metapenaeopsis stridulans Alcock, 1905
33-85 mm. White to reddish brown, with
red to dark brown mottlings; pereiopods
pinkish to dark red except on their
proximal parts; uropods red to brown
except for their proximal third and often
their tips

Inshore and outer continental shelf
(Tirmizi and (Bashir) Kazmi, 1973)



Metapenaeopsis mogiensis consobrina
(Nobili, 1904)
Inshore and outer continental shelf
(Kazmi, 2003)



Genus *Trachysalambria* Burkenroad,
1934

Trachysalambria aspera (Alcock, 1905)
Demersal; depth range 37 - 64 m.
(Psomadakis, *et al.*, 2015)

Trachysalambria curvirostris (Stimpson,
1860)

Muddy sand bottoms at 13-150m
(Dore and Frimodt, 1987)



(Photo contributed by Moazzam)
(After Dore and Frimodt, 1987)

Genus *Penaeus* Fabricius, 1798

Penaeus monodon Fabricius, 1798 85-
333 mm.

Likes mud or sand bottom at all depths
from shallow to 110 m.

(Tirmizi, 1967)



(Photo contributed by Moazzam)

Penaeus semisulcatus de Haan, 1844
43-186 mm.

On sandy or muddy bottoms in depth
down to 130 m, juveniles estuarine
(Tirmizi, 1967)

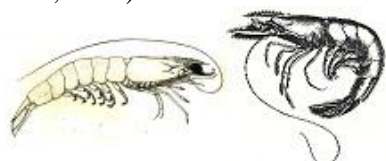


Penaeus latisulcatus (Kishinouye, 1900)

Lives on hard bottom of sand, sandy mud or gravel, likes shallower water to about 90 m.
(Dore and Frimodt, 1987)



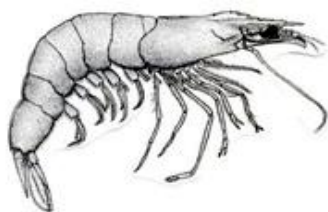
Penaeus canaliculatus (Olivier, 1811)
Coastline to about 50 m. Prefers depth of 33-46 m, also in estuaries and backwater (Bianchi, 1984)



Penaeus indicus (H. Milne- Edwards, 1837) 44-218 mm.
Juveniles in estuaries, adult like mud at depth of 2-90 m.
(Tirmizi, 1967)



Penaeus merguensis (de Man, 1888)
85-238 mm.
Lives in shallow water between 10-45m., on muddy bottom, juveniles in estuarine (Tirmizi, 1967)



Penaeus penicillatus (Alcock, 1905)
80-175 mm.
From shoreline down to 90 m.
(Tirmizi, 1967)



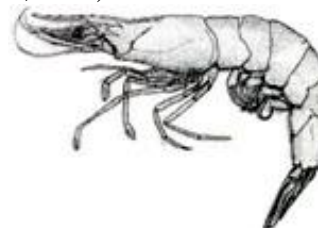
Penaeus pulchricaudatus Stebbing, 1914
59-193 mm. Lives on sandy/mud sandy bottoms at depth upto 90 m
(Tirmizi, 1965 as *Penaeus japonicus* (Bate.). Ref. to change Tsoi *et al.*, 2014)



Penaeus hathor Burkenroad, 1959
Found on sandy bottoms
(Pérez-Farfante and Kensley 1997)



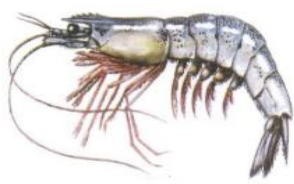
Genus *Metapenaeus* Wood-Mason, 1891
Metapenaeus stebbingi Nobili, 1904
34-115 mm. inshore sea
(Tirmizi, 1962)



Metapenaeus brevicornis (H. Milne Edwards, 1837) 65-130 mm.
Down to about 90 m, also found in brackish water and even in nearly freshwater
(Tirmizi and (Bashir) Kazmi, 1973)



(After Tirmizi and (Bashir) Kazmi, 1973)
Metapenaeus monoceros (Fabricius, 1789) 61-170 mm.
In shallow water down to 60 m, prefers sandy mud bottom and brackish to marine salinity as low as to upto 30%
(Tirmizi, 1967)



Metapenaeus affinis (H. Milne Edwards, 1837)
60-195 mm.
Muddy bottoms in shallow water
(Tirmizi, 1967)



Metapenaeus lysianassa (de Man, 1888)
Depth 5-9 m
(Ahmed, 1985)



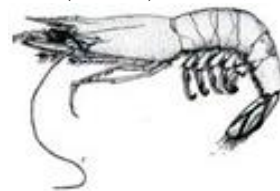
Genus *Parapenaeopsis* Alcock, 1901
Parapenaeopsis coromandelica Alcock, 1906
Shallow waters to a depth of about 11m,
mainly on mud.
(Holthuis, 1980)

Parapenaeopsis stylifera (H. Milne Edwards, 1837) 37-120 mm.
Preferring depths of 20-90 m.
(Holthuis and Rosa, 1965)



Parapenaeopsis acclivirostris Alcock, 1906
29-66 mm.

Shallow coastal area
(Tirmizi and (Bashir) Kazmi, 1973)



Parapenaeopsis tenella (Spence Bate, 1888)
On muddy or sandy mud bottoms
(Holthuis, 1980)



Genus *Mierspenaeopsis* Sakai and Shinomiya, 2011

Mierspenaeopsis sculptilis (Heller, 1862)
79-170 mm.

In coarse sand and fine mud bottoms at
depth down to 90 m
(Tirmizi, 1967 as *Parapenaeopsis sculptilis* Heller)



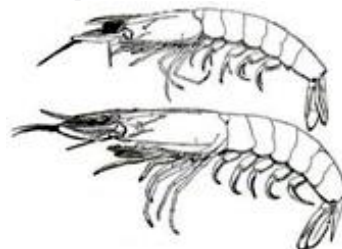
Mierspenaeopsis hardwickii (Miers, 1878) 49-114 mm.

In fairly shallow water to about 90 m.
(Tirmizi, 1968 as *Parapenaeopsis hardwickii* (Miers))



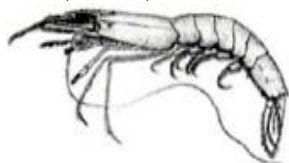
Mierspenaeopsis cultriostriis (Alcock, 1906)

At depth 35 to 90 m.
(Ahmed and Moazzam, 1982 as *Parapenaeopsis hardwickii*)

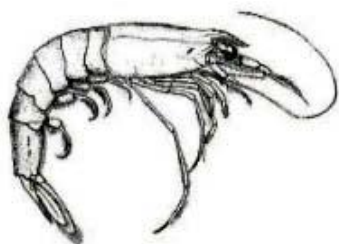


Male and female
Genus *Parapenaeus* Smith, 1885
Parapenaeus longipes Alcock, 1905

68 mm.
Depth 13 to 88 m.
(Tirmizi and (Bashir) Kazmi, 1973)



Parapenaeus fissurus (Bate, 1881)
88-93 mm.
Depth 50 to 274 m in mud and sand
(Tirmizi and (Bashir) Kazmi, 1973)



Parapenaeus fissuroides Crosnier, 1986
130m-293m
(Saher and Noor, 2022)

Genus *Ganjampenaepsis* Sakai and Shinomiya, 2011

Ganjampenaepsis uncta (Alcock, 1905)

5 to 82 m.
(Alcock, 1905 as *Parapenaepsis uncta*)



Family Solenoceridae Wood-Mason and Alcock, 1891

Genus *Solenocera* Lucas, 1850

Solenocera choprai Nataraj, 1945

75-90 mm.

50-175 m; outer continental shelf
(Tirmizi and (Bashir) Kazmi, 1973)

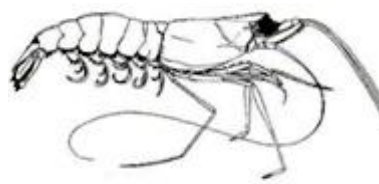


Solenocera melantho De Man, 1907

23 mm.

At 400 m.

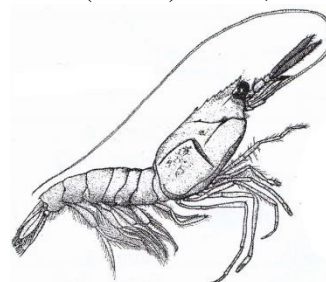
(Tirmizi and Kazmi, 1979)



Solenocera hextii Wood-Mason, 1891
32-35 mm.

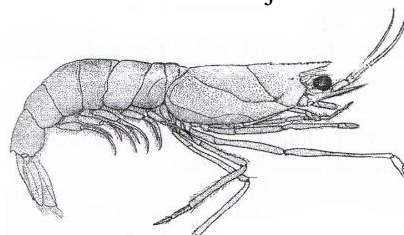
Outer continental shelf and beyond 200 m. depth

(Tirmizi and (Bashir) Kazmi, 1973)



Solenocera crassicornis (H. Milne Edwards, 1837) 40 mm.

Inshore and outer continental shelf, 80 m depth, common on muddy bottoms
(Tirmizi and (Bashir) Kazmi, 1973 as *Solenocera indica* Nataraj)



Solenocera pectinata (Bate, 1881) 4-39 mm.

At 45-108 m.

(Tirmizi and Ghani, 1979)



Family Sicyoniidae Ortmann, 1898

Genus *Sicyonia* H. Milne Edwards, 1830

Sicyonia lancifer (Olivier, 1811)

Bathymetric, 22-31m.

(Holthuis, 1980; Moazzam *et al.*, 2003)

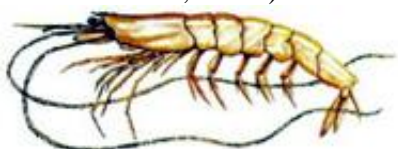


Family Benthescymidae Wood-Mason in Wood-Mason and Alcock, 1891
 Genus *Gennadas* Bate, 1881
Gennadas propinquus Rathbun, 1906
 Offshore, 1063-2292 m.
 (Moazzam *et al.*, 2003)



Superfamily Sergestoidea Dana, 1852

Family Sergestidae Dana, 1852
 Genus *Acetes* H. Milne Edwards, 1830
Acetes japonicus Kishinouye, 1905 8.5 - 23.5 mm.
 Lives in shallow water over muddy bottoms
 (Tirmizi and Ghani, 1982a)



Acetes indicus H. Milne Edwards, 1830
 20 - 30 mm.
 Lives in shallow water over muddy bottoms of coastal and estuarine regions
 (Tirmizi and Ghani, 1982a)



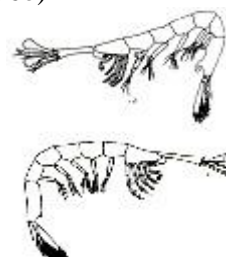
Acetes johni Nataraj, 1947 27 - 37 mm.
 Lives in shallow water over muddy bottoms
 (Tirmizi and Ghani, 1982a)

Family Luciferidae de Haan, 1849
 Genus *Lucifer* Thompson, 1829
Lucifer penicillifer Hansen, 1919 11.5 - 14.7 mm.
 Neritic waters
 (Khan, 1976b)



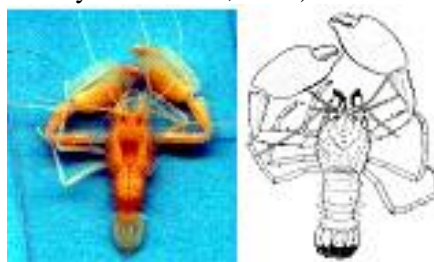
Lucifer hanseni Nobili, 1905 11.7 mm to 12.4 mm.

Neritic waters
 (Khan, 1976b)
Lucifer typus H. Milne-Edwards, 1837
 12.5mm.
 Planktonic Oceanic
 (Khan, 1976b)



Male and Female
Lucifer orientalis Hansen, 1919 13.2 mm.
 Planktonic
 (Khan, 1976b)
 Suborder Pleocyemata Burkenroad, 1963
 Infraorder Stenopodidea Bate, 1888

Family Spongicolidae Schram, 1986
 Genus *Microprosthema* Stimpson, 1860
Microprosthema undescribed species
 Intertidal, associated with scallop *Lima*
 (Tirmizi and Kazmi, 1979 as *M. validum*;
 Pakistani specimens neither *M. validum*
 nor *M. semilaeve* but represent an
 undescribed species of *Microprosthema*
 Ref: Goy and Martin, 2013)



Microprosthema validum Stimpson, 1860
 Intertidal
 (Saito and Anker, 2012)

Family Stenopodidae Claus, 1872
 Genus *Stenopus* Latreille, 1819
Stenopus hispidus (Olivier, 1811) 5 cm.
 At 5 m.
 (Ali, 2006)
 Infraorder Caridea Dana, 1852
 Superfamily Oplophoroidea Dana, 1852

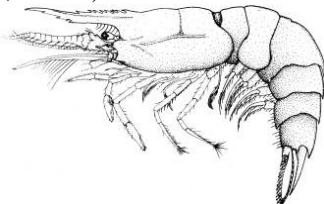
Family Oplophoridae Dana, 1852

Genus *AcanthePHYra* A. Milne Edwards, 1881

AcanthePHYra eximia Smith, 1884 95 mm.

Nektobenthic, 216-1000 m.

(Kazmi, 1971a)



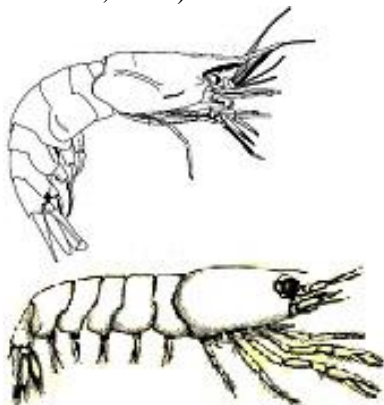
Superfamily Pasiphaeoidea Dana, 1852

Genus *Leptochela* Stimpson 1860

Leptochela pugnax de Man, 1916

Inshore waters in depth from 8-140 m. on both sand and mud bottoms

(Kazmi *et al.*, 1990)

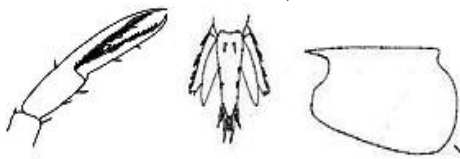


Leptochela irrobusta Chace, 1976

4.4 mm.

Offshore

(Kazmi and Kazmi, 2012)

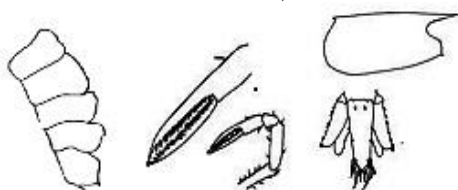


Leg, telson and uropods, carapace

Leptochela nasimae Kazmi and Kazmi, 2012

Planktonic

(Kazmi and Kazmi, 2012)



Abdomen, carapace, telson and chelipede

Leptochela aff. *sydniensis* Dakin and Colefax, 1940

Planktonic

(Kazmi *et al.*, 1990)



Abdomen, carapace, telson and chelipede

Genus *Pasiphaea* Savigny, 1816

Pasiphaea alcocki Wood-Mason and

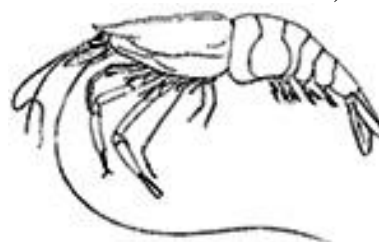
Alcock 1891 Body almost entirely

transparent with some scattered red

chromatophores and eyes dark brown

At 947 fathoms

(Wood-Mason and Alcock 1891)



Genus *Psathyrocaris* Wood-Mason in

Wood-Mason and Alcock, 1893

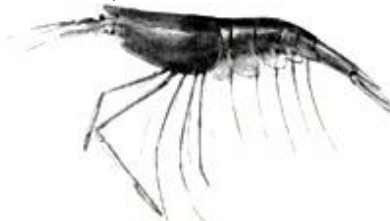
Psathyrocaris fragilis Wood-Mason in

Wood-Mason and Alcock, 1893

1180-1299 m. depth

(Wood-Mason in Wood-Mason and

Alcock, 1893)



Genus *Glyphus* Filhol, 1884

Glyphus marsupialis Filhol, 1884

Deep sea

(Present study)



(Photo courtesy Moazzam)

Superfamily Palaemonoidea Rafinesque, 1815

Family Gnathophyllidae Dana, 1852

Genus *Gnathophyllum* Latreille, 1819

Gnathophyllum americanum Guérin-Méneville, 1855 [in Guérin-Méneville, 1855-1856]
Subtidal
(Ali, 2006)

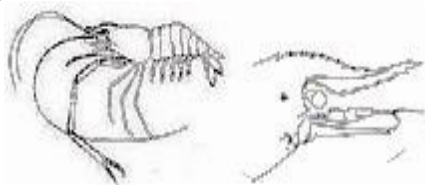
Family Palaemonidae Rafinesque, 1815
Subfamily Palaemoninae Rafinesque, 1815

Genus *Macrobrachium* Bate, 1868
Macrobrachium equidens Dana, 1852
120 mm.

Brackish and salt waters rarely in pure fresh water
(Kazmi and Kazmi, 1979)



Macrobrachium malcolmsonii (H.M. Edwards, 1844) Male 230 mm and female 200 mm.
Brackish and fresh water
(Qureshi, 1956)

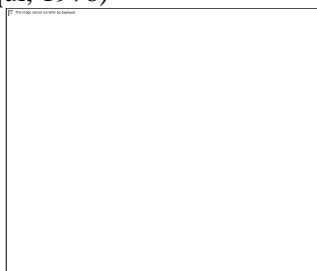


Male front



Female front

Macrobrachium lamarreii H.M. Edwards, 1837 69 mm.
Fresh and brackish water, deltaic
(Siddiqui, 1976)



Macrobrachium lamarrei korangii
Kazmi and Kazmi, 2012

Creeks
(Kazmi and Kazmi, 2012)

Macrobrachium rosenbergii (de Man, 1879)

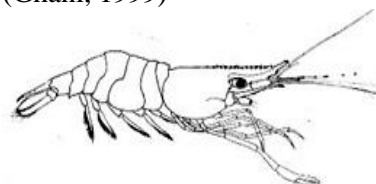
Male 320 mm, female 250 m.
In fresh and brackish water, sometimes even in marine environment
(Qureshi, 1956 as *Palaemon carcinus* Linnaeus)



Male front and female front



Genus *Palaemon* Weber, 1975
Palaemon sewelli Kemp, 1925
Littoral, in low salinity
(Ghani, 1999)



(After Ghani, 1999)

Palaemon pacificus Stimpson, 1860
53 mm.
Intertidal rock pools
(Tirmizi and Kazmi, 1984)

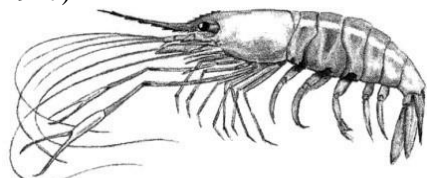


Palaemon semmelinkii (De Man, 1881)
Shallow Creeks, sometimes brackish water
(Kazmi and Kazmi, 2002)

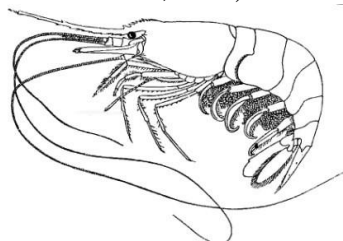


Genus *Exopalaemon* Holthuis, 1950

Exopalaemon styliferus (H. Milne Edwards, 1840) 90 mm.
In shallow coastal waters but also in brackish water and even in freshwater (De Man, 1908 as *Leander* sp.; Kemp, 1917)



Genus *Nematopalaemon* Holthuis, 1950
Nematopalaemon tenuipes Henderson, 1893
70 mm.
Coastal, brackish water to depth of only 17 m.
(Tirmizi and Kazmi, 1995)



Genus *Leandrites* Holthuis, 1950
Leandrites celebensis (de Man, 1881)
Brackish
(Kazmi *et al.*, 2009)



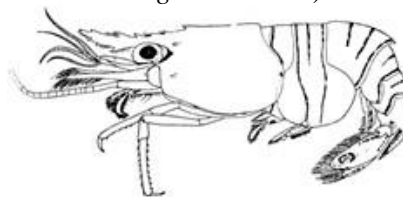
Carapace and telson

Genus *Leptocarpus* Holthuis, 1950
Leptocarpus potamiscus (Kemp, 1917)
Benthic, brackish, freshwater
(Kazmi and Kazmi, 2012)

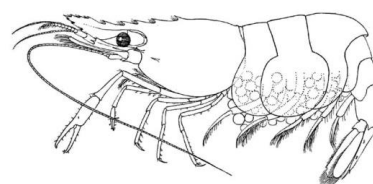


Subfamily Pontoniinae Kingsley, 1878
Genus *Cuapetes* Clark, 1919
Cuapetes elegans (Paul'son, 1875)
Subtidal, coral reef

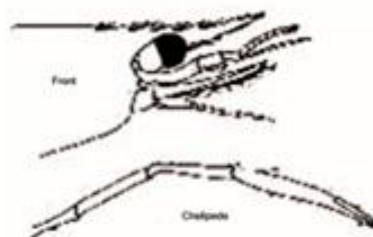
(Kazmi and Qureshi, 1974 as *Periclimenes elegans* Paulson)



Cuapetes seychellensis (Borradaile, 1915)
Subtidal among seagrass, algae, floating sargassum
(Kazmi *et al.*, 1975 as *Periclimenes seychellensis* Borradaile)

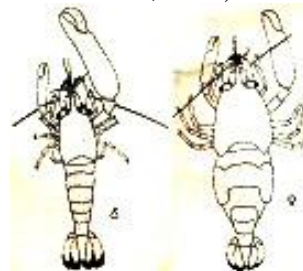


Cuapetes longirostris (Borradaile, 1915)
Offshore
(Kazmi and Kazmi, 1979 as *Periclimenes longirostris* Borradaile)



Genus *Periclimenes* O.G. Costa, 1844
Periclimenes digitalis Kemp, 1922
Associated with cnidarians
(Ahmed and Rizvi, 1985, unpublished report)

Genus *Anchistus* Borradaile, 1898
Anchistus custos Forskal, 1775
Rocky shore, commensal with pinnids
(Tirmizi and Kazmi, 1982)



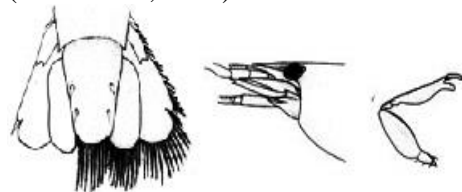
Family Hymenoceridae Ortmann, 1890
Genus *Hymenocera* Latreille, 1819
Hymenocera picta Dana, 1852 5 cm .

At 25 m.
(Ali, 2006)
Superfamily Alpheoidea Rafinesque,
1815

Family Alpheidae Rafinesque, 1815
Genus *Athanas* Leach, 1814
Athanas dimorphus Ortmann, 1894
Rocky/cobble intertidal or found in
detritus on shallow reef flats, rarely to a
depth of 115 m.
(Kazmi and Kazmi, 1979)

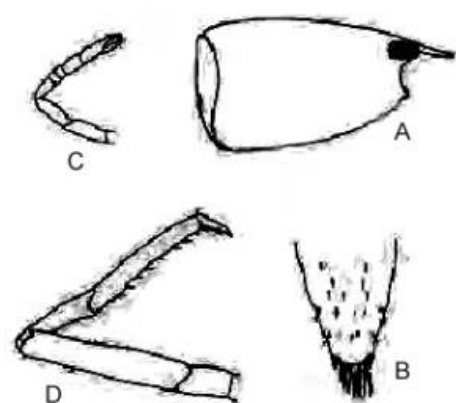


Athanas arabicus Afzal, 1984
Rocky shore
(Afzal *et al.*, 1984)



Telson, front, cheliped

Genus *Arete* Stimpson, 1860
Arete indicus Coutière, 1903
Commensal with the sea urchin
Echinometra mathaei
(Ghory and Kazmi, 2021)



A. carapace; B. telson, C. second leg. D.
fourth leg

Genus *Synalpheus* Bate, 1888
Synalpheus neptunus (Dana, 1852)
Intertidal
(Kazmi and Kazmi, 2012)

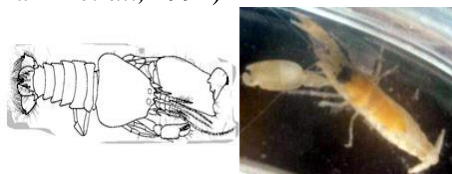


Synalpheus tumidomanus (Paulson,
1875) Greyish green with dark fingers.
Intertidal to 148 meters, in dead coral and
sponges
(Kazmi and Kazmi, 1979)

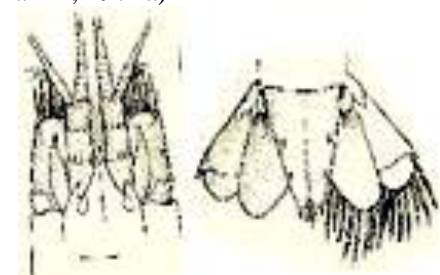


Synalpheus thai Banner and Banner,
1966

11 mm.
Shallow subtidal
(Kazmi *et al.*, 1991)



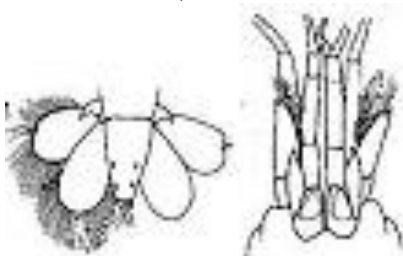
Genus *Salmoneus* Holthuis, 1955
Salmoneus brevirostris (Edmondson,
1930)
Rocky areas, intertidal
(Kazmi, 1974a)



Front and telson

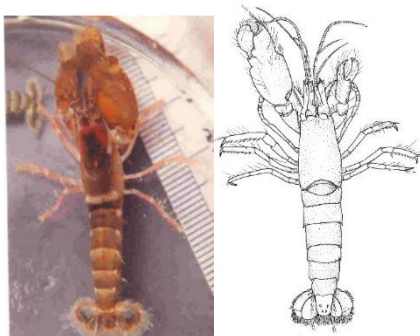
Genus *Automate* de Man 1888
Automate dolichognatha De Haan, 1888
14.5 mm.
Usually intertidal or shallow subtidal

(Kazmi *et al.*, 1973 as *Automate gardineri* Coutiere)



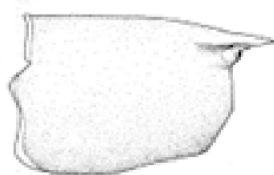
Telson, uropods and front

Genus *Alpheus* Fabricius, 1798
Alpheus inopinatus Holthuis and Gottlieb, 1958 Great variation of colour from gray body or light coloured transverse bands and white spots on carapace or transverse bands may be black, brown or green.
 Under intertidal rocks and boulders (Tirmizi and Kazmi, 1969)

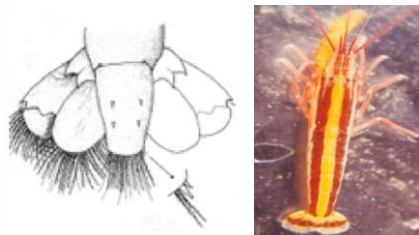


(After Tirmizi and Kazmi, 1969)

Alpheus splendidus Coutiers, 1897 local colour pattern differs from other regions of the world in having bright yellow longitudinal stripe running from rostrum to telson, flanked by two maroon stripes, meri of the chelae and the following legs maroonish.
 Lower Intertidal to 2-3 meters, under dead corals and large boulders, may live in same burrow with a goby (Kazmi and Kazmi, 1979, a part of a small pantropical species complex, which includes at least three other species (A. Anker, in study)



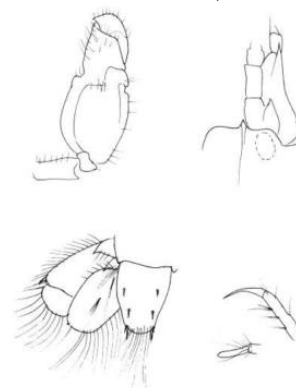
Carapace



Telson and uropods



With a sea urchin and goby
Alpheus sp. may be a new species
 Subtidal mud (Kazmi and Kazmi, 2012)



Cheliped, front, telson and left uropod, third leg dactylus



Alpheus albertei Kazmi, 1974 nomen nudum
 Intertidal rock pools (Kazmi, 1974b)

Alpheus pacificus Dana, 1852
 Intertidal to 20 meters (Kazmi and Kazmi, 1979)



(Picture after Debelius, 2001) Telson and front

Alpheus edwardsii (Audouin, 1827)
Carapace greyish green, abdomen also greyish with longitudinal rows of white spots, transverse bands on tailfan, chelipeds bluish grey, legs pink, some times with white patches on abdomen, tail-fan and chela
Intertidal under rocks to 25 meters
(Kazmi and Kazmi, 1979)



Alpheus zulfaquiri Kazmi, 1982
Intertidal
(Kazmi, 1982)



(Photo contributed by Moazzam)
Alpheus strennus strennus Dana, 1852
Greyish Green
Littoral
(Kazmi and Kazmi, 1979)



Alpheus chiragricus H. Milne Edwards, 1837
Intertidal to 20 meters
(Chace, 1988)



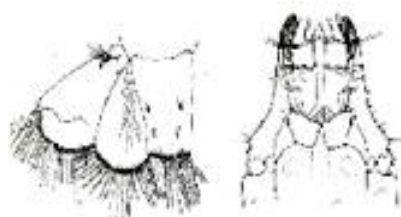
Cheliped and animal
Alpheus pseudoedwardsii Afzal, 1984
nomen nudum
Rocky shore
(Afzal *et al.*, 1986)



Front and Telson
Alpheus manorensis Afzal, 1984 nomen nudum
Rocky shore
(Afzal *et al.*, 1986)



Front, cheliped
Alpheus isodactylus Afzal, 1984 nomen nudum
Rocky shore
(Afzal *et al.*, 1986)



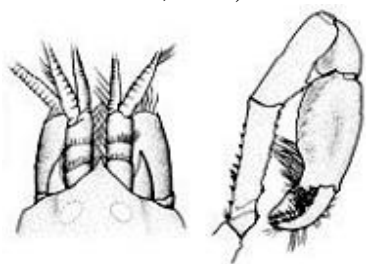
Telson, left uropod and front
Alpheus bisincisus De Haan, 1849
Below stones or sponges
(Kazmi and Kazmi, 2012)
Alpheus cf. *barbatus* Coutiere, 1897
Intertidal to 10 meters
(Kazmi and Kazmi, 2012)



Alpheus rapax Fabricius, 1798
Black and white transverse bands across the cephalothorax and abdomen. Large chela with similar transverse markings, clearly visible on the inner side also. Tips of fingers white
In burrows shared by gobiid Fish. Depth 1-2m.
(Kazmi and Kazmi, 2012)



Genus *Alberta* Kazmi and Kazmi, 2012
Alberta banneri Kazmi and Kazmi, 2012
 Rock pool
 (Kazmi and Kazmi, 2012)



Front and cheliped

Family Ogyrididae Holthuis, 1955
 Genus *Ogyrides* Stebbing, 1914
Ogyrides orientalis (Stimpson, 1860)
 Buried in the sand of a rock pool
 (Tirmizi, 1980)

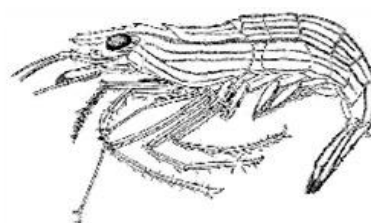


Ogyrides ? saldanhae Barnard, 1947
 In sediment
 (Kazmi and Kazmi, 2012)

Family Hippolytidae Dana, 1852
 Genus *Saron* Thallwitz, 1891
Saron marmoratus Olivier, 1811
 38-81 mm.
 Littoral, coral reef
 (Kemp, 1914)



Genus *Lysmata* Risso, 1816
Lysmata vittata (Stimpson, 1860)
 In rock pools
 (Kemp, 1916 as *Hippolysmata vittata*)



Lysmata amboinensis (De Man, 1888)
 Subtidal
 (Ali, 2006)

Genus *Exhippolysmata* Stebbing, 1915
Exhippolysmata ensirostrisensirostris
 (Kemp, 1914) 79 mm.

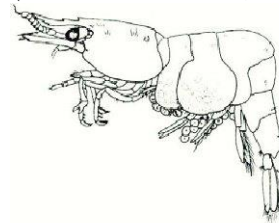
Lives in shallow sea water
 (Kazmi and Kazmi, 1979)

Genus *Hippolyte* Leach, 1814

Hippolyte ventricosa H. Milne Edwards,
 1837
 2-8 mm.

Algal beds, also in, sponges etc., on
 jetties and pontoons; intertidal and
 shallow subtidal.

(Tirmizi and Kazmi, 1984)

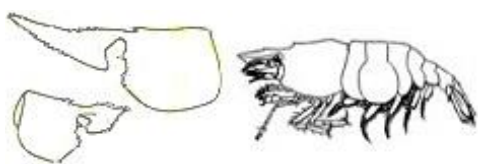


(After Tirmizi and Kazmi, 1984) on
 seaweed

Genus *Latreutes* Stimpson, 1860
Latreutes anoplonyx Kemp, 1914 39
 mm.
 Floating weeds and jelly Fish associated
 (Kazmi, 1971)



symbiont on jelly fish



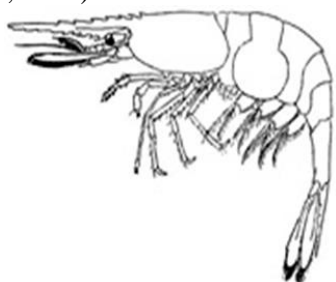
Animal, male and female, carapaces

Latreutes mucronatus (Stimpson, 1860)
4 mm (cl)
Weeds
(Ghani and Tirmizi, 1991a)



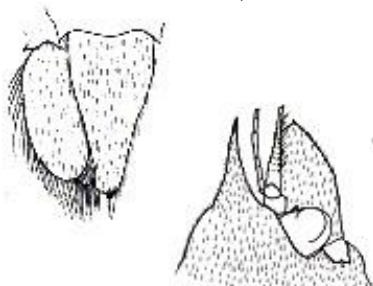
(After Ghani and Tirmizi, 1991) (picture after Debelius, 2001)

Genus *Heptacarpus* Holmes, 1900
Heptacarpus pandaloides (Stimpson, 1860)
In the *Zostera* belt
(Kemp, 1914)



(After Hayashi and Miyake, 1968)

Genus *Gelastocaris* Kemp, 1914
Gelastocaris paronae (Nobili, 1905) 37-44m.
In mangoves, symbiotic on dead corals or sponges
(Kazmi and Kazmi, 2012)



Telson



Front dorsal and in lateral views

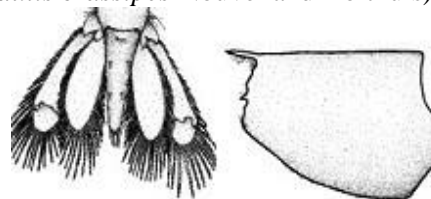
Superfamily Pandalioidea Haworth, 1825

Family Pandalidae Haworth, 1825
Genus *Heterocarpus* H-Milne Edwards
Heterocarpus laevigatus Bate, 1888
Deep water 300-1150 m. on sandy bottom
(Dora and Frimboldt, 1987)



Superfamily Processidea Ortmann, 1896

Family Processidae Ortmann, 1896
Genus *Processa* Leach, 1815 [in Leach, 1815-1875]
Processa compacta Crosnier, 1971 30-44 mm.
Shallow water
(Kazmi and Kazmi, 1973 as *Processa edulis crassipes* Nouvel and Holthuis)



Telson, uropods and carapace
Superfamily Crangoidea Haworth, 1825

Family Crangonidae Haworth, 1825
Genus *Pontocaris* Bate, 1888
Pontocaris pennata Bate, 1888 43 mm.
At 20-90m depth and sandy mud
(Kazmi, 1972 unpublished thesis)

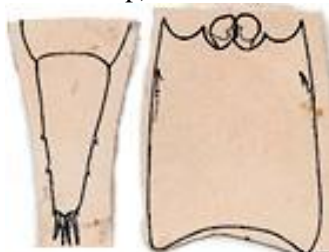


(Picture contributed by Moazzam)



***Pontocaris* sp.**
between 140 and 1400 m water depth

(Jeffereys *et al.*, 2009)
 Genus *Philocheras* Stebbing, 1900
Philocheras parvirostris (Kemp, 1916)
 52 mm.
 Deep sea Intertidel, rocky
 (Tirmizi, 1980 as *Pontophilus parvirostris* Kemp)



Telson and carapace (After Tirmizi, 1980)

Genus *Parapontophilus* Christoffersen, 1988
Parapontophilus gracilis (Smith, 1882)
 5.5 mm.
 Depth of capture range from 370-3440m.
 (Calman, 1939 as *Pontophilus gracilis* Smith)
 Genus *Aegaeon* Agassiz, 1846 [in Agassiz, 1842-1846]
Aegaeon cataphractus (Olivi, 1792)
 10 - 50 (80) m.
 (Kemp, 1916)



Superfamily Nematocarcinoidea Smith, 1884

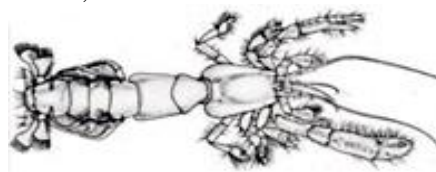
Family Rhynchocinetidae Ortmann, 1890
 Genus *Rhynchocinetes* H. Milne Edwards, 1837
Rhynchocinetes uritai Kubo, 1942 1 cm.
 At 6 m.
 (Ali, 2006)
Rhynchocinetes durbanensis Gordon, 1936
 From the stomach of *Johnius dussumieri* (Moazzam *et al.*, 2020)
 Infraorder Axiidea de Saint Laurent, 1979

Family Axiidae Huxley, 1879
 Genus *Lophaxius* Kensley, 1989
Lophaxius investigatoris (Anderson, 1896)
 1733 m., deep sea
 (Anderson, 1896 as *Calastacus investigatoris* Anderson)
 Genus *Calocaris* Bell, 1853
Calocaris macandreae (Bell, 1846)
 Subtidal-1850 m in deep complex burrows
 (Jeffereys *et al.*, 2009)

Family Callianassidae Dana, 1852
 Subfamily Callichirinae Manning and Felder, 1991
 Genus *Balsscallichirus* Sakai, 2011
Balsscallichirus masoomi (Tirmizi, 1970)
 22.5 mm.
 Intertidal zone of muddy sandy beach with loose stones
 (Tirmizi, 1970a as *Callianassa masoomi*)

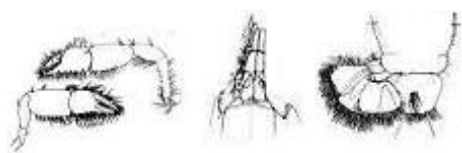


Genus *Corallianassa* Manning, 1987
Corallianassa martensi (Miers, 1884)
 79 mm.
 Sandy beach
 (Tirmizi, 1974 as *Callianassa martensi*)



Genus *Neocallichirus* Sakai, 1988
Neocallichirus manningi Kazmi and Kazmi, 1992
 Sand-mud substrate
 (Kazmi and Kazmi, 1992)





Chelae, front, telson

Neocallichirus jousseaumei Nobili, 1904

Sand-mud substrate
(Naderloo and Turkay, 2012)

Genus *Audacallichirus* Poore, Dworschak, Robles, Mantelatto and Felder, 2019

Audacallichirus audax (de Man, 1911)

58 mm.

Sandy beach

(Tirmizi, 1967b as *Callianassa audax* (de Man))



Genus *Paratrypaea* Komai and Tachikawa, 2008

Paratrypaea bouvieri (Nobili, 1904)

Subtidal

(Hamdard *et al.*, 2015)



Infraorder Gebiidea de Saint Laurent, 1979

Family Upogebiidae Borradaile, 1903

Genus *Upogebia* Leach, 1814

Upogebia kemp Shenoy, 1967 30-53 mm.

Intertidal sands loose stones

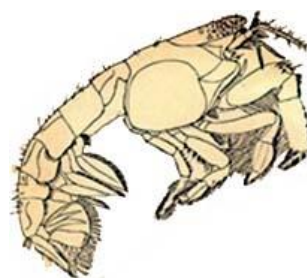
(Tirmizi and Ghani, 1979)



Upogebia assisi Barnard, 1947

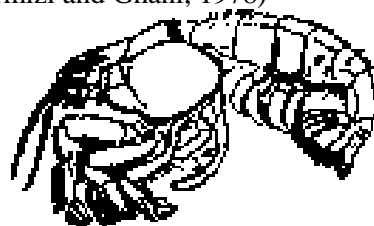
Inshore waters

(Kazmi and Bourdon, 1997 as host)



Upogebia quddusiae Tirmizi and Ghani, 1978

Sandy-muddy beaches
(Tirmizi and Ghani, 1978)



Infraorder Achelata Scholtz and Richter, 1995

Family Palinuridae Latreille, 1802

Genus *Panulirus* White, 1847

Panulirus versicolor Latreille, 1804 400 mm.

In shallow waters, to 15m depth in clear strong flowing water

(Tirmizi and Kazmi, 1983)



Panulirus homarus megasculpta Pesta, 1915

200-250 mm.

Shallow waters between 1 - 90m. depth
(Holthuis, 1991)



(Photo contributed by Moazzam)

Panulirus homarus near *rubellus* Berry, 1974
Rocky shore
(Kazmi, 1995b)



Antennular plate and pleurites
Panulirus ornatus (Fabricius, 1798)
300-500 mm.

In shallow, slightly turbid coastal waters from 1-8m.

(Report of Govt. of Pakistan, 1960, Bianchi, 1984; Fatima, 2000)

Panulirus polyphagus Herbst, 1793
200-400 mm.

On muddy bottom in turbid water close to river mouths at 3-90 m depth
(Ahsanullah, 1965)



(Photo contributed by Moazzam)

Panulirus penicillatus Olivier, 1791
300-400 mm.
From 1-4 m, rocky substrate in surf zone
(Tirmizi and Ahsanullah, 1966; Holthuis, 1991)



Panulirus longipes A. Milne Edwards, 1868 200-300 mm.

In clear or slightly turbid water at depths of 1-18 m in rocky area and coral reefs
(Williams, 1988)



Genus *Puerulus* Ortmann, 1897

Puerulus sewelli Ramadan, 1938
150-200 mm.

Depth between 180 to 1300 m, on a substrate of coarse sand, hard mud and shells

(Bianchi, 1984; Moazzam *et al.*, 2003)
Puerulus angulatus Bate, 1888 210 mm.

274-536 m. on soft substrate
(Moazzam *et al.*, 2003)



(Photo contributed by Moazzam)

Family Scyllaridae Latreille, 1825
Subfamily Ibacinae Holthuis, 1985
Genus *Parribacus* Dana, 1852
Parribacus antarcticus (Lund, 1793)
Benthic; depth range 0 - 20 m
(FishBase.probability of occurrence)
Subfamily Theninae Holthuis, 1985

Genus *Thenus* Leach, 1815
Thenus orientalis Lund, 1793 250 mm.
Intertidally on a sandy beach, 0-140 m.
(Ahsanullah, 1965)



Thenus indicus Leach, 1815

Sandy bottom
(Burton and Davie, 2007)
Thenus parindicus Burton and Davie,
2007

Sandy bottom
(Burton and Davie, 2007)
Thenus unimaculatus Burton and Davie
2007

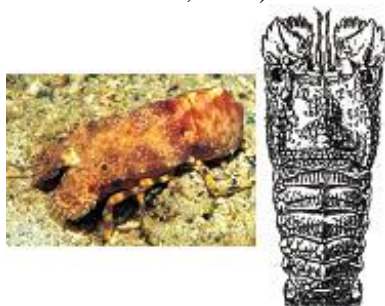
Depth range from 8 -70 m. On a soft
substrate, sand or mud.
(Saher *et al*, 2018)



(After Saher *et al*, 2018)

Subfamily Arctidinae Holthuis, 1985
Genus *Scyllarides* Gill, 1898
Scyllarides tridacnophaga Holthuis,
1967 300mm.

Depth range from 5 to 112m.
(Tirmizi and Kazmi, 1983)



Scyllarides haanii de Haan, 1841
500 mm.

Depth between 10 to 135m.
(SeaLifeBase)



Genus *Acantharctus* Holthuis, 2002
Acantharctus ornatus (Holthuis, 1960)
From substrates consisting of sand and
shells with stones, sponges and rubble,

and the encrusting algae spp. range of 27-
55 m.
(Holthuis, 2000 as *Scyllarus ornatus*)



Subfamily Scyllarinae Latreille, 1825
Genus *Scammarctus* Holthuis, 2000
Scammarctus batei (Holthuis, 1946)
70 mm.

Depth range 160-482m., on sandy and
muddy substrates
(Williams, 1986; Holthuis, 1991, as
Scyllarus batei)



Genus *Eduarctus* Holthuis, 2000
Eduarctus martensii (Pfeffer, 1881) 20-
40 mm.

Rocky shore (Tirmizi and Siddiqui, 1981,
1982)

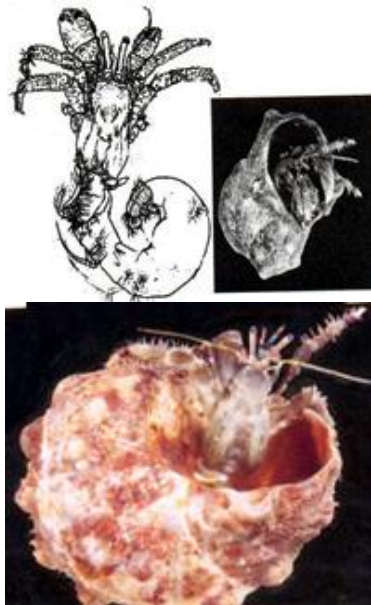
From 6-7 m.
(Holthuis, 1991 as *Scyllarus*
martensii)



Infraorder Anomura Macleay, 1838
Superfamily Paguroidea Latreille, 1802

Family Diogenidae Ortmann, 1892
Genus *Calcinus* Dana, 1851
Calcinus latens Randall, 1840

Calcinus elegans H. Milne-Edwards,
1836 Rocky shore
(After Debelius, 2001)
(Kazmi and Siddiqui, 2003)



Genus *Clibanarius* Dana, 1852
Clibanarius aequabilis Dana, 1852
Muddy and sandy shores
(Ahmed and Khan, 1971)
Clibanarius arethusa de Man, 1888
Rocky shore
(Ahmed and Khan, 1971)



Clibanarius clibanarius Herbst, 1791
Muddy and sandy beach
(Ahmed and Khan, 1971)
Clibanarius infraspinatus Hilgendorf,
1869
Muddy and sandy beach
(Ahmed and Khan, 1971)



Clibanarius padavensis de Man, 1888
Muddy and sandy shores (Ahmed and
Khan, 1971)



Clibanarius signatus Heller, 1861
Common on rocky and sandy shores,
rarely on muddy shore
(Chopra and Das, 1940)



Clibanarius striolatus Alcock, 1905
Rocky and muddy shore
(Alcock, 1905)



Clibanarius virescens Krauss, 1843
Rocky shore
(Tirmizi and Siddiqui, 1981, 1982)



Clibanarius nathi Chopra and Das, 1940
Rocky shore
(Chopra and Das, 1940)



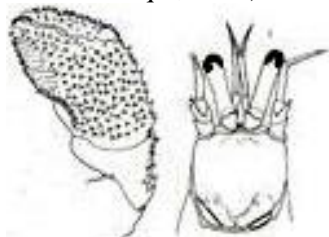
Front and chela (After Chopra and Das, 1940)

Genus *Dardanus* Paulson, 1875

Dardanus setifer H. Milne Edwards, 1836

Off shore

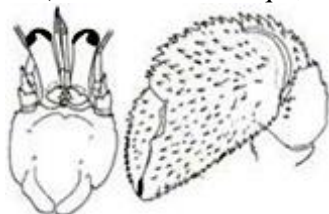
(Tirmizi and Siddiqui, 1982)



Chela and front (After Tirmizi and Siddiqui, 1982)

Dardanus vulnerans Thallwitz, 1890

Off shore (Tirmizi and Siddiqui, 1981)



Front and chela

Dardanus pedunculatus (Herbst, 1804)

At 1m. depth

(Ali, 2006)

Dardanus guttatus (Olivier, 1812)

At 5 m. depth (Ali, 2006)

Genus *Diogenes* Dana, 1852

Diogenes alias McLaughlin and Holthuis, 2001

Muddy shores (Alcock, 1905 as *Diogenes diogenes*)



Diogenes avarus Heller, 1865

Rocky shore

(Tirmizi and Siddiqui, 1982)



Front and cheliped

Diogenes custos (Fabricius, 1798)

Muddy shore

(Tirmizi and Siddiqui, 1982 as *Diogenes? affinis*, not as *Diogenes custos*)



Front and cheliped

Diogenes dubius Herbst, 1804

Muddy shores

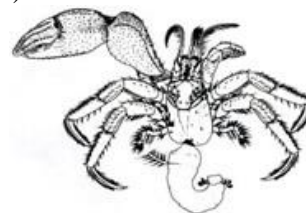
(Ahmed and Khan, 1971 as *Diogenes custos*)



Diogenes lophochir Morgan, 1989

Creeks

(Tirmizi and Siddiqui, 1982 as ? *D. costatus*)

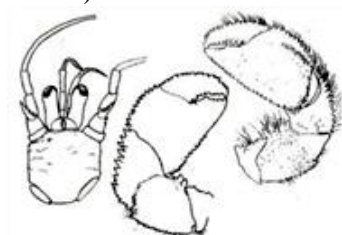


Diogenes persicus Nobili, 1905

Sandy cum rocky shore

(Tirmizi and Siddiqui, 1981 as *D. jousseaumei*;

Siddiqui and Kazmi, 2003 as *D. manaarensis*)



Front and chelipeds

Diogenes canaliculatus Komai, Reshmi and Biju Kumar, 2013

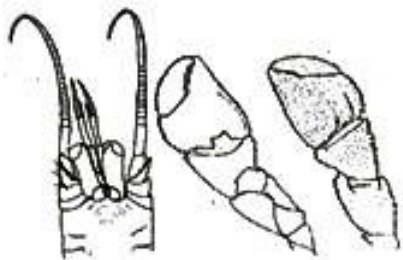
Sand or mud, littoral

(Ahmed and Khan, 1971 as *D. costatus*,

Tirmizi and Siddiqui, 1982 as *D.*

bicristimanus; Siddiqui *et al.*, 2004 as

Diogenes fasciatus Rahayu and Forest)



Front and cheliped

Diogenes tirmiziae Siddiqui and McLaughlin, 2003

Rocky shores at shallow depths

(Tirmizi and Siddiqui, 1981 as *D. guttatus*)

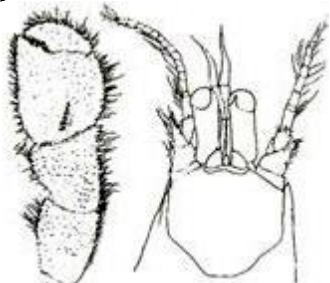


Front and cheliped (After Tirmizi and Siddiqui, 1981)

Diogenes karwarensis Nayak and Neelkantan, 1989

Substrate a mixture of sand and mud, lower intertidal

(Siddiqui and Kazmi, 2003)

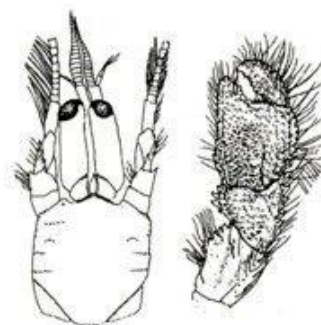


Cheliped and front

Diogenes? klaasi Rahayu and Forest, 1995

Bottom of sand and rock

(Siddiqui *et al.*, 2006)



Front and cheliped

Diogenes planimanus Henderson, 1893

Rocky, intertidal

(Tirmizi *et al.*, 1981)



Front and cheliped

Diogenes violaceus Henderson, 1893

Sandy and muddy shores

(Ahmed and Khan, 1971)

Diogenes sp. [aff. *rectimanus* Miers, 1884]

Rocky shores

(Alcock, 1905 as *Diogenes rectimanus*)

Genus *Areopaguristes* Rahayu and McLaughlin, 2010

Areopaguristes perspicax (Nobili, 1906)

Rocky shores

(Tirmizi and Siddiqui, 1979 as *Paguristes perspicax* Nobili)

Family Coenobitidae Dana, 1851

Genus *Coenobita* Latreille, 1829

Coenobita perlatus Milne Edwards, 1837

On rocks and land

(Ahmed and Khan, 1971)



Coenobita rugosus Milne Edwards, 1837

Rocky and sandy shores

(Ahmed and Khan, 1971)



Coenobita scaevola Forskal, 1775
Virtually terrestrial, more abundant above sandy shores and tidal zone (Tirmizi and Siddiqui, 1981)



Family Paguridae Latreille, 1802
Genus *Pagurus* Fabricius, 1775
Pagurus kulkarnii Sankolli, 1961 Shield light pinkish with few dark patches. Ocular peduncles orange proximally and distally, separated by broad light yellowish-brown band; ocular acicles reddish-brown proximally
Rocky shore
(Tirmizi and Siddiqui, 1981)



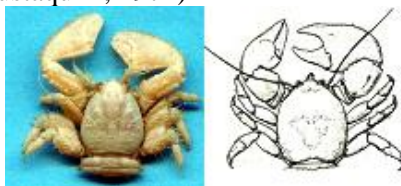
Pagurus nisari Siddiqui and Komai, 2008
Intertidal, rocky cum sandy
(Siddiqui and Komai, 2008)



(After Siddiqui and Komai, 2008)

Superfamily Galatheoidea Samouelle, 1819

Family Porcellanidae Haworth, 1825
Genus *Pachycheles* Stimpson, 1858
Pachycheles natalensis (Krauss, 1843)
In rocks crevices near low water mark
(Mustaquim, 1972)



Pachycheles tomentosus Henderson, 1893
Found in holes and crevices of rocks near low water mark
(Henderson, 1893)



(Photo courtesy Moazzam)

Genus *Petrolisthes* Stimpson, 1858
Petrolisthes boscii (Audouin, 1826)
Found rocky pools under stones and in sand cavities near low water mark
(Mustaquim, 1972)



(Photo contributed by Moazzam)

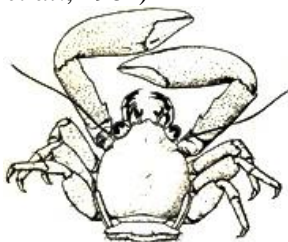
Petrolisthes lamarckii (Leach, 1820)
Found under large stones, in littoral and shallow sublittoral
(Mustaquim, 1972)



Petrolisthes ornatus Paulson, 1875
 Found under stones
 (Mustaquim, 1972)



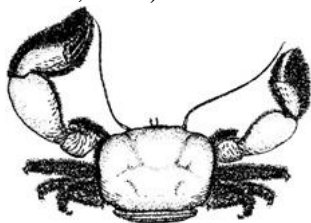
Petrolisthes leptocheles Heller, 1861
 Found under stones
 (Tirmizi *et al.*, 1982)



Petrolisthes rufescens Heller, 1861
 Littoral, found under stones
 (Mustaquim, 1972)



Genus *Polyonyx* Stimpson, 1858
Polyonyx loimicola Sankolli, 1965
 3-6 mm (males) 4-8 mm (females)
 Found under stones from the tube of
 tube-worm *Loimia medusa*
 (Tirmizi *et al.*, 1989)



Polyonyx hendersoni Southwell, 1909
 Found buried under mud; inhabits
 exclusively the water ducts of
 Demospongiae, from the intertidal to a
 depth of 6 m.
 (Tirmizi *et al.*, 1982)



Genus *Pisidia* Leach, 1820
Pisidia dehaanii (Krauss, 1843)
 Found under the stones from small pools
 (Mustaquim, 1972)

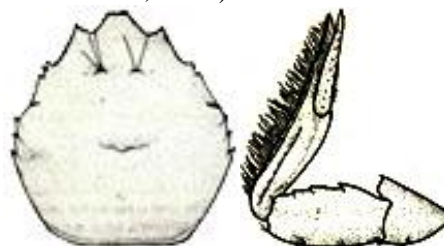


Pisidia delagoae (Barnard, 1955)
 Found under the stones from small pools
 (Tirmizi *et al.*, 1982)



Carapace and chelipeds

Pisidia gordonii Johnson, 1970
 Sublittoral, occasionally found in the
 littoral zone: Small specimens found
 scattered in the lower intertidal and large
 adults regularly under stones in depths
 between 6-10 m.
 (Tirmizi *et al.*, 1989)



Carapace and chelipeds

Genus *Ancylocheles* Haig, 1978
Ancylocheles gravelei (Sankolli, 1963)
 Found under stones, in small pools to a
 depth of about 16m. (Tirmizi *et al.*, 1982)



Carapace and heliped

Genus *Enosteoides* Johnson, 1970

Enosteoides ornatus (Stimpson, 1858)
 Found under stones Lower intertidal to 8
 m depth.
 (Tirmizi *et al.*, 1982)



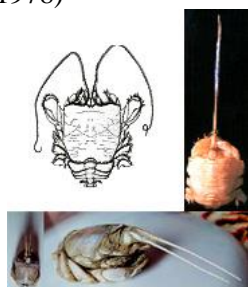
Genus *Raphidopus* Stimpson, 1858
Raphidopus persicus Ng, Safaie and
 Naser, 2012
 Muddy bottoms
 (Tirmizi and Ghani 1994 (part) as
Raphidopus ciliatus Stimpson, 1858)
Raphidopus ciliatus Stimpson, 1858
 8 x 10 mm.
 Muddy bottoms
 (Tirmizi and Ghani, 1994a)



(After Tirmizi and Ghani, 1994)

Family Galatheididae Samouelle, 1819
 Genus *Galathea* Fabricius, 1793
Galathea yamashitai Miyake and Baba,
 1967
 At 72-90 m.
 (Tirmizi and Javed, 1993)
 Genus *Munidopsis* Whiteaves, 1874
Munidopsis aff *scobina* Alcock, 1894
 40 m-1200 m.
 (Jeffreys *et al.*, 2009)
 Superfamily Hippoidea Latreille, 1825

Family Albuneidae Stimpson, 1858
 Genus *Albunea* Fabricius, 1793
Albunea steinitzi Holthuis, 1958
 Soft substrate
 (Tirmizi, 1978)



(Photo courtesy Moazzam)

Family Hippidae Latreille, 1825
 Genus *Emerita* Scopoli, 1777
Emerita holthuisi Sankolli, 1965



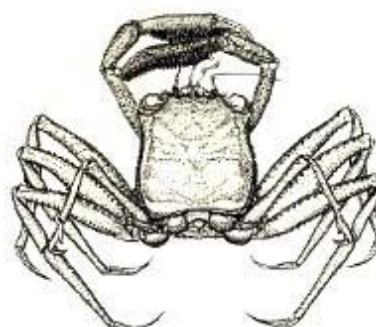
Emerita karachiensis Niazi and Hoque,
 1974
 Littoral sand
 (Niazi and Hoque, 1974)



(After Niazi and Hoque, 1974)

Infraorder Brachyura Linnaeus, 1758
 Section Podotrmata Guinot, 1977
 Superfamily Homoloidea De Haan, 1839

Family Homolidae De Haan, 1839
 Genus *Homolax* Alcock, 1899
Homolax megalops (Alcock 1894)
 Deep sea
 (Tirmizi and Kazmi, 1988 as *Homola*
megalops)



Superfamily Dromioidea de Haan, 1833

Family Dromiidae de Haan, 1833
 Subfamily Dromiinae de Haan, 1833
 Genus *Conchoecetes* Stimpson, 1858
Conchoecetes artificiosus (Fabricius,
 1798) 20.5 x 225mm.

Muddy or sandy bottoms from 30 to 100m depth
(Alcock, 1899, Tirmizi and Kazmi, 1988)



Animal carrying sponge



Denuded

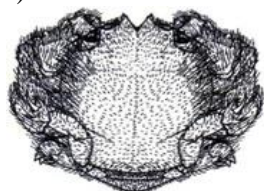
Genus *Lauridromia* McLay, 1993
***Lauridromia dehaani* (Rathbun, 1923)**
44.28x37.68mm. Harsh grey with fingers of chelipeds dark pink.
Muddy or sandy mud, from 50 to 150 m. depth
(Hashmi, 1963, Tirmizi and Kazmi, 1988 as *Dromia dehaani*)



(Photo contributed by Moazzam)

Genus *Lewindromia* Guinot and Tavares, 2003

***Lewindromia unidentata* (Ruppell, 1830)**
1.75x11mm. Whiteish with dark brown pile
(Tirmizi and Kazmi, 1988 as *Dromidia unidentata*)



Genus *Epigodromia* McLay, 1993
***Epigodromia ebalioides* (Alcock, 1899)**
Subtidal



(Alcock, 1899 as *Dromia (Cryptodromia) ebalioides*)

***Epigodromia granulata* (Kossman, 1878)**

Subtidal sand and sponge, 1-30 m depth.
(Al-Hindi, 2019, unpublished dissertation, Al-Hindi *et al.*, 2020)



(After Al-Hindi *et al.*, 2020)

Section Eubrachyura de Saint Laurent, 1980

Subsection Heterotremata Guinot, 1977
Superfamily Dorippoidea MacLeay, 1838

Family Dorippidae MacLeay, 1838
Subfamily Dorippinae MacLeay, 1838
Genus *Dorippe* Weber, 1795

***Dorippe quadridens* (Fabricius, 1793)**
1-30 m. flat bottoms of soft to firm bud, to sand mixed with gravel, shell, rocks, coral, low sponge
(Karim, 1973; Holthuis and Manning, 1990)

Genus *Dorippoides* Serene and Romimohtarto, 1969

***Dorippoides nudipes* Manning and Holthuis, 1986** 24 x 30 mm.
Sandy or soft muddy bottoms at 15- 100 m, protected by the valve of some flat Lamellibranch
(Tirmizi and Kazmi, 1983 as *Dorippe (Dorippoides) facchino*)



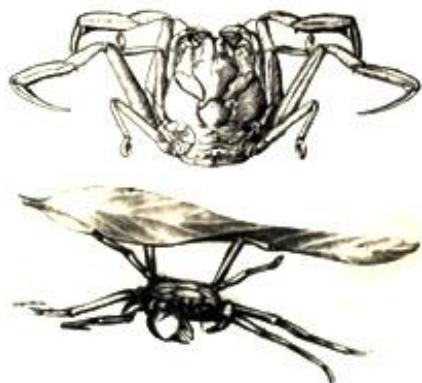
Animal carrying sea anemone



Animal carrying *Spisula* shell, *Anadara* shell

Genus *Neodorippe* Serene and Romimohtarto, 1969

Neodorippe callida (Fabricius, 1798) 11 mm x 12 mm.
Shallow waters of the shore, common on the mangrove swamps (Alcock, 1896 as *Dorippe astuta*; Tirmizi and Kazmi, 1988)



Carrying mangrove leaf

Superfamily Calappoidea Milne Edwards, 1837

Family Calappidae Milne Edwards, 1837
Subfamily Calappinae de Haan, 1833
Genus *Calappa* Weber, 1795
Calappa guerini Brito Capello, 1871 20-54 mm x 29-94 mm. numerous small red spots on chelipeds.
Found on soft sandy bottoms at 30-72m depth (NHM 1903.7.29.4; Tirmizi and Kazmi, 1988 as *Calappa lophos* Herbst Ref. to change: Lai *et al.*, 2008)



Calappa capellonis Laurie, 1906) 22 mm x 27 mm

Benthic at 9-80 m. on sand pebbles, rocky bottom (Collected Hansen, 1963; Tirmizi and Kazmi, 1988 as *Calappa gallus* (Herbst).



Calappa philargius (Linnaeus, 1758)
Subtidal (Ali, 2006)

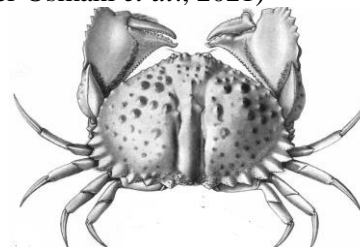
Calappa japonica Ortmann, 1892
Up to 250 metres deep (Collected 27.10.1963, coll. P. Hansen; Galil, 1997)



Calappa exanthematos Alcock and Anderson, 1894 CL75mm Maroon spots on posterior half of carapace, not connected, demarcated by cream area around each appeared distinctly spotted Found in soft sandy bottoms, at a depth range in between 13-46 meters; trawled from sandy, muddy or shelly bottom. (ZMUC Cru 1846; Hansen, 1963; Osmani *et al.*, 2021)



(After Osmani *et al.*, 2021)



Family Matutidae de Haan, 1841

Genus *Matuta* Weber, 1795

Matuta victor (Fabricius, 1781) 4 cm.

Lives in sandy and muddy regions between high and low tidal marks to the infratidal area down to a depth of 10-20 m

(Collected by Murray (NHM 1883.8.265); Tirmizi and Kazmi, 1988 as *Matuta lunaris*; Galil and Clark, 1994



Genus *Ashtoret* Galil and Clark, 1994

Ashtoret lunaris (Forsk., 1775) 4cm.

Lives in sandy and muddy regions between high and low tidal marks to the infratidal area down to a depth of 10-20 m.

(Alcock, 1896, Tirmizi and Kazmi, 1988 as *Matuta lunaris*)



Genus *Matuta* Weber, 1795

Matuta planipes Fabricius, 1798

34 x 34 mm.

Found on shallow sandy beaches, between high and low tidal marks, also to a depth of 10-15m

(Collected J. A. Murray, Karachi Museum, reg. 265; (NHM 1883:8), Tirmizi and Kzmi, 1988)



Genus *Mursia* Leach, 1823

Mursia armata de Haan, 1839

Muddy- sandy bottoms, 50-260m depth

(Hashmi, 1964, species does not occur in the western Indian Ocean cf. Galil, 1993. doubtful record, may be *Mursia arabica* cf. Kumar *et al*, 2013)

Superfamily Leucosiidea Samouelle, 1819

Family Leucosiidae Samouelle, 1819

Subfamily Iliinae Stimpson, 1871

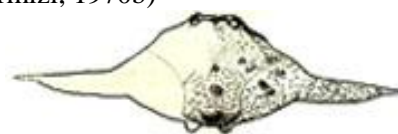
Genus *Ixa* Leach, 1815

Ixa holthuisi Tirmizi, 1970

Female 13 x 38 mm, male 22.5 x 45 mm.

Sublittoral

(Tirmizi, 1970b)



Carapace (After Tirmizi, 1970)

Ixa ? inermis Leach, 1817

Offshore

(Present study)



(Photo contributed by Moazzam)

Subfamily Ebaliinae Stimpson, 1871

Genus *Tokoyo* Galil, 2003

Tokoyo eburnea (Alcock, 1896)

At 80-85 meters

(Daniel and Sivanandam, 1977 as

Randallia eburnea)



Genus *Arcania* Leach, 1817
Arcania brevifrons Chen, 1989
 At 60 m depth, on silt and clay sediment
 (Galil, 2001)
Arcania septemspinosa (Fabricius, 1787)
 21 x 20mm.
 Lives on muddy bottom.
 (Khan and Ahmad, 1975; Tirmizi and
 Kazmi, 1988)



Arcania undecimspinosa de Haan, 1841
 31 x 32 mm. Found on the bottoms of sand
 or sandy mud from about 7-10m
 (Ahmad *et al.*, 1973, Tirmizi and Kazmi,
 1988 as *Arcania erinacea* (Fabricius)



Arcania cornuta (MacGilchrist, 1905)
 Subtidal
 (Moazzam and Kazmi, 2016)



Genus *Leucisca* MacLeay, 1838
Leucisca rubifera (F Müller, 1887)
 (Tirmizi and Kazmi, 1979 as *Nursia*
rubifera Muller) as)

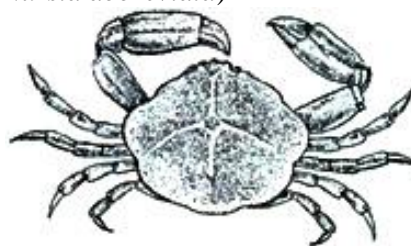


Genus *Nursia* Leach, 1817
Nursia blanfordi Alcock, 1896
 At 100 m.
 (Alcock, 1896)
Nursia plicata (Herbst, 1803)8mm.
 At 3-5 m, sand with clay and stones

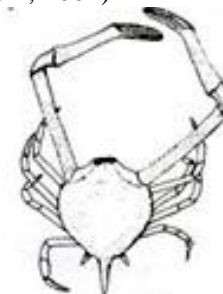
(Wood-Mason, 1891; Tirmizi and Serene,
 1971)



Genus *Paranursia* Serène and Soh, 1976
Paranursia abbreviata (Bell, 1855)
 8 x 9.2 mm. At 9-11m, on sand, gravel
 and shell
 (Alcock, 1896, Tirmizi and Ghani, 1994b
 as *Nursia abbreviata*)



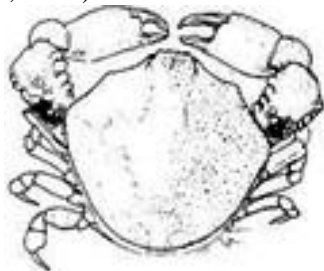
Genus *Myra* Leach, 1817
Myra pernix Galil, 2001
 Eurybenthic ranging from 50-200 m
 depth, common on mud, shelly mud, sand
 and silt
 (Ahmad *et al.*, 1973, Tirmizi and Kazmi,
 1988 as *Myra fugax* (Fabricius); Ref. to
 change Galil, 2001)



Subfamily Leucosiinae Samouelle, 1819

Genus *Leucosia* Weber, 1795
Leucosia anatum (Herbst, 1782)
 Inhabits coarsely at sandy, muddy sandy
 or shelly bottoms 10-80 m. depth
 (Kazmi and Tirmizi, 1990)
Leucosia sima Alcock, 1896
 Sublittoral

(Khan and Ahmad, 1973; Kazmi and Tirmizi, 1990)



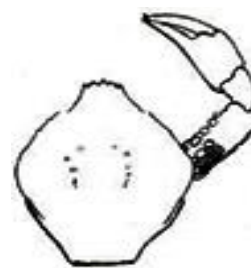
Genus *Coleusia* Galil, 2006
Coleusia biannulata (Tyndale-Biscoe and George, 1962) 24 x 19.5 mm.
 Sublittoral
 (Alcock, 1896 as *Leucosia longifrons* var. *neocaledonia*; Tirmizi and Kazmi, 1988 as *Leucosia biannulata* (Tyndale-Biscoe and George))



Coleusia janani Giraldes, Al-Maslamni and Smyth, 2017. Carapace with bright orange/greyish back ground. Pair of large ocelli on the gastric region on each side of the carapace; with small white centres and lined by thin red outer rings overlapped with an inclined 8-shape. Intestinal region with reddish blotches on either side and without lined margins.
 Offshore zones with sandy mixed substrates of gravel and mud; depth between 22 and 27 m.
 (Present study)



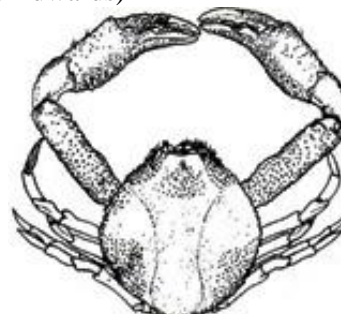
Genus *Seulocia* Galil, 2005
Seulocia anahita Galil, 2005 11x16 m.
 At 16-17 m. depth
 (Khan and Ahmad, 1973 as *Leucosia pubescens* (Mier), Ref. to change: Galil, 2005)



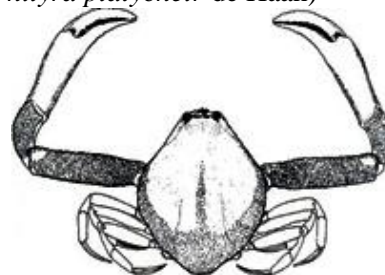
Genus *Pseudophilyra* Miers, 1879
Pseudophilyra blanfordi Alcock, 1896
 At 56 m., sandy clay
 (Alcock, 1896)



Genus *Lyphira* Galil, 2009
Lyphira perplexa Galil, 2009 25 x 26 mm.
 Prefers muddy bottom, from 24-108 m
 (Khan and Ahmad, 1973, Tirmizi and Kazmi, 1988 as *Philyra globulosa* A. Milne Edwards)



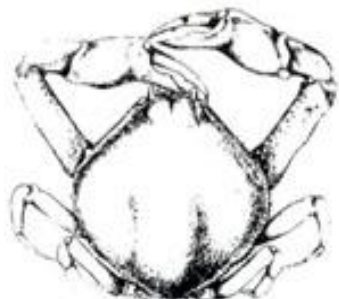
Genus *Hiplyra* Galil, 2009
Hiplyra sagitta Galil, 2009 15.5 x 14 mm.
 Found on clay, gravel and sandy bottoms, 35-150 m depth
 (Alcock, 1896; Tirmizi and Kazmi, 1988 as *Philyra platycheir* de Haan)



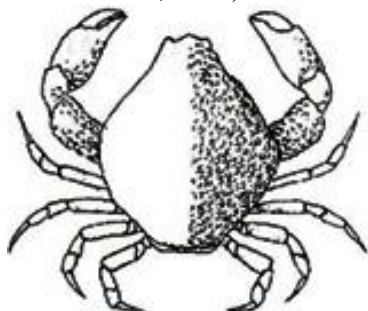
Genus *Philyra* Leach, 1817

Philyra globus (Fabricius, 1798) 15.5 x 16 mm.

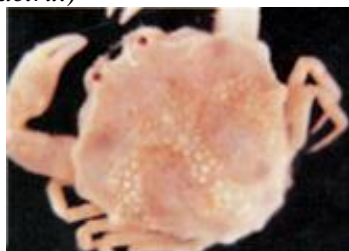
Rocky substratum, at 24m depth (Alcock, 1896 as *Philyra globosa*, Khan and Ahmad, 1979 as *P. globossa*)



Philyra corallicola Alcock, 1899
Hard flat coral slab (Khan and Ahmad, 1975)



Philyra malefactrix (Kemp, 1915)
Mud, in intertidal zone (Tirmizi and Kazmi, 1988 as *Ebalia malefactrix*)



Philyra concinnus Ghani and Tirmizi, 1995 6.8 x 8.5 x 12mm.
Mangroves mud, in intertidal zone (Ghani and Tirmizi, 1995)



Female (After Ghani and Tirmizi, 1995)

Genus *Ryphila* Galil, 2009

Ryphila cancellus (Herbst, 1783) 15.25 mm.

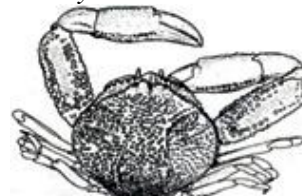
Found in the intertidal zone (Alcock, 1896, Tirmizi and Kazmi, 1988 as *Philyra scabriuscula* (Fabricius), Aziz *et al.*, 2021)



different colour patterns

Ryphila verrucosa (Henderson, 1893)

Sandy bottom in mangroves area (Henderson, 1893; Tirmizi and Ghani, 1992b as *Philyra verrucosa* Henderson)



(After Tirmizi and Ghani, 1992)

Family Iphiculidae Alcock, 1896

Genus *Iphiculus* Adams and White, 1848

Iphiculus spongiosus Adams and White, 1848

8x14 mm.

Soft muddy or coarse sandy bottoms at 25-

106 m. depth

(Alcock, 1896, present study)



Genus *Pariphiculus* Alcock, 1896

Pariphiculus mariannae (Herklots, 1852)

37x32 mm.

Lives on muddy bottoms from 45-82m. (Tirmizi and Kazmi, 1988)

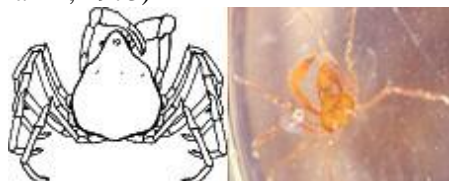


(Photo contributed by Moazzam)

Superfamily Hymenosomatoidea
MacLeay, 1838

Family Hymenosomatidae MacLeay, 1838

Genus *Elamena* H. Milne Edwards, 1837
Elamena sindensis Alcock, 1900 8.8 mm.
Common on the undersides of slabs and boulders in the intertidal zone
(Karim, 1973)



Elamena cristatipes Gravely, 1927
Sublittoral
(Hashmi, 1963)



Superfamily Majoidea Samouelle, 1819

Family Oregoniidae Garth, 1958

Genus *Pleistacantha* Miers, 1879

Pleistacantha sp. cl.68mm

Deep sea, offshore

(Tirmizi and Kazmi, 1988)



Family Inachidae MacLeay, 1838

Genus *Encephaloides* Wood-Mason and Alcock, 1891

Encephaloides armstrongi Wood-Mason and Alcock, 1891

At 120m depth., densely found in the oxygen minimum zone .

(Bett, 1995; Kazmi and Moazzam, 2014)



Genus *Camposcia* Latreille, 1829

Camposcia retusa Latreille, 1829 38x30 mm.

Found on reefs or rocky weedy bottoms, ranging from 10-40 m depth. Usually masked with seaweed or sponges
(Tirmizi and Kazmi, 1988)



Genus *Macropodia* Leach, 1814

Macropodia aff. *falcifera* (Stimpson, 1857)

20.5x11 mm.

Among sea weeds etc., on a sandy bottom

(Tirmizi and Kazmi, 1988)

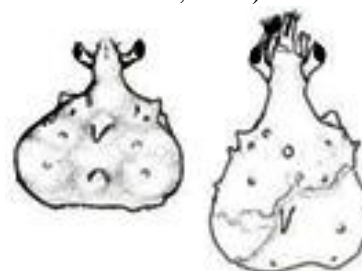


Macropodia formosa Rathbun, 1911

14 mm.

Subtidal

(Kazmi and Tirmizi, 1995)



Female and male

Genus *Achaeus* Leach, 1817

Achaeus lacertosus Stimpson, 1857

8.5x7.5 mm.
Weedy rocky bottoms ranging from 30-50 m depth
(Tirmizi and Kazmi, 1988)



Subfamily Pisinae Dana, 1851

Genus: *Hoplophrys* Henderson, 1893

Hoplophrys oatesii Henderson, 1893

Epizoic, subtidal

(Davei, 2021)

Genus *Doclea* Leach, 1814

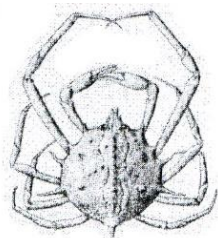
Doclea rissoni Leach, 1815

Bottoms with lime gravel and mud
(Hashmi, 1963 as *D.gracilipes*, Wagner, 1986)

Doclea aduncus Wagner, 1986 55-47 mm.

Muddy bottoms

(Wagner, 1986; Tirmizi and Kazmi, 1988)



Doclea aff. *muricata* (Herbst, 1788)

38x31.5 mm.

At 23-25 m depth

(Karim, 1973 as *Doclea hybrida*; Tirmizi and Kazmi, 1988)



Genus *Hyastenus* White, 1847

Hyastenus pleione (Herbst, 1803)

36.5x30 mm.

Muddy bottom, 10 m deep.

(Kohli, 1922)



(After Lee and Ng, 2020)

Hyastenus spinosus A. Milne Edwards, 1972

Body and limbs encrusted heavily with hydroids and algae

(Griffin, 1974)

Hyastenus planasius (Adams and White, 1848)

Course sand and rubble

(Hashmi, 1963)



Genus *Lahaina* Dana, 1851

Lahaina ovata (Dana, 1851)

Body and limbs encrusted heavily with hydroids and algae

(Griffin, 1974 as *Hyastenus ovatus*)

Genus *Oncinopus* De Haan, 1839

Oncinopus neptunus Adams and White, 1848

Subtidal

(Griffin, 1974)

Family Epialtidae MacLeay, 1838

Subfamily Tychinae Dana, 1851

Genus *Stilbognathus* Von Martens, 1866

Stilbognathus neumanii n.sp.57 mm.

Rocky and sandy beach. Pakistan,

Sandspit (24°50'24N, 66°54.24E,

holotype housed in MRCC)

(Tirmizi and Kazmi, 1988 as

Ophthalmias curvicornis Herbst)



Subfamily Epialtinae Macleay, 1851

Genus *Huenia* De Haan, 1837

Huenia heraldica (De Haan, 1837)

Benthic; depth range 0 - 36 m., on

Halimeda, weedy pebbles.

(Davei, 2021)
 Genus *Simocarcinus* Miers, 1879
Simocarcinus simplex (Dana, 1852)
 25x13 mm.
 In shallow waters, from rocky weedy beach
 (Tirmizi, 1978b)



Genus *Acanthonyx* Latreille, 1828
Acanthonyx limbatus A. Milne Edwards, 1862
 Female 9.5x7.5 mm, Male 14x10 mm.
 Lives among the branches of sea-weed
 (Tirmizi and Kazmi, 1988)



Acanthonyxinglei Tirmizi and Kazmi, 1988
 Female 29x22 mm, Male 33x25 mm.
 In small pools and under stones among sea-weed
 (Tirmizi and Kazmi, 1988 as *Acanthonyx elongatusinglei*)



Acanthonyx scutellatus MacLeay, 1838
 Weeds
 (Alcock, 1896 as *Acanthonyx macleaii* Krauss)
Acanthonyx euryseroche Griffin and Tranter, 1986

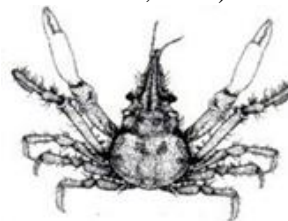
In association with brown seaweeds from lower intertidal zone
 (Afsar *et al.*, 2019)
 Genus *Menaethiops* Alcock, 1895
Menaethiops bicornis Alcock, 1895
 Male 16.6, Female 8.5x4 mm.
 Sandy bottom in rock pools
 (Tirmizi and Kazmi, 1988)



Menaethiops nodulosa (Nobili, 1905)
 From holes in rocks crevices with weeds and barnacles
 (Kazmi and Tirmizi, 1999)



Menaethiops gadaniensis Kazmi and Tirmizi, 1999
 Among seaweed. Coastal
 (Kazmi and Tirmizi, 1999)



Genus *Menaethius* H. Milne Edwards, 1834
Menaethius monoceros (Latreille, 1825)
 22x18 mm.
 Inhabits rocky region overgrown with seaweed
 (Hashmi, 1963, Tirmizi and Kazmi, 1988)



Genus *Huenia* De Haan, 1837 [in De Haan, 1833-1850]

Huenia heraldica (De Haan, 1837 [in De Haan, 1833-1850])
(Davei, 2021)

Family Majidae Samouelle, 1819
Subfamily Majinae Samouelle, 1819
Genus *Prismatopus* Ward, 1933
Prismatopus aculeatus (H. Milne Edwards, 1834)
Rocky and weedy bottoms, 10-50 m depth

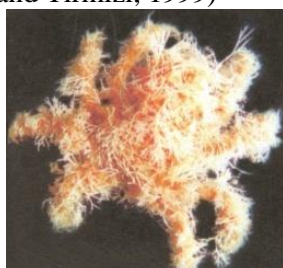
(Hashmi, 1964 as *Paramithrax (Chlorinoides) aculeatus*)
Genus *Maja* Lamarck, 1801
Maja spinigera (de Haan, 1839)
Muddy, pebbly or rocky bottom, 15-50 m. depth

(Alcock, 1896 as *Maia spinigera*)
Maja gibba Alcock, 1895.
Muddy or muddy- sandy bottoms, 100-200m. depth

(Kohli, 1922 as *Maia gibba*)
Genus *Schizophrys* White, 1848
Schizophrys pakistanensis Tirmizi and Kazmi, 1995 60x47 mm.
Rocky bottoms
(Tirmizi and Kazmi, 1988 as *Schizophrys aspera* (H. Milne Edwards).



Genus *Pseudomicippe* Heller, 1861
Pseudomicippe griffini Kazmi and Tirmizi, 1999 nomen nudum
Among seaweeds
(Kazmi and Tirmizi, 1999)

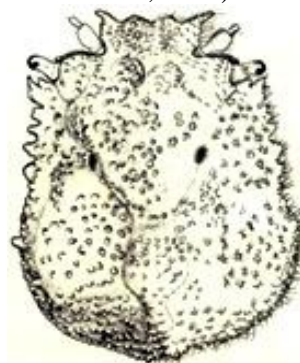


Genus *Micippa* Leach, 1817
Micippa thalia (Herbst, 1803) Male
53x45 mm, Female 47x40 mm.
Shallow offshore water, bottoms of mud, sandy mud or broken shells ranging from

20 to 100 m. occasionally found in algae of semibeaten regions
(Tirmizi and Kazmi, 1988)

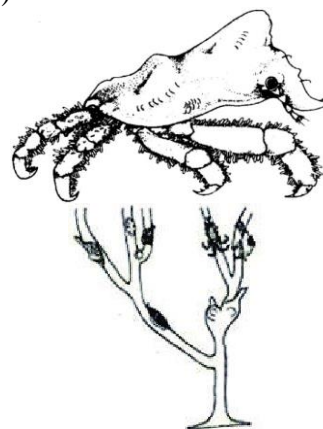


Micippa platipes Ruppell, 1830 Female 23x19, male 14x12 mm.
Found under stones in rock pools in rocks covered with algae and sandy mud
(Tirmizi and Kazmi, 1988)



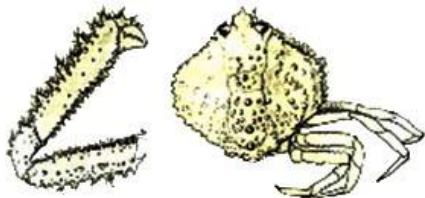
Subfamily Mithracinae MacLeay, 183

Genus *Cyphocarcinus* A. Milne Edwards, 1868
Cyphocarcinus sargassumi Kazmi and Tirmizi, 1995
8.5 mm.
Among Sea weed (Tirmizi and Kazmi, 1995b)

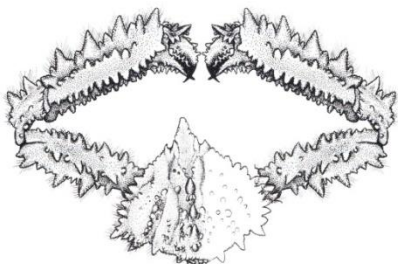


on gorgonian branch
Superfamily Parthenopoidea MacLeay, 1838

Family Parthenopidae MacLeay, 1838
 Subfamily Parthenopinae MacLeay, 1838
 Genus *Parthenope* Weber, 1795
Parthenope longimanus Linnaeus, 1764
 17x18 mm.
 Muddy-sandy bottoms
 (Tirmizi and Kazmi, 1988)



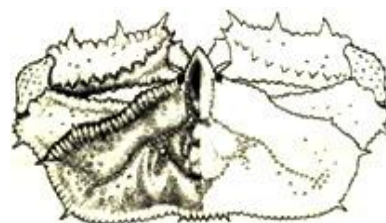
Cheliped, carapace (detail sculpture on right and right legs
 Genus *Enoplolambrus* A.Milne-Edwards, 1875
Enoplolambrus cf. *carenatus* (H. Milne-Edwards, 1834) 25x27 mm.
 Ranges from shallow infratidal to 72 m. depth
 (Tirmizi and Kazmi, 1988 as *Parthenope quemvis*)



Enoplolambrus pransor (Herbst, 1796)
 male 26x30 mm. female 25x27 mm.
 Lives in shallow waters only
 (Hashmi, 1963 as *Parthenope pransor*;
 Tirmizi and Kazmi, 1988)



Genus *Cryptopodia* H. Milne Edwards, 1834
Cryptopodia angulata H. Milne Edwards and Lucas, 1841 37x60 mm.
 Prefers muddy bottoms at a depth of 34-47 m
 (Alcock, 1895 as *Cryptopodia angulata* var. *cippife*; Tirmizi and Kazmi, 1988)



Details of left side shown



Cryptopodia fornicata (Fabricius, 1787)
 5cm.
 Broken shelly and muddy-sandy bottoms,
 25-30 m. deep
 (Fanning *et al.*, 2011)



(After Debelius, 2001)

Cryptopodia echinosa Chiong and Ng, 1998
 Subtidal
 (Moazzam and Kazmi, 2016)



Superfamily Portunoidea Rafinesque, 1815

Family Polybiidae Ortmann, 1893
 Genus *Ovalipes* Rathbun, 1898
Ovalipes catharus (White, in White and Doubleday, 1843) from shallow waters (Fanning *et al.*, 2011)

Family Portunidae Rafinesque, 1815
 Subfamily Portuninae Stephenson and Campbell, 1960 Genus *Scylla* de Haan, 1833

Scylla serrata (Forsk., 1775)
Mangroves, sandy and muddy bottoms
(Hashmi, 1963; Keenan *et al.*, 1998 stated that the exact distribution of *Scylla serrata* sensu strictu is not clear in Pakistan)



Scylla olivacea Herbst, 1796
Upto 180 mm. Colour varies from red to brown to slightly brown/black depending on habitat.
Associated with mangrove forests
(Keenan *et al.*, 1998, Kazmi *et al.*, 2000)



(After Keenan *et al.*, 1998)

Scylla tranquebarica (Fabricius, 1798)
200mm.
Associated with mangrove forests
S. serrata recorded from Pakistan by Tirmizi and Kazmi (1996) rather refers to *S. tranquebarica*.Ref. (Keenan *et al.*, 1998; Kazmi *et al.*, 2000)



Subfamily Thalamitinae Paulson, 1875
Genus *Charybdis* de Haan, 1833
Subgenus *Charybdis* (*Charybdis*) De Haan, 1833

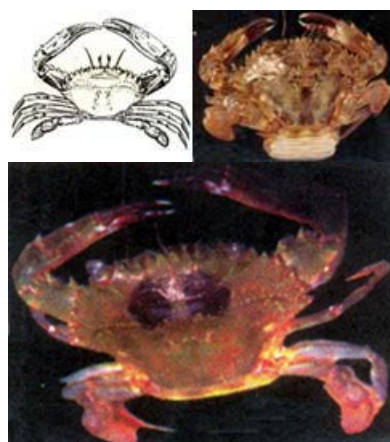
Charybdis (*Charybdis*) *annulata* (Fabricius, 1798) 41x60mm. Body colours include plain olive, greenish grey, orange. Legs have alternating bands of dark brown and bright blue, tips of claws also banded dark brown and bright blue, a fine network of brown lines on claws
Found on rocky shores
(BMNH, 1881; Hashmi, 1963; Tirmizi and Kazmi, 1996)



Charybdis (*Charybdis*) *orientalis* Dana, 1852 31-36 mm x 42-49 mm. Mottled brown, finger of cheliped dark red
Inhabiting rocky and sandy shores
(Hashmi, 1963 as *Charybdis* (*Goniosoma*) *orientalis*; Tirmizi and Kazmi, 1996)



Charybdis (*Charybdis*) *hellerii* (A. Milne Edwards, 1867) 25-31 mm x 34-43 mm. Inhabiting rocky, sandy and muddy shores (Alcock, 1899 as *Charybdis* (*Goniosoma*) *merguiense*); Tirmizi and Kazmi, 1996)
Charybdis (*Charybdi*) *lucifera* Fabricius, 1798) 48x74 mm., greenish brown, cheliped scarlet pink, two large white spots on either branchial region
Found on rocky, sandy and muddy bottoms (Day, BMNH 1896; Hashmi, 1963 as *Charybdis* (*Goniosoma*) *lucifera*; Khan and Ahmad, 1973; Tirmizi and Kazmi, 1996)

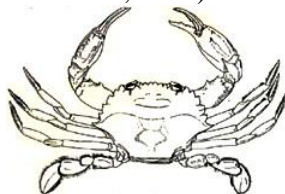


Charybdis (Charybdis) variegata
(Fabricius, 1798) 25-25 mm x 33-41 mm.
Rocky shore, bottoms of mud and sand
(BMNH 1882; Henderson, 1893 as
Charybdis (Goniosoma) variegatum)



(Picture courtesy Negri *et al.*, 2017)

Charybdis (Charybdis) callianassa
(Herbst, 1789) 22x38 mm. Dirty white to
light grey
Sandy - muddy and shelly bottoms, 5 - 15
m deep.
(BMNH 1882; Alcock, 1899 as
Charybdis (Goniosoma) callianassa;
Tirmizi and Kazmi, 1996)



Charybdis (Charybdis) feriata
(Linnaeus, 1758) 69x100 mm., purplish
brown, chelipeds purple with yellowish
spots.
Rocky or stony coast, coral reef flats.
Sandy muddy substratum
(Stephenson, 1972)



Charybdis (Charybdis) natator (Herbst,
1794)
42x66 mm.
Bottoms of sand or rocky, sandy or
muddy- sandy bottoms
(Kohli, 1922 as *Goniosoma natator*;
Mustaquim and Rabbani, 1976)



Left cheliped missing
Subgenus *Charybdis (Goniohellenus)*
Alcock, 1899

Charybdis (Goniohellenus) hoplites
(Wood-Mason, 1877) 31 mm x 60 mm.
Dirty white
15-40 metres deep, sandy substream.
(Since juvenile specimens of *C. hoplites*
sensu lato are easily confused with
juveniles of *C. vadorum*, the record from
by Karim, 1974 may be based on
misidentified specimens of *C. hoplites*
sensu lato; Hashmi, 1963; Tirmizi and
Kazmi, 1996)



Charybdis (Goniohellenus) vadorum
Alcock, 1899
At 10-80 m depth
(Karim, 1973 as *Charybdis*
(*Goniohellenus*) var. *vadoru*); somewhat
doubtful and needs to be confirmed.)
Charybdis (Goniohellenus) smithii
MacLeay, 1838
Pelagic, deep sea
(Hashmi, 1963 as *Gonioneptunus smithii*)



Charybdis (Charybdis) anisodon (De Haan, 1850)
At 6-14 m depth
(Hashmi, 1964 as *Charybdis (Charybdis) anisodon*) questionable cf Apel. and Spiridonov 1998

Charybdis (Charybdis) miles (De Haan, 1835)
Found subtidal on sandy-muddy substrates, from depths of 10 to 160 meters
(Present study)



(Photo contributed by Moazzam)

***Charybdis* sp**
Epibiotic Commensal with brittle star
(Kazmi, 2016)



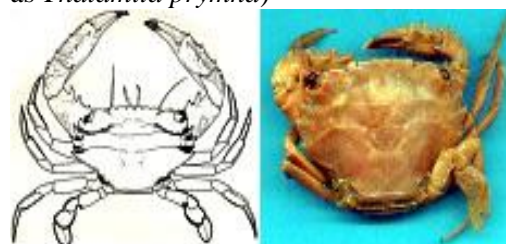
Charybdis (Charybdis) riversandersoni
Alcock, 1899
Deep sea
(Apel and Spiridonov, 1998)
Genus *Thranita* Evans, 2018

Thranita crenata (Ruppell, 1830) 40-43 mm x 56-61 mm. Uniformly greenish grey, claws pinkish, a dark green colour with lighter markings and brownish patches in the anterior part; chelipeds yellowish-green with darker spots, the

ambulatory legs light green; or as greyish-pink with pink claws having black tips., or the dorsal surface of the carapace may be yellowish-green with orange brown patches on ridges, the ventral surface pale orange. Ambulatory and natatory legs bluish-green, including spines and fingers of chelipeds; or the colour may be as violet and green with brownish-green spines. Creeks, mud flats, rocky shores, usually found under stones within intertidal zone (Karachi Museum., BMNH 1882; Kohli, 1921)



Thranita prymna (Herbst, 1803) 35-43 mm X 50-62 mm. Greenish pink, claws with dark black tips.
Inhabits rocky shores within intertidal zone
(Khan, 1975 ; the specimen illustrated by Khan, 1975 under the name *prymna* (his fig. 3, pl. 3) clearly belongs to *Thalamita crenata*.;Mustaquim and Rabbani, 1976 as *Thalamita prymna*)



Genus *Thalamita* Latreille, 1829
Thalamita poissonii (Audouin, 1826)
Mangal associated
(Chandy, 1969 from the Gulf of Kutch, north-west India, close to Pakistani waters)
Thalamita admete (Herbst, 1803)
Found on rocky shores within intertidal zone
(Hashmi, 1964, Tirmizi and Kazmi, 1996)



Thalamita danae (Stimpson 1858) Whole body light and dark greenish colouration with slight purplish shade
Intertidal areas of rocky shore and mudflats of sand or muddy sand with stones, areas with pebbles under stones (Saher *et al.*, 2018)

Genus *Portunus* Weber, 1795

Portunus segnis (Forskål, 1775)

Upto 200 mm.

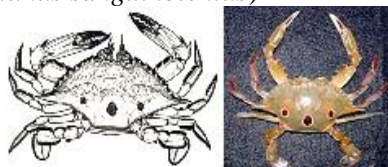
Under rocks and in rock pools (Henderson, 1893, Khan, 1975 as *Neptunus pelagicus*; Tirmizi and Kazmi, 1996 as *Portunus pelagicus*, Ref to change: Lai *et al.*, 2010)



Portunus sanguinolentus (Herbst, 1783)

56x124 mm.

Sandy, rocky bottoms (Henderson, 1893; Khan, 1975 as *Neptunus sanguinolentus*)



(Photo contributed by Moazzam)

Portunus pulchricristatus (Gordon, 1931) 10-14 mm X 14-20 mm.

Sandy and stony bottoms, also found in crevices of coral reefs (Ghani and Tirmizi, 1993b)

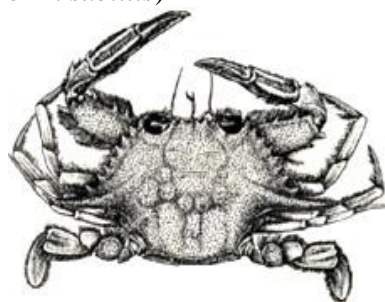


(After Ghani and Tirmizi, 1993)
Genus *Eodemus* Koch, Spiridonov and Āuriš, 2022

Eodemus hastatooides (Fabricius, 1798)

12-16 mm x 19-29 mm.

Creeks, muddy and sandy bottoms (Hashmi, 1964 as *Portunus hastatooides* Fabricius; Tirmizi and Kazmi, 1996, ref Son, 2013 incerta sedis, as G1 resembles that of *P. subtilis*)



Genus *Cycloachelous* Ward, 1942

Cycloachelous granulatus (H. Milne Edwards, 1834) 12x19 mm.

Rocky shore, bottom of sand and shells and coral reef

(Tirmizi and Ghani, 1982 as *Portunus granulatus* (H. Milne Edwards); Tirmizi and Kazmi, 1983 *Portunus (Cycloachelaus) granulatus*)



Cheliped and carapace (After Tirmizi and Ghani, 1982)

Genus *Lupocyclus* Adams and White, 1849

Lupocyclus philippinensis Semper, 1880
Carapace bright orange in color with yellowish orange bands on legs.

Pelagic Inhabits the bottoms of sandy mud or broken shells; 50 to 100 meters deep.

(Alcock, 1899 as *Lupocyclus strigosus*; Leene and Buitendijk, 1952; Osmani *et al.*, 2019)



Carapace (After Osmani *et al.*, 2019)
Subfamily Caphyrinae Paulson, 1875

Genus *Lissocarcinus* Adams and White, 1849

Lissocarcinus laevis Miers, 1886

Benthic; depth range 9 - 82 m
(Davei, 2021)



Subfamily Carcininae Macleay, 1838

Genus *Carcinus* Leach, 1814

Carcinus maenas (Linnaeus, 1758) 44 x 56 mm.

Pelagic ,brackish
(Tirmizi and Ghani, 1983)



Subfamily Podophthalminae Dana, 1851

Genus *Podophthalmus* Lamarck, 1801

Podophthalmus vigil Fabricius, 1798

Female 34x68, male 36x74 mm.
Off shore waters and creeks mostly inhabiting muddy areas
(Hashmi, 1964)



Superfamily Goneplacoidea MacLeay, 1938

Family Euryplacidae Stimpson, 1871

Genus *Trissoplax* Castro and Ng, 2010

Trissoplax dentata (Stimpson, 1969) 5-11 mm X 7-15 mm.

Sandy-muddy bottoms of intertidal regions

(Hashmi, 1964 as *Eucrate crenata dentata*; Tirmizi and Ghani, 1982 as

Eucrate haswelli fide Campbell; Castro and Ng ,2010)



Genus *Eucrate* de Haan, 1835

Eucrate indica Castro and Ng, 2010

Subtidal

(Kazmi and Moazzam, 2012)



Eucrate sulcatifrons (Stimpson, 1858)

9x11 mm.

Lives under stones on rocky shore
(Tirmizi and Ghani, 1982b)



(Carapace and cheliped, after Tirmizi and Ghani, 1982)

Eucrate crenata (De Haan, 1835)

(Tirmizi and Ghani, 1982, may be *Eucrate tripunctata* Campbell fide Ng and Castro, 2010)

Superfamily Pseudozioidea Alcock, 1898

Family Pseudoziidae Alcock, 1898

Genus *Pseudozius* Dana, 1851

Pseudozius caystrus (Adams and White, 1848)

20.9x12.5 mm. Dark blackish brown 2 pale dots on branchial region to offwhite, finely mottled

Rocky shores, living understones
(Alcock, 1898; Tirmizi and Ghani, 1996)



Family Planopilumnidae Serène, 1984
Genus *Planopilumnus* Balss, 1933
Planopilumnus holthuisi Ng and Kazmi, 2010
(Ng and Kazmi, 2010)



Family Xanthidae MacLeay, 1838
Subfamily Cymoinae Alcock, 1898
Genus *Cymo* de Haan, 1833
Cymo andreossyi (Audouin, 1826)
On branching corals in shallow sublittoral
(Alcock, 1898)



Subfamily Liomerinae Sakai, 1976

Genus *Neoliomera* Odhner, 1925
Neoliomera intermedia Odhner, 1925
22x35 mm.
Lives under stones on rocky shore
(Ghani and Tirmizi, 1992a)



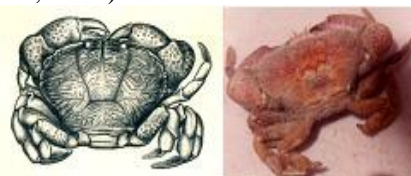
Subfamily Euxanthinae Alcock, 1898
Genus *Euxanthus* Dana, 1851

Euxanthus exsculptus (Herbst, 1790)
29x43 mm.
Lives under stones on rocky shores
(Ghani and Tirmizi, 1992a)

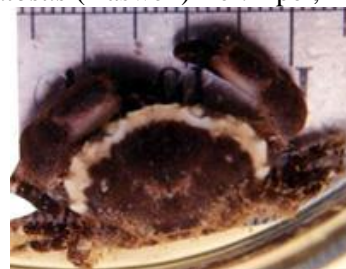


Carapace (After Ghani and Tirmizi, 1992)

Genus *Medaeops* Guinot, 1967
Medaeops edwardsi Guinot, 1967
17x24mm.
Lives under stones on rocky shores
(Tirmizi and Kazmi, 1983; Tirmizi and Ghani, 1995)



Medaeops neglectus (Balss, 1922)
Intertidal. Rocky beaches, on or below low tidal marks, sheltered under stones
(Alcock, 1898 as *Xantho distinguendus*; Hashmi, 1963 as *Medaeus granulatus*; Tirmizi and Ghani, 1996 as *Medaeops granulatus* (Haswell) Ref. Apel, 2001)



Subfamily Actaeinae Alcock, 1898
Genus *Epiactaea* Serène, 1984
Epiactaea margaritifera (Odhner, 1925)
Shells, coral gravel
(Odhner, 1925 as *Actaea margaritifera*)
Genus *Actaeodes* Dana, 1851

Actaeodes tomentosus (H. Milne-Edwards, 1834)
Crevices of rocks along the littoral zone on coral reefs
(Karim, 1973 as *Actaea tomentosa*)



Genus *Odhnea* Ng and Low, 2010
Odhnea echinus (Alcock, 1898)
Trawled
(Mendoza *et al.*, 2011)



Genus *Actaea* de Haan, 1833 emend
Actaea jacquelineae Guinot, 1976
Lives buried under stones on rocky shores
(Alcock, 1898 as *Actaea calculosa* and *A. granulata*,
(Tirmizi and Ghani, 1996)

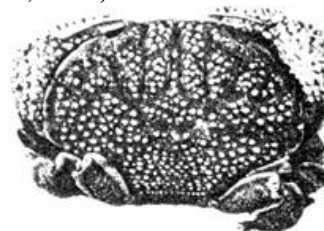


Actaea savignii (H. Milne Edwards, 1834)
Sand, stones, rocks, intertidal to 300m
(Alcock and Anderson, 1894)



Subfamily Zosiminae Alcock, 1898
Genus *Platypodia* Bell, 1835
Platypodia cristata (A. Milne-Edwards, 1865)

Rocky bottom
(Hashmi, 1964)



Platypodia granulosa (Ruppell, 1830)
Shallow waters
(Tirmizi and Kazmi, 1983)
Genus *Atergatis* de Haan, 1835
Atergatis laevigatus A. Milne-Edwards, 1865
Littoral, lives buried under stones
(Tirmizi and Ghani, 1996, their record of *Atergatis roseus* (Ruppell) is a misidentification of *A. laevigatus*. Ref Apel, 2001)



(Photo contributed by Moazzam)

Atergatis integerrimus (Lamarck, 1801).
Inhabitant of rocky shores, lives buried under stones
(Alcock, 1898, Khan, 1977b)



Atergatis ocyroe (Herbst, 1801)
At or below low tidal mark, quite common on rocky shores
(Alcock, 1898; Tirmizi and Ghani, 1996 as *Atergatis floridus* (Linnaeus)



Atergatis dilatatus de Haan, 1835
On rocky shores
(Alcock, 1898; Ahmad *et al.*, 1973)



Genus *Atergatopsis* A. Milne-Edwards, 1862

Atergatopsis granulata A. Milne-Edwards, 1865

Rock pools
(Sèrene, 1984)

Genus *Zozymodes* Heller, 1861

Zozymodes cavipes (Dana, 1852)

Shallow waters under rocks;
rocky/cobble intertidal
(Alcock, 1898 as *Xantho cavipes*;
Tirmizi and Ghani, 1992a)



Genus *Lophozozymus* A. Milne Edwards, 1863

Lophozozymus dodone (Herbst, 1801)

Under rocks or in crevices
(Hashmi, 1964)



Lophozozymus pulchellus A. Milne-Edwards, 1867. Carapace width attains 1 inch

Uncommon under rocks at night in shallow water, reefs; among coral and rocky rubble; to 120m

(SealifeBase)

Subfamily Xanthinae MacLeay, 1838

Genus *Liagore* De Haan, 1833

Liagore rubromaculata (De Haan, 1835)

Red spots spread on carapace standing out against a light background, arranged on the carapace and legs; present on the gastric region, of an odd spot anterior and two pairs of posterior spots. Half of the 1st to 3rd abdominal segments also red colour

Subtidally between a depths of 28–33 m in muddy substrate.

(Moazzam and Moazzam, 2022)



(After Moazzam and Moazzam, 2020)

Genus *Macromedaeus* Ward, 1942

Macromedaeus quinqueidentatus

(Krauss, 1843)

Middle and lower shore and shallow sublittoral

(Hashmi, 1963 as *Leptodius euglyptus quadrispinosus*; Tirmizi and Ghani, 1996)



Macromedaeus crassimanus (A. Milne Edwards, 1867)

Middle and lower shore and shallow subtidal

(Alcock, 1898 as *Xantho (Leptodius) crassimanus*)



(After Ghotbeddin and Naderloo, 2014)

Genus *Xanthias* Rathbun, 1897

Xanthias sinensis (A. Milne Edwards, 1867)

Crevices of corals

(Alcock, 1898 as *Lioxantho asperatus*)



Genus *Paraxanthodes* Guinot, 1968

Paraxanthodes cumatodes

(MacGilchrist, 1905)

Muddy areas with sponges; also on rocks and rubbles

(Mendoza *et al.*, 2011)



Genus *Leptodius* A. Milne Edwards, 1863, emend

Leptodius exaratus (H. Milne Edwards, 1834

Found on rocky shores

{ Alcock, 1898 in part; Henderson, 1893 as *Xantho (Leptodius) hydrophilus* }



Leptodius gracilis (Dana, 1852)

At 15 m.

(Kazmi and Moazzam, 2014)



Genus *Demania* Laurie, 1906

Demania baccalipes (Alcock, 1898)

Rocky or shelly bottoms, 15-35 m. deep (Hashmi, 1963 as *Xantho (Lophoxanthus) scaberrimus baccalipes*)

Subfamily Etisinae Ortmann, 1893

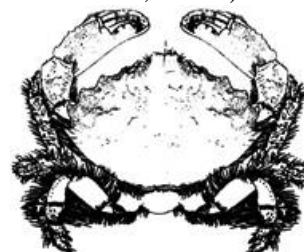
Genus *Etisus* H. Milne Edwards, 1834

Etisus bulejiensis Tirmizi and Ghani, 1988

31x44 mm.

Lives on rocky shores, sheltered under stones.

(Tirmizi and Ghani, 1988a)



(After Tirmizi and Ghani, 1988)

Etisus laevimanus Randall, 1840

Crevices of rocks or under stones, intertidal zone

(Alcock and Anderson, 1894)



Subfamily Chlorodiellinae Ng and Holthuis, 2007

Genus *Chlorodiella* Rathbun, 1897

Chlorodiella nigra (Forsk., 1775)

Sublittoral (1 m.) on branching corals, or rocky shore

(Alcock, 1898 as *Chlorodius niger*)



Subfamily Polydectinae Dana 1851

Lybia leptochelis (Zehntner, 1894)

Coral reef, typically under dead coral slabs or rocks

(Davei, 2021)

Family Tetraliidae Castro, Ng and Ahyong, 2004

Genus *Tetralia* Dana, 1851

Tetralia glaberrima (Herbst, 1790)

Offshore waters, coral commensal

(Alcock, 1898)



Family Trapeziidae Miers, 1886
Genus *Trapezia* Latreille, 1825
Trapezia cymodoce (Herbst, 1801)
Sublittoral, obligate commensal of
branching corals
(Alcock, 1898)



Genus *Quadrella* Dana, 1851
Quadrella reticulata Alcock, 1898
Fishing area
(Kazmi and Moazzam, 2012)



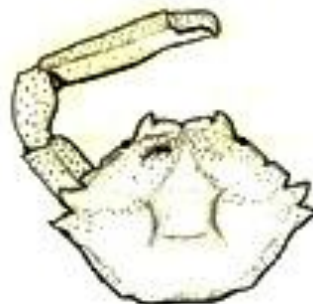
Carapace and chelipeds

Superfamily Pilumnoidae Samouelle, 1819

Family Pilumnidae Samouelle, 1819
Subfamily Eumedoninae Dana, 1852

Genus *Harrovia* Adams and White, 1848
Harrovia elegans de Man, 1887 7x10 mm.

Found externally on crinoids
(Tirmizi and Kazmi, 1982)



(After Tirmizi and Kazmi, 1982)

Subfamily Pilumninae Samouelle, 1819
Genus *Heteropilumnus* de Man, 1895
Heteropilumnus angustifrons (Alcock, 1900)

Benthic
(Alcock, 1900 as *Litocheira angustifrons* Alcock)

Heteropilumnus setosus (A. Milne-Edwards, 1873)

Sandy bottoms, 10 -80 meters deep.
Under stones

(Hashmi, 1963 as *Litocheira setosa* H. Milne-Edwards, 1873)

Heteropilumnus trichophoroides de Man, 1895 10x15 mm.

Lives under stones on rocky shores
(Tirmizi and Ghani, 1982b)



Genus *Nanopilumnus* Takeda, 1974
Nanopilumnus rouxi (Balss, 1936) 6x9 mm.

Lives under stones on rocky shores

(Tirmizi and Ghani, 1986)



Cheliped and carapace (After Tirmizi and Ghani, 1986)

Genus *Pilumnus* Leach, 1815
Pilumnus vespertilio (Fabricius, 1793).
 Lives under stones on rocky shores
 (Alcock and Anderson, 1894)



Pilumnus longicornis Hilgendorf, 1878
 Lives under stones on rocky shores
 (Khan, 1977b)



Pilumnus kempii Deb, 1987
 Understones in shallow waters
 (Deb, 1987)
Pilumnus karachiensis Deb, 1987
 Understones in shallow waters
 (Deb, 1987)
Pilumnus sluiteri De Man, 1892
 In shallow waters
 (Present study)



Genus *Actumnus* Dana, 1851
Actumnus arbutum Alcock, 1898
 Crevices of rocks, roots of algae (Alcock, 1898)



Genus *Heteropanope* Stimpson, 1858
Heteropanope glabra Stimpson, 1858
 4-7 mm x 6-9mm. Inhabitant of mud in mangroves, also found in hollow wooden pieces in that area
 (Tirmizi *et al.*, 1986)

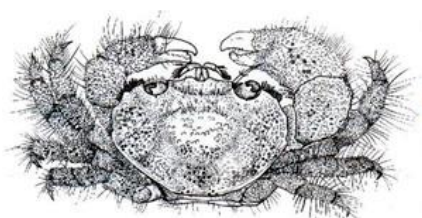


Genus *Eurycarcinus* A. Milne-Edwards, 1867
Eurycarcinus integrifrons De Man, 1879
 5-13 mm x 7-18 mm.
 Inhabitant of mangrove mud flats and hollow wooden pieces
 (Wetmore, 1933; Tirmizi and Kazmi, 1983 as *Eurycarcinus orientalis* A. Milne-Edwards)



(Photo contributed by Moazzam)

Genus *Cryptopilumnus* Hsueh, Huang and Ng, 2009
Cryptopilumnus pereiodontus (Davie and Ghani, 1993) 6.8x4.8 mm.
 In littoral shallow waters, lives in holes and crevices in stones
 (Davie and Ghani, 1993 as *Pilumnopus pereiodontus* Davie and Ghani reference to change Hsueh *et al.*, 2009)



(After Davie and Ghani, 1993)

Genus *Pilumnopus* A. Milne Edwards, 1863

Pilumnopus makianus (Rathbun, 1929)

Found under stones or on muddy and weedy bottoms, intertidal zone (Tirmizi and Kazmi, 1983, doubtful identification)

Pilumnopus convexus (Maccagno, 1936) 6 x 9mm.

Mangroves area, sandy beach and rocky shores

(Ghani and Davie, 2000)



Pilumnopus laevis (Dana, 1852)

Mangrove swamps

(Alcock, 1898 as *Heteropanope laevis*)

Genus *Benthopanope* Davie, 1989

Benthopanope indica (De Man, 1887)

Intertidally on the rocky beach or coral reef

(Tirmizi and Kazmi, 1983 as

Pilumnopus indica)



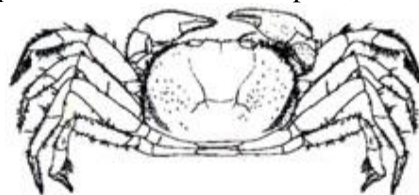
Subfamily Rhizopinae Miers, 1886

Genus *Typhlocarcinops* Rathbun, 1909

Typhlocarcinops stephenseni Serène, 1964

Muddy-sandy bottoms, 30-50 m. depth

(Alcock, 1900; Kazmi, 2003 as *Typhlocarcinus nudus* Stimpson, 1858)



Family Galenidae Alcock, 1898

Subfamily Halimedinae Alcock, 1898

Genus *Halimede* de Haan, 1833

Halimede tyche (Herbst, 1801)

27x36mm.

Inhabits the bottoms of mud or sandy mud, 20-50 m. depth

(Ghani and Tirmizi, 1992a as *Halimede ochtodes* (Herbst))



Subfamily Dentoxanthinae Stevcic, 2005

Genus *Dentoxanthus* Stephensen, 1945

Dentoxanthus iranicus Stephensen, 1945

13x17mm.

Hard clay with sand Rocky bottom near the coast, in corals

(Alcock, 1898 as *Hoploxanthus cultripes*; Tirmizi and Serene, 1971, Tirmizi and Kazmi, 1988)



(After Alcock, 1898)



Female and male

Subfamily Galeninae Alcock, 1898

Genus *Galene* de Haan, 1833

Galene bispinosa (Herbst, 1783)

Sandy and muddy bottoms in shallow waters

(Hashmi, 1964)

Family Oziinidae Dana, 1851

Genus *Epixanthus* Heller, 1861

Epixanthus frontalis (H. Milne-Edwards, 1834)

Rocky shores, near high tide marks (Tirmizi and Ghani, 1996)

Genus *Lydia* Gistel, 1848

Lydia tenax (Ruppell, 1830)

Shore, among boulders

(Alcock, 1898 as *Ozius (Eurupellia) tenax*; some records in the Western Indian Ocean questioned due to the confusion with the very similar *Lydia annulipes*)

Family Menippidae Ortmann, 1893

Genus *Myomenippe* Hilgendorf, 1879

Myomenippe hardwicki (Gray, 1831)

Under stones

(Hashmi, 1963)



Genus *Menippe* de Haan, 1833

Menippe rumphii (Fabricius, 1798)

Reddish to pinkish brown and maroon in

adults; young crabs maroon to reddish brown, with longitudinal white stripes. Claws with black tips; eyes red without any green

Lives under stones on rocky shores

(Alcock, 1898; Tirmizi and Ghani, 1996 as *Ozius rugulosus* Stimpson)



Superfamily Eriphioidea MacLeay, 1838

Family Eriphiinae Alcock, 1898

Genus *Eriphia* Latreille, 1817

Eriphia smithii MacLeay, 1838

Inhabitant of the rocky shores, lives in crevices, or under stones, reef, intertidal areas

(Alcock, 1898 as *Eriphia laevimana* var. *smithii*; Tirmizi and Ghani, 1996)



Subsection Thoracotremata Guinot, 1977

Superfamily Pinnotheroidea de Haan, 1833

Family Pinnotheridae de Haan, 1833

Subfamily Pinnotherinae de Haan, 1833

Genus *Afropinnotheres* Manning, 1993

Afropinnotheres ratnakara Ng and Kumar, 2015

Parasitic in bivalve

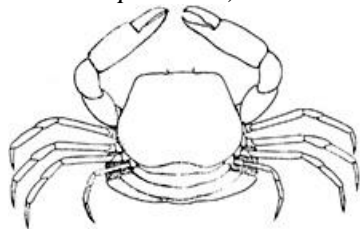
(Tirmizi and Ghani 1996 as *Pinnotheres* sp. which agrees in many respects with *Afropinnotheres ratnakara*. The two may be conspecific: Ref. Ng and Kumar, 2015)

Genus *Arcotheres* Manning, 1993

Arcotheres placunae (Hornell and Southwell, 1909)

Females live inside the mantle cavity of bivalve shells

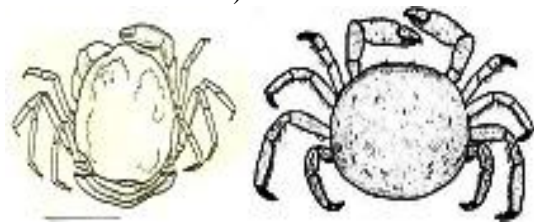
(Hashmi, 1963; Tirmizi and Ghani, 1996 as *Pinnotheres placunae*)



Arcotheres tivelae (Gordon, 1936) 10 mm.

Backwaters, Commensal. Host: *Tivela stefaninii*

(Moazzam and Rizvi, 1985 as *Pinnotheres tivelae*)

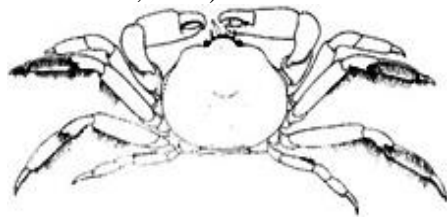


(After Moazzam and Rizvi, 1985)

Arcotheres aff. *alcocki* Rathbun, 1909

Commensal. Host: *Marcenaria*, Mantle cavity (Bivalvia)

(Kazmi *et al.*, 2016)



Arcotheres exiguus (Bürger, 1895)

Commensal. Host: *Mercenaria*, Mantle cavity (Bivalvia)

(Kazmi *et al.*, 2016 as *Arcotheres casta* (Antony and Kuttyamma)

Genus *Nepinnotheres* Manning, 1993

Nepinnotheres villosulus (Guérin-Meneville, 1831)

Commensal. Hosts: *Meretrix casta* var *ovum*, *Protapes cor*, *Amianlis umbonella*, *Gastrana multiantgula*, *Marcia marmorata*, *Tellinimectra angulata*, *Anadara antiquate* (Bivalvia)

(Jahangir *et al.*, 2015)



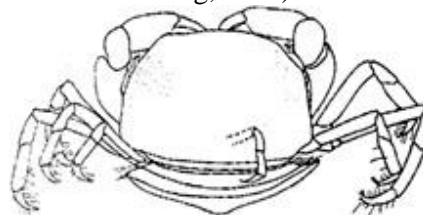
Male, female (After Jahangir *et al.*, 2015)

Genus *Sindheres* Kazmi and Manning, 2003

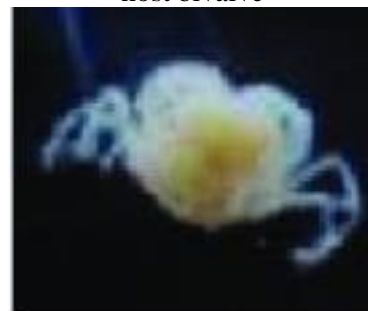
Sindheres karachiensis Kazmi and Manning, 2003 3.25x5 mm.

Females commensal. Host: *Gastrochaena* species indeterminate, mantle cavity (Bivalvia)

(Kazmi and Manning, 2003)



host bivalve



Genus *Pinnotheres* Bosc, 1801

Pinnotheres quadratus Rathbun, 1909

Parasitic. Host: *Marcenaria* (Bivalvia)

(Kazmi *et al.*, 2016)

Genus *Indopinnixa* Manning and Morton, 1987

Indopinnixa sipunculana Manning and Morton, 1987

Subtidal sediments
(Kazmi and Moazzam, 2012)



Family Xenophthalmidae Stimpson, 1859
Subfamily Xenophthalminae Stimpson, 1858

Genus *Xenophthalmus* White, 1846

Xenophthalmus wolffi Takeda and Miyake, 1970

Sandy-muddy bottom, eulittoral
(Ghani and Tirmizi, 1995b)



(After Ghani and Tirmizi, 1995)

Superfamily Ocypodoidea Rafinesque, 1815

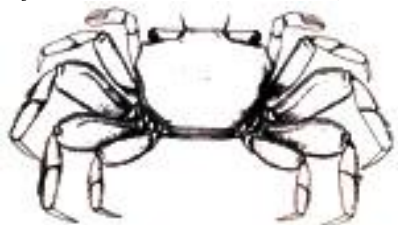
Family Camptandriidae Stimpson, 1858

Genus *Nasima* Manning, 1991

Nasima dotilliformis (Alcock, 1900) 5-8 mm x 7-11 mm.

Lives buried in the mud flats of mangroves

(Alcock, 1900 as *Cleistostoma dotilliforme*; Tirmizi *et al.*, 1986)



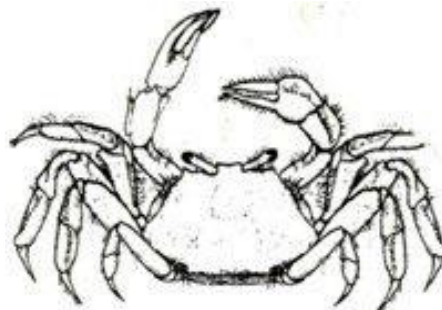
(After Alcock and McArdle, 1902)

Genus *Opusia* Ng, Rahayu and Naser, 2009

Opusia indica (Alcock, 1900) 4-4.8 mm x 4-6 mm.

Lives buried in the mud flats of mangroves

(Alcock, 1900 as *Tyloidiplax indica*; Tirmizi *et al.*, 1986 as *Serenella indica*)



Genus *Manningis* Al Khayat and Jones, 1996

Manningis arabicum (Jones and Clayton, 1983)

Intertidal

(Aziz *et al.*, 2015 Abstract; Saher *et al.*, 2017)

Family Ocypodidae Rafinesque, 1815

Subfamily Ocypodinae Rafinesque

Genus *Ocypode* Weber, 1795

Ocypode brevicornis H. Milne Edwards, 1837

Sandy beach

(Apel and Turkey, 1999)

Ocypode macocera H. Milne Edwards, 1852

Sandy beach

(Sakai and Turkey, 2013)

Ocypode rotundata Miers, 1882 46 x 39 mm.

Inhabitant of sandy beach lives in deep burrows

(Jackson, BMNH 1897; Alcock, 1900;

Yousuf, *et al.*, 2007 as *Ocypode*

gaudichaudii H. Milne Edwards and

Lucas and as *Ocypoda macLeayana*

Hess)



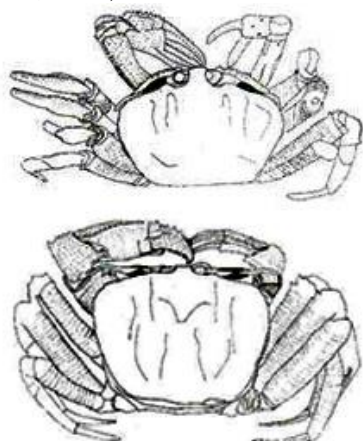
Ocypode cordimanus Latreille, 1818 30 mm.

Sandy beaches of the intertidal zone

(Hashmi, 1963; Tirmizi and Ghani, 1983)

Ocypode ceratophthalmus (Pallas, 1772)

Open sandy surf beaches, in holes
(Hashmi, 1963)



Ocypode kuhlii De Haan, 1835
Burrows in sand
(Hashmi, 1964)
Subfamily Gelasiminae Miers, 1886
Genus *Tubuca* Butt, 1973

Tubuca alcocki Shih, Chan and Ng, 2018
Soft bottom, mud or sand, in mangroves
and muddy shores, lives in large and deep
burrows
(Alcock, 1900 as *Tubuca urvillei* (H.
Milne Edwards; Tirmizi *et al.*, 1986 as
Tubuca urvillei)



Tubuca acuta (not of Stimpson, 1858)
Muddy flats
(Alcock, 1900 part)
Genus *Cranuca* Beinlich and von Hagen,
2006
Cranuca inversa (Hoffmann, 1874)
Mud
(Al-Hindi., 2019)
Genus *Gelasimus* Latreille, 1817
Gelasimus hesperiae (Crane, 1975)
Intertidal muddy and sandy muddy
shores
(Apel and Turkey, 1999)
Gelasimus vocans (Linnaeus, 1758)
Burrowing in muddy flats of river mouth

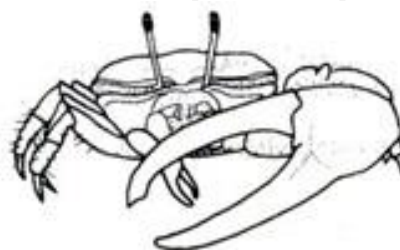
(Hashmi, 1963 as *Gelasimus marionis
nitidus*)



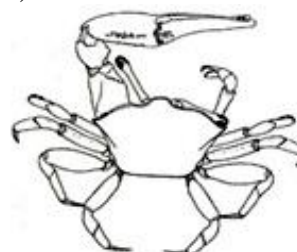
Genus *Austruca* Bott, 1973
Austruca lactea (de Haan, 1835)
Muddy flats near river mouth at low tidal
mark
(Alcock, 1900)



Austruca annulipes (H. Milne Edwards,
1837) 6-13x10-20 mm.
Inhabitant of mangroves and muddy
shores
(Alcock, 1900; Hashmi, 1963 as
Gelasimus annulipes,
Tirmizi *et al.*, as *Leptuca annulipes*)



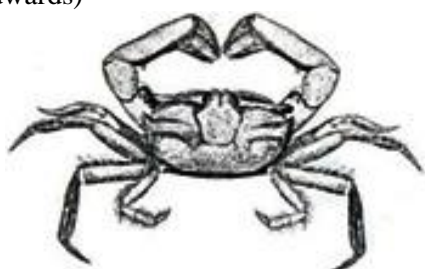
Austruca iranica Pretzmann, 1971
Benthic; brackish
(Tirmizi and Ghani, 1996 as *Uca
annulipes*; Saher *et al.*, 2015)
Austruca sindensis (Alcock, 1900)
Muddy flats
(Alcock, 1900 as *Gelasimus inversus* var.
sindensis)



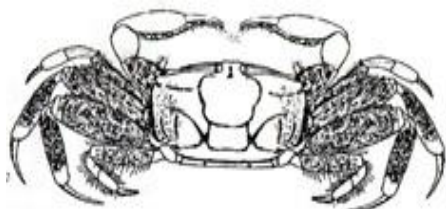
Family Macrophthalmidae Dana, 1851
 Subfamily Macrophthalminae Dana, 1852
 Genus *Macrophthalmus* Latreille, 1829
 Sub genus *Macrophthalmus* Desmarest, 1823

Macrophthalmus (Macrophthalmus) sulcatus H. Milne Edwards, 1852

Lives buried on the sandy shores (Hashmi, 1964; Tirmizi and Ghani, 1996 also as *Macrophthalmus (Macrophthalmus) grandidieri* A. Milne Edwards)

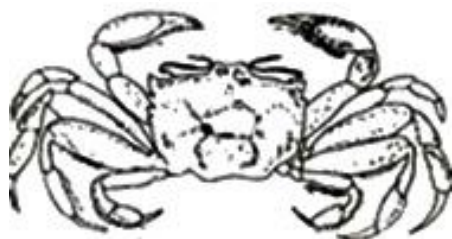


Subgenus *Mareotis* Barnes, 1967
Macrophthalmus (Mareotis) depressus Ruppell, 1830 4-11x6-17 mm.
 Lives buried in mud flats of mangroves (Hashmi, 1964; Tirmizi and Ghani, 1996)



Macrophthalmus (Mareotis) pacificus Dana, 1851
 Mud flats or sandy mud flats (Hashmi, 1964)

Macrophthalmus (Mareotis) crinitus Rathbun, 1913
 Mud flats (Hashmi, 1963)



Macrophthalmus (Mareotis) laevis A. Milne Edwards, 1867 14x3 mm.

Found buried in mud, mostly in mangroves (Tirmizi and Ghani, 1988b)



Genus *Venitus* Barnes, 1967
Venitus dentipes (Lucas, 1836)
 Found in mangrove swamps, or muddy/sandy shores, in burrows (Henderson, 1893; Tirmizi, 1981 as *Macrophthalmus (Venitus) pectinipes*)



Venitus latreillei (Desmarest, 1822)
 Lives buried in the mud of mangroves. (Hashmi, 1964 as *Macrophthalmus latreillei*)



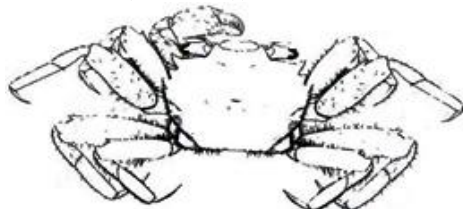
Genus *Chaenostoma* Stimpson, 1858
Chaenostoma sinuspersici (Naderloo and Türkay, 2011)
 In the mid intertidal zone of rocky shores found underneath stones covered with an algal mat at low tide (Tirmizi and Ghani, 1996 as *Macrophthalmus boscii*)



Subfamily Ilyograpsinae Stevcic, 2005

Genus *Ilyograpsus* Barnard, 1955

Ilyograpsus rhizophorae (Barnard, 1955)
8-9x7-9.5 mm.
Lives buried in the mud flats of mangroves
(Tirmizi *et al.*, 1985 as *Ilyograpsus paludicola* (Rathbun))



Family Dottillidae Stimpson, 1858
Genus *Scopimera* de Haan, 1835
Scopimera cabricauda Alcock, 1900
Lives buried in mud flats of mangrove areas
(Alcock, 1900)

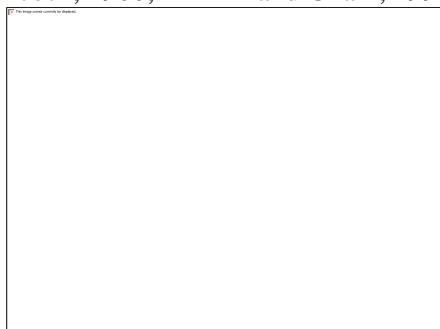


Animal and carapace

Dotilla sulcata (Forsk., 1775)
Intertidal zone of sheltered beaches at sand flats.
(Alcock, 1900 as *Dotilla affinis* Alcock; Kemp, 1919)

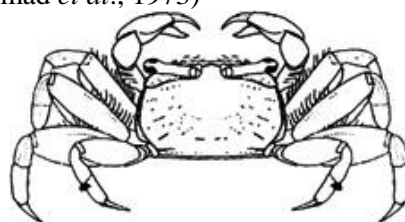


Genus *Dotilla* Stimpson, 1858
Dotilla blanfordi Alcock, 1900
Sandy ground, in burrows near low water mark
(Alcock, 1900; Tirmizi and Ghani, 1996)

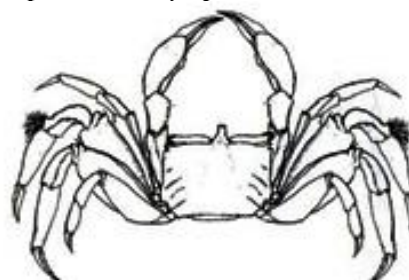


Dotilla myctiroides (H. Milne-Edwards, 1852) 14mm.
Sandy shores, backwaters
(Hashmi, 1963)

Genus *Ilyoplax* Stimpson, 1858
Ilyoplax frater (Kemp, 1919)
Lives in burrows of mud in mangroves exposed at low water
(Kemp, 1919 as *Tympanomerus frater*; Ahmad *et al.*, 1973)



Ilyoplax stevensi (Kemp, 1919)
Brackish and freshwater
(Kemp, 1919 as *Tympanomerus stevensi*)



Superfamily Grapsoidea MacLeay, 1838

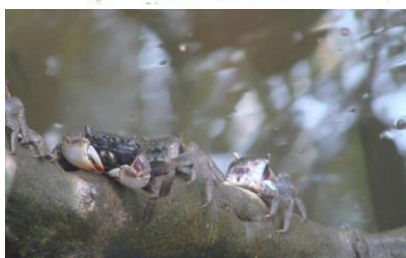
Family Grapsidae MacLeay, 1838
 Genus *Grapsus* Lamarck, 1818
Grapsus albolineatus Latreille in
 Milbert, 1812
 Rocky shore, in cervices
 (Alcock, 1900, Tirmizi and Ghani, 1996
 as *Grapsus strigosus*)



Genus *Metopograpsus* H. Milne-
 Edwards, 1853
Metopograpsus thukuhar (Owen, 1839)
 9.524 mm x 7-19.5 mm.
 Found under decaying wood of
 mangroves, or on rocky shore, usually
 near high tidal mark
 (Tirmizi *et al.*, 1985)



Metopograpsus messor (Forsk., 1775)
 19x24 mm.
 Associated with hard substrates, rocks
 intertidal zone, sometimes in mangroves
 (Alcock, 1900)



Animals on trunk of mangrove

Metopograpsus latifrons (White, 1847)
 On muddy flats of mangroves swamps
 (Hashmi, 1963 as *Metopograpsus
 maculates*)



Genus *Planes* Bowdich, 1825
Planes minutus (Linnaeus, 1758) 13x3.5
 mm. may be albino
 Clinging to jelly fishes, turtles, and bouys
 or pumice stones
 (Tirmizi *et al.*, 1982; as *P. cyaneus* Dana
 1851)



Family Plagusiidae Dana, 1851
 Subfamily Plagusiinae Dana, 1851
 Genus *Plagusia* Latreille, 1804
Plagusia squamosa (Herbst, 1790)
 Under stones or in crevices on rocky
 shores. Common on floating wreckage
 (Hashmi, 1964 as *Plagusia depressa
 tuberculata*; Tirmizi and Ghani, 1996 as
Plagusia tuberculata Ref. to change:
 Schubart and Ng, 2000)



Covered with acorn barnacles (left
 picture)



(Picture courtesy Kamran Sheikh)

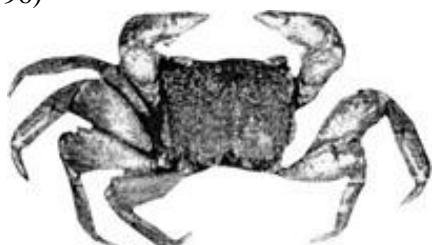
Family Sesarmidae Dana, 1851
 Genus *Parasesarma* De Man, 1895
Parasesarma persicum Naderloo and
 Schubart, 2010 6-19x8-24 mm.
 Mangrove area, lives in burrows

(Hashmi, 1964 as *Sesarma* (*Sesarma*) *quadrata*, Tirmizi *et al.*, 1986 as *Parasesarma plicatum* (Latreille))



Genus *Episesarma* De Man, 1895
Episesarma versicolor (Tweedie, 1940)
26-39x29-42 mm.

Lives in deep holes, sometimes seen climbing on the mangroves trees (Tirmizi *et al.*, 1986; Tirmizi and Ghani, 1996)



Episesarma mederi (H. Milne Edwards, 1854)

Muddy flats between low and high tide marks

(Hashmi, 1964 as *Sesarma* (*Sesarma*) *taeniolata*)



Genus *Neosarmatium* Serene and Soh, 1970

Neosarmatium smithi (H. Milne Edwards, 1853)

Muddy flats along the seashore (Hashmi, 1964 as *Sesarma* (*Sesarma*) *aclanica* (misspelled) for *S.* (*S.*) *oceanica*)

Genus *Clistoecoloma* A. Milne-Edwards, 1873

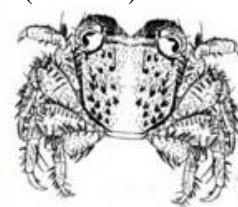
Clistoecoloma lanatum (Alcock, 1900)
7-10x8-11mm.

Lives buried in mud flats mostly in mangroves (Tirmizi *et al.*, 1986 as *Sesarma lanatum*)



Genus *Nanosesarma* Tweedie, 1950
Nanosesarma sari Naderloo and Türkay, 2009 4 x 5mm.

Muddy flats, understones (Hashmi, 1964; Tirmizi *et al.*, 1986 as *Nanosesarma minutum* (De Man))



Nanosesarma pontianacense (de Man, 1895)

4x4.5 mm.

Muddy mangrove flats in brackish water (Tirmizi *et al.*, 1985)

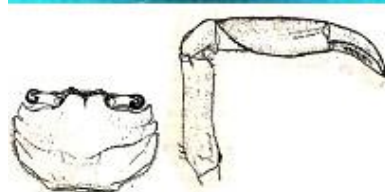
Family Varunidae Millne Edwards, 1853
Subfamily Cyclograpsinae H. Millne Edwards, 1853

Genus *Metaplax* H. Milne Edwards, 1852

Metaplax indica H. Milne Edwards, 1852 9.5x13 mm.

Body colour grey legs mottled indigo
Inhabitant of mangroves delta, lives buried in the mud

(Alcock, 1900; Tirmizi *et al.*, 1982)



Carapace and cheliped (After Tirmizi *et al.*, 1982)

Metaplex distincta H. Milne-Edwards, 1852 6-15 x 8-22mm.
Lives buried in the mud flats mostly in the mangroves
(Hashmi, 1963)



Subfamily Varuninae H. Milne Edwards, 1853

Genus *Varuna* H. Milne Edwards, 1830
Varuna litterata (Fabricius, 1798)

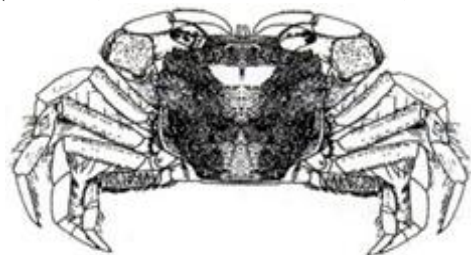
Estuaries, even into fresh water and also found at sea on floating timber
(Hashmi, 1964)



Genus *Pseudograpsus* H. Milne-Edwards, 1837

Pseudograpsus intermedius Chhapgar, 1955

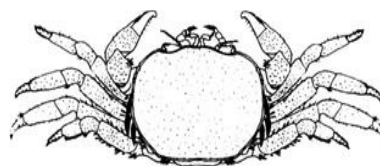
Lives buried in mud flats
(Hashmi, 1964; Tirmizi and Ghani, 1996)



Subfamily Gaeticinae Davie and Ng., 2007

Genus *Sestrostoma* Davie and Ng., 2007
Sestrostoma balssi (Shen, 1932) 5x6 mm. uniformly pale buff

Lives inside the burrows of *Upogebia* by attaching itself upside down on the bases of thoracic appendages
(Ghani and Tirmizi, 1991a as *Acmaeopleura balssi*; Itan *et al.*, 2002)



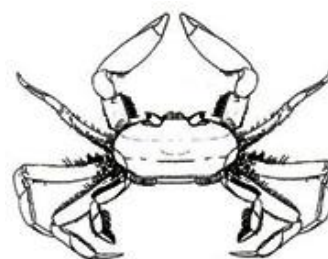
Female (After Ghani and Tirmizi, 1991)

Genus *Gopkittisak* Naruse and Clark, 2009

Gopkittisak gallardoi (Serene and Soh, 1976) 5x9.5 mm.

Lives in deep burrows on sandy part of the rocky beaches

(Ghani and Tirmizi, 1991b as *Asthenognathus gallardoi* Serene and Soh. Ref to change Ng *et al.*, 2008; Naruse and Clark, 2009)



(After Ghani and Tirmizi, 1991)

Family Gecarcinidae Rathbun, 1904

Genus *Cardisoma* Latreille, 1828

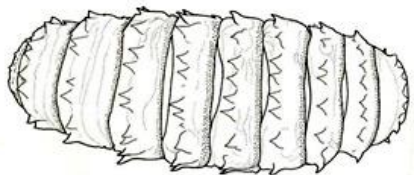
Cardisoma carnifex (Herbst, 1794).

Dorsal surface of carapace purple with a close and fine reticulation of yellowish-green which gradually disappears towards the sides, densest in the central part of the cardiac region; hepatic regions and the sides of the carapace lilac. Ventrally cream-coloured, epistome tinged with purple; chelipeds cream-coloured, deepening to yellow on palm and fixed finger and suffused on the dorsal surface of the merus and carpus with purple; extreme tips of the fingers brown.; basal joints of walking legs yellowish; the merus, carpus and propodus deeply tinged with purple and bear dark brownhairs; dactylus orange yellow.

In holes in mangrove swamps or mud flats near river mouth. In the vicinity of fresh saline water or wet mud and sand like ontidal mudflats. In soft soils it digs well-defined burrows; occupies the landward fringe of the mangroves and well adapted to terrestrial habitat
(Kazmi and Perveen, 2005)



Pupa of some unknown insect
Mangrove flats
(Present study)



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Chapter 19

Phylum Echinodermata

The phylum Echinodermata is an extremely large, well-known phylum containing many familiar organisms, including starfish, sea urchins, and sand dollars. All echinoderms live in the ocean. They can be found in every ocean living on the ocean floor, whether 1000 feet below ocean level or 2 feet below ocean level. There are approximately 7000 living species in six classes.

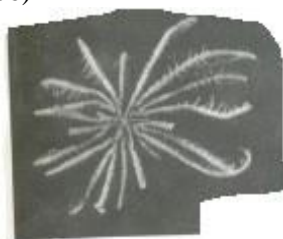
Phylum Echinodermata Klein, 1734
 Subphylum Pelmatozoa Bather, 1900
 Class Crinoidea Miller, 1821
 Subclass Articulata Zittel, 1879
 Order Comatulida Clark, 1908

Family Thalassometridae A.H. Clark, 1908

Genus *Thalassometra* A.H. Clark, 1907
Thalassometra attenuata A.H. Clark, 1909
 At 797-1,398 m. depth
 (Clark, 1909)

Family Comasteridae Clark, 1908

Genus *Comanthus* Clark, 1908
Comanthus parvicirrus (Müller, 1841)
 Benthic 0-28 m., inshore. Sandy beach
 (Clark, 1937; Hoque's, 1970 records of *C. parvicirrus* need confirmation in the light of the revisionary changes made by Rowe et al, 1986)



Comanthus wahlbergii (Müller, 1843)
 Sandy, rocky pools
 (Hoque, 1969 as *Comanthus samoanus* Clark)



(Photo courtesy: Moazzam)
 Family Comatulidae Fleming, 1828

Genus *Comaster* L. Agassiz, 1836
 ?*Comaster schlegelii* (Carpenter, 1881)
 colour very variable, at some places plain golden yellow, pale brown or black and at other place being multicoloured, often green with bands of orange, white and black on the arms and pinnules
 Conceals in a crevice and the only visible part is its array of arms, especially when it is young.
 (Present study).



Family Clobometridae A.H. Clark, 1909

Genus *Decametra* Clark, 1911
Decametra mollis (Clark, 1912)
 Littoral
 (Clark and Rowe, 1971)
Cyllometra manca (Carpenter, 1888)
 Depth range 22 (?15)-329 (?731) m
 (NMNH)

Family Mariametridae A.H. Clark, 1909

Genus *Lamprometra* Clark, 1913
Lamprometra palmata (Müller, 1841)
 Benthic, inshore, continental shelf. Depth range: 0-51m.
 (Clark, 1929)



(Picture via Google)

Family Himerometridae Clark, 1907

Genus *Heterometra* A.H. Clark, 1909
Heterometra africana (Clark, 1911)
 Shoreline to 88 m. depth
 (Clark and Rowe, 1971)
 Order Isocrinida Sieverts-Doreck, 1952
 Sub order Isocrinina Sieverts-Doreck, 1952
 Family Cainocrinidae Simms, 1988

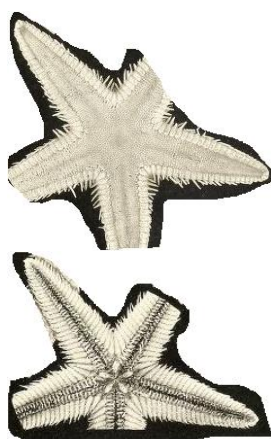
Genus *Teliocrinus* Döderlein, 1912
Teliocrinus springeri Clark, 1909
 On hard substratum. Oxygen gradient zone
 (Murty *et al.*, 2009 as *Hypalocrinus springeri*)
 Subphylum Asterozoa Von Zittel, 1895
 Class Asterozoa de Blainville, 1830
 Order Valvatida Perrier, 1884

Family Acanthasteridae Sladen, 1889
 Genus *Acanthaster* Gervasis, 1841
Acanthaster planci (Linnaeus, 1758)
 Dia 1 meter.
 Parasitic on corals
 (Clark and Rowe, 1971)
 Order Paxillosida Perrier, 1884

Family Astropectinidae Grey, 1840
 Genus *Astropecten* Gray, 1840
Astropecten indicus Döderlein, 1889
 white or grey in colour, sometimes with black patches on the upper side
 Lives in the sandy shore areas, or on dead corals, from shore-line to 25 m.
 (Hoque, 1969)



(After Tahera, 1998, 2007)



(After Koehler, 1910)

Astropecten andersoni Sladen, 1888
 10cm.
 Rocky beach, 8-13 m. depth, inhabits the upper level of sand and mud in protected lagoons
 (Ahmed *et al.*, 1982)



(Photo after Koehler, 1910)

Astropecten polyacanthus Muller and Troschel, 1842 20 mm. Colour in life grayish brown with dark markings on the arms.
 Lives buried in inshore coastal estuaries and harbours up to 40 m depth
 (Steiner, 1975 unpublished; Tahera, 2006)



Astropecten euryacanthus Lutken, 1871
 Estuarine, in sand or silt
 (Koehler, 1910 as *Astropecten nobilis*)



Family Luidiidae Verril, 1899
 Genus *Luidia* Forbes, 1839
Luidia maculata Muller and Troschel, 1842
 Sandy up to the depth of 33 meters
 (Hoque, 1969)



(After Tahera and Kazmi, 2005)

Luidia avicularia Fisher, 1913
Benthic; depth range 9 - 275 m.
(Moazzam and Moazzam, 2018)



(After Moazzam and Moazzam, 2018)

Genus *Pentaceraster* Döderlein, 1916
Pentaceraster regulus (Müller and Troschel, 1842)

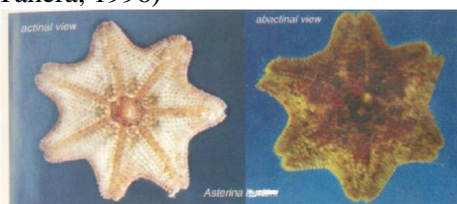
Benthic, continental shelf, inshore
(Moazzam and Moazzam, 2018)



(After Moazzam and Moazzam, 2018)

Order Spinulosida Perrier, 1884
Suborder Leptognathina Spencer and Wright, 1966

Family Asterinidae Gray, 1840
Genus *Aquilonastra* O'Loughlin in O'Loughlin and Waters, 2004
Aquilonastra burtoni (Gray, 1840)
Littoral, epizoic, may be found under stone and deep sea
(Tahera, 1996)



(After Tahera, 1996)



(After Tahera, 2007)

Aquilonastra iranica (Mortensen, 1940)
Grayish, with reddish or bluish-gray spots; oral side lighter, uniformly coloured

Soft and hard substrate
(1977, NMV F112182 (1); F112183 (2); O'Loughlin and Rowe, 2006)

Aquilonastra lorioli (Koehler, 1910)
Abactinal colour variably mottled with grey-brown, green-brown, yellow-brown, red-brown.

Littoral
(Koehler, 1910; BMNH 1960.10.4.11-16; 1967.11.1.4; Hoque, 1969; Ahmed *et al.*, 1982 as *Asterina lorioli*)



(After Tahera, 1996, 2007)
Suborder Granulosina Perrier, 1894

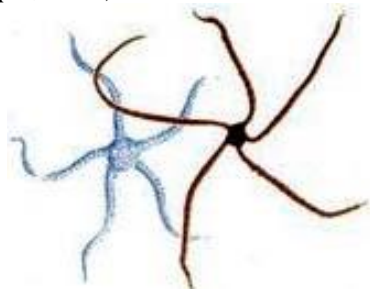
Family Oreasteridae Fisher, 1911
Genus *Anthenea* Gray, 1840
Anthenea rudis Koehler, 1910
Shallow water on sandy beds, attached to rock in intertidal zone
(Hoque, 1969)

Family Ophidiasteridae Verrill, 1867
 Genus *Linckia* Nardo, 1834
Linckia multifora (Lamarck, 1816)
 diameter of 2 to 5 inches (5 to 13 cm). Background blue-green with deep blue markings, deep fawn with brown markings or pale fawn with purple markings, always paler ad-orally
 Coral reef and sub tidal sand 3-5 meters depths
 (Clark and Rowe, 1971)
 Class Ophiuroidea Gray, 1840
 Order Ophiurida Muller and Troschel, 1840

Family Amphiuridae Ljungman, 1867
 Genus *Amphipholis* Verrill, 1899
Amphipholis squamata (Delle Chiaje, 1828)
 Mud under stone, grass bed and sub tidal sand depth range 10 m down to 1300m depth
 (James, 1989; Tahera and Kazmi, 2003)



Genus *Amphiura* Forbes, 1843
 Subgenus *Ophiopeltis* Düben and Koren, 1846
Amphiura (Ophiopeltis) tenuis (Clark, 1938)
 Shallow water, buried in sand or mud of soft substrate
 (Hoque, 1969)



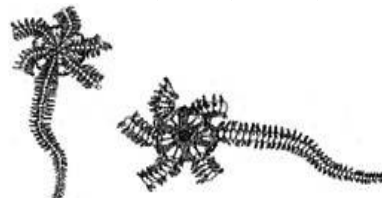
Genus *Amphiodia* Verrill, 1899
Amphiodia occidentalis (Lyman 1860)
 Benthic continuous rock, sand/mud
 (Beatty Museum Databases Wet Marine Invertebrate Results)

Family Ophiochitonidae Matsumoto, 1915
 Genus *Ophiochiton* Lyman, 1878
Ophiochiton ambulator Koehler, 1897
 At 1628 m depth
 (Koehler, 1897)



Family Ophiuridae Müller and Troschel, 1840
 Genus *Ophiuroglypha* Hertz, 1927
Ophiuroglypha euryplax (H.L. Clark, 1939)
 At 940 m depth
 (Jeffereys *et al.*, 2009 as *Ophiura (Ophiuroglypha) euryplax*)
Ophiuroglypha kinbergi (Ljungman, 1866) uniformly grayish
 Eulittoral and deeper in coral rubble and other coarse substrates
 (Clarke and Row, 1971 as *Ophiura kinbergi*)

Family Ophiactidae Matsumoto, 1915
 Genus *Ophiactis* Lutken, 1856
Ophiactis savignyi (Muller and Troschel, 1842)
 Intertidal, found in shallow water epizoic on gorgonian, collected among weeds and crevices of rocks.
 (Clark and Rowe, 1971; James, 1989)



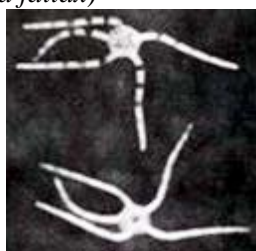
(After Tahera and Naushaba, 1995)

Ophiactis modesta Brock, 1888 green – bluish, a pair of white spots near the distal margin of each dorsal arm plate
 A depth range of 0–22 m.
 (Clark and Rowe, 1971)

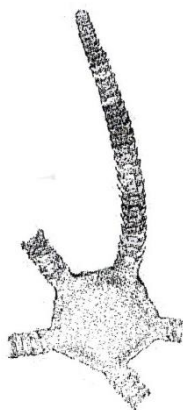
Family Ophiopyrgidae Perrier, 1893
 Genus *Ophiuroglypha* Hertz, 1927

Ophiuroglypha. kinbergi (Ljungman, 1866)
Sand and sea grass beds
(Olbers, 2016)

Family Ophiodermatidae Ljungman, 1867
Genus *Ophiopeza* Peters, 1851
Ophiopeza spinosa (Ljungman, 1867)
Shallow water, hiding under rock or buried in sandy muddy bottom
(Hoque, 1969; Tahera, 1996 as *Ophiopeza fallax*)



Ophiopeza fallax arabica A.M. Clark, 1968
Intertidal
(Tahera, 1996)



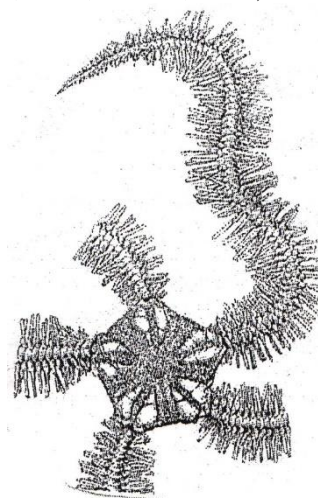
Genus *Ophioderma* Muller and Truschel, 1840

Ophioderma longicauda (Bruzelius, 1905) 300x200 mm.
(Ali, 2006)

Genus *Ophiorachnella* Ljungman, 1872
Ophiorachnella gorgonia Muller and Truschel, 1842
Coral communities, sandy bottoms and sea grass beds
(Ali, 2006)

Family Ophiotricidae Ljungman, 1866
Genus *Macrophiothrix* H.L. Clark, 1938
Macrophiothrix aspidota (Muller and Troschel, 1842)

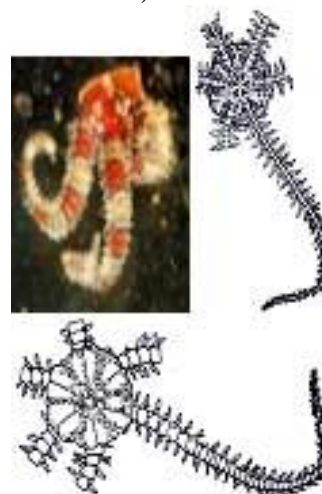
In tide pools under small rocks or in mud under stone
(Hoque, 1969, Tahera, 1996)



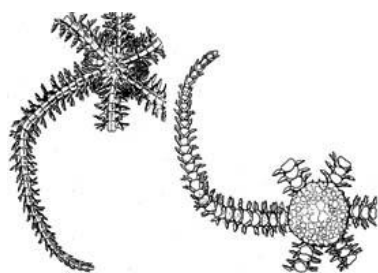
Genus *Ophiothrix* Clark, 1936
Ophiothrix nereidina (Lamarck, 1816) with a colour pattern of bright blue, narrow lines across each dorsal arm plate 25 cm.

Lives in association with other invertebrates
(Ali, 2006)

Genus *Ophiothela* Verrill, 1855
Ophiothela danae Verrill, 1869
Ecosymbiotic. Associated with gorgonians, macro-algae, Millepora species and sponges
(Tahera and Naushaba, 1995; Tahera, 2001 as *Ophiothela hadra* Clark, also as *Ophiothela verill*, given figure as *Ophiothela danae*)



Ophiothela venusta (de Loriol, 1900)
Epizoic species attached to gorgonians
(Tahera, 1996)



(After Tahera and Naushaba, 1995)

***Ophiothela* sp.**

Trawled, unpublished collection
(Steiner, 1973)

Family Ophiuridae Lyman, 1865

Genus *Ophioplocus* Lyman, 1861

Ophioplocus imbricatus (Muller and Troschel, 1842)

Intertidal zone

(Hoque, 1969; Clark and Rowe, 1971)



(After Tahera, 1996)



(After Tahera, 2007)

Family Ophionereididae (Ljungman, 1867)

Genus *Ophioneries* Lutken, 1859

Ophioneries dubia dubia (Muller and Troschel, 1842) pale yellow or greyish yellow green with reddish or dark brown reticulation on dorsal disc, arms banded dorsally only, reddish purple, brown or yellow.

Littoral, sand, shell, white mud, coral rubble and rock

(Hoque, 1969)



(After Tahera, 1996)

Order Euryalida Lamarck, 1816

Family Gorgonocephalidae Ljungman, 1867

Genus *Astroboa* Döderlein, 1911

Astroboa nuda (Lyman, 1874)

Lives on gorgonia

(Ali, 2006)

Class Echinoidea Leske, 1778

Subclass Echinoidea Bronn, 1860

Order Camarodonta Jackson, 1912

Family Echinometridae Gray, 1855

Genus *Echinometra* Gray, 1825

Echinometra mathaei (de Blainville, 1825) usually black, gray, dark purple or dark red

Intertidal, inhabits shallow burrows of the intertidal zone

(Hoque, 1969; Tahera, 1996)



Genus *Echinostrephus* Agassiz, 1863

Echinostrephus molaris (de Blainville, 1825)

Littoral rock boring

(Hoque, 1969; Munir and Almas, 2008)



Family Phormosomatidae Mortensen, 1934

Genus *Phormosoma* Thomson, 1872

Phormosoma placenta Thomson, 1872
At 940-1200 m., seldom being found at depths less than 500 m
(Jeffreys *et al.*, 2009)

Family Toxopneustidae Troschel, 1872
Genus *Toxopneustes* L. Agassiz, 1841
Toxopneustes pileolus (Lamarck, 1816)
Sub tidal
(Ali, 2006)



(After Moazzam and Moazzam, 2018)

Genus *Tripneustes* L. Agassiz, 1841
Tripneustes gratilla (Linnaeus, 1758)
white, surface dark brown in ambulacral and interambulacral areas except along rows of tube feet where it appears mid brown. Benthic, inshore, continental shelf, algae
(Moazzam and Moazzam, 2018)



(After Moazzam and Moazzam, 2018)
Order Diadematoida Duncan, 1889

Family Diadematidae Gray, 1855
Genus *Diadema* Gray, 1825
Diadema setosum (Leske, 1778) black, red ring around anus and white spot over each genital pore
Commonly associated with coral reefs, also found on sand flats and in sea grass beds.
(Sea LifeBase)
Genus *Echinothrix* Peters, 1853
Echinothrix calamaris (Pallas, 1774) 5 cm. On reefs, in crevices
(Ali, 2006)
Order Stomopneustoida Kroh and Smith, 2010

Family Stomopneustidae Mortensen, 1903
Genus *Stomopneustes* L. Agassiz, 1841
Stomopneustes variolaris (Lamarck, 1816)
Lives in deep burrows in rocks
(Hoque, 1969)



Order Cidaroida Claus, 1880

Family Cidaridae Gray, 1825
Genus *Prionocidaris* A. Agassiz, 1863
Prionocidaris baculosa (Lamarck, 1816)
Brown, dark purple spines, the denuded test dark purple or brown apical plates and ambulacra, irregularly banded, collar always with purple spots
Mostly in sub tidal waters, sandy, coral reef and rocky bed at greater depths
(Clark, 1925; Clark and Rowe, 1971)



(Left Photo courtesy Moazzam)
Order Temnopleuroidea Roh and Smith, 2010

Family Temnopleuridae Agassiz, 1872
Genus *Temnopleurus* Agassiz, 1841
Temnopleurus toreumaticus (Leske, 1778)
Crevices of rock or mud under stone, algae, sub tidal sand, sub tidal mud, rock tidal flat and mixed rock and sand tidal flat at 0-5m. depth
(Hoque, 1969)



Genus *Salmacis* L. Agassiz, 1841
Salmacis bicolor L. Agassiz, 1846
Shallow water
(Clark and Rowe, 1971; Gul, 2017)



(Photo courtesy: Moazzam)

Infraclass Irregularia Latreille, 1825
Order Echinolampadoida Kroh and Smith, 2010

Family Echinolampadidae Gray, 1851
Genus *Echinolampas* Gray, 1825
Echinolampas alexandri de Loriol, 1876
Benthic
(Ghiold, 1989)



Order Spatangoida L. Agassiz, 1840

Family Brissidae Gray, 1855
Genus *Brissopsis* L. Agassiz, 1840
Brissopsis luzonica (Gray, 1851)
Depth range 10-1000 (? 2000) m.
(Clark and Rowe, 1971)
Order Clypeasteroida A. Agassiz, 1872
Suborder Clypeasterina von Zittel, 1879

Family Clypeasteridae L. Agassiz, 1835
Genus *Arachnoides* Leske, 1778
Arachnoides placenta (Linnaeus, 1758)
Body diameter 6-8cm. colours may range from deep reddish-purple, to brownish-purple or beige.
Sandy and muddy shore at low tide mark
(Hoque, 1969)
Genus *Clypeaster* Lamarck, 1801
Clypeaster humilis (Leske, 1778)
From sub tidal sandy or clay beds, sandy bays and sandy tidal zone at depths of 0-5m
(Clark and Rowe, 1971)



(Photo courtesy: Moazzam)

Clypeaster rarispinus de Meijere, 1903
Buried in sandy or muddy shore
(Hoque, 1969)



Clypeaster reticulatus (Linnaeus, 1758)
Benthic
(Clark and Rowe, 1971)



Sub Order Scutellina Haeckel, 1896

Family Astriclypeidae Stefanini, 1912
Genus *Sculpsitechinus* Stara and Sancier, 2014
Sculpsitechinus auritus (Leske, 1778)
Brown
Shallow water in sub tidal, sandy, substrates sea grass beds, sandy tidal flat of 0-5m.
(Clark and Rowe, 1971 as *Echinodiscus auritus*)
Genus *Echinodiscus* Leske, 1778
Echinodiscus bisperforatus Leske, 1778
Benthic; depth range 3 - 20 m.
(Clark and Rowe, 1971)



(Picture after Pourvali, 2015)

Echinodiscus auritus Leske, 1778

Dredged from depth of 5-10m.
(Clark and Rowe, 1971)



(Picture after Pourvali, 2015)

Class Holothuroidea de Blainville, 1834)
Order Dendrochirotida Grube, 1840

Family Cucumariidae Ludwig, 1894

Genus *Aslia* Rowe, 1870

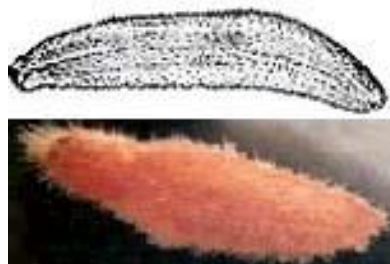
Aslia forbesi (Bell, 1886)

Lives attached on rock or crevices
(Koehler and Vaney, 1908 as *Cucumaria forbesi*)



(After Tahera, 2007)

Genus *Staurothyone* H.L. Clark, 1938
Staurothyone rosacea (Semper, 1869)
Attached to rocks
(Hoque, 1969)



(After Tahera, 2004)

Genus *Actinocucumis* Ludwig, 1875
Actinocucumis typicus Ludwig, 1875
Lives under the sponge in dead coral at 3 meter depth
(Mary Bai, 1980)

Family Phylloporidae Östergren, 1907
Genus *Stolus* Selenka, 1867
Stolus buccalis (Stimpson, 1855)
Found in stones attached to rocks
(Hoque, 1969)



(After Tahera, 2004)

Stolus conjungens (Semper, 1867)
Lives under the sand beach at 3 meter depth
(Mary Bai, 1980; Tahera, 2004 as *Cucumaria conjungens* (Semper)



(After Tahera, 2004)

Genus *Thyone* Jaeger, 1833
Thyone dura Koehler and Vaney, 1908
Benthic
(Koehler and Vaney, 1908; Clark and Rowe, 1971)
Genus *Hemithyone* Pawson, 1967
Hemithyone semperi (Bell, 1884)
Benthic in reef at 0-13 m.
(Koehler and Vaney, 1908 as *Cucumaria pigra*; Clark and Rowe, 1971)
Genus *Thyonina* Thandar, 1990
Thyonina rasidae Thandar, 2017
Intertidal
(NHMUK 1883.4.19.7; Thandar, 2017)



(After Thandar, 2017)

Family Sclerodactylidae Panning, 1949
Genus *Ohshimella* Heding and Panning, 1954
Ohshimella ehrenbergii (Selenka, 1868)
Crevices in the rocky bottom in the intertidal area during low tide

(Clark and Rowe, 1971)
 Genus *Cladolabes* Brandt, 1835
Cladolabes aciculus (Semper, 1867)
 Benthic

(Clark and Rowe, 1971)
 Order Aspidochirotida Grube, 1840

Family Synallactidae Ludwig, 1894
 Genus *Benthothuria* Perrier R., 1898
Benthothuria cristata Koehler and Vaney, 1905
 At 1827-1839 m. oxygen minimum zone
 (Jeffreys *et al.*, 2009)

Family Stichopodidae Haeckel, 1896
 Genus *Stichopus* Brandt, 1835
Stichopus horrens Selenka, 1867
 Reef Associated. 0-15 m. depth
 (Ali, 2006)
Stichopus hermanni Semper, 1868
 Offshore, benthic
 (Moazzam and Moazzam, 2020)



(After Moazzam and Moazzam, 2020)

Family Holothuriidae Ludwig, 1894
 Genus *Actinopyga* Bronn, 1860
Actinopyga mauritiana (Quoy and Gaimard, 1833)
 Intertidal area, hiding under small rocks
 and coral stones where the surf breaks
 (Hoque, 1969)



Genus *Holothuria* Linnaeus, 1767
 Subgenus *Holothuria* (*Semperothuria*)
 Deichmann, 1958
Holothuria (*Semperothuria*) *cinerascens*
 (Brandt, 1835)
 Benthic, lives inshore 30 m.
 (Ahmed *et al.*, 2016)



Subgenus *Holothuria* (*Halodeima*)
 Pearson, 1914
Holothuria (*Halodeima*) *atra* Jaegar,
 1933
 Buried in sand
 (Tahera, 1996)



Sub genus *Holothuria* (*Lessonothuria*)
 Deichmann, 1958
Holothuria (*Lessonothuria*) *pardalis*
 Selenka, 1867 Grey-brown to green-
 brown uniform or with variable brown
 bands or with a series of 8-10 pairs of
 brown blotches along the back or with
 many black spots.
 Intertidal zone, under rock, benthic,
 inshore in crevice between boulders, no
 sand
 (Clark and Rowe, 1971; Tahera, 1996)



Holothuria (*Lessonothuria*) *verrucosa*
 Selenka, 1867
 Littoral
 (Tahera and Kazmi, 2005, fig. Ref
 Ahmed *et al.*, 2016)

Holothuria (*Lessonothuria*) *insignis*
 Ludwig, 1875
 Attached to a rock in the intertidal zone,
 inhabits the lower midlittoral zone on rock
 and sand substrate, living under boulders
 or hides in sand in shallow waters
 (Ahmed *et al.*, 2020)

Holothuria (*Lessonothuria*) *lineata*
 Ludwig, 1875
 Intertidal, found under a rock on sand in
 the
 (Ahmed *et al.*, 2020)
 Subgenus *Mertensiothuria* Deichmann,
 1958

Holothuria (Mertensiothuria)

leucospilota (Brandt, 1835) Charcoal grey or reddish-black with pale grey tube feet on the underside
From tidal pools, under small stones (Clark and Rowe, 1971; Tahera, 1996)



Subgenus *Platyperona* Rowe, 1969

Holothuria (Platyperona) difficilis Semper, 1868 26-100 mm. Bright green with black spots to dark yellow-brown with yellow tentacles
Attached to green sea weed on rock (Tahera and Kazmi, 1995)



Habitus and anterior part

Subgenus *Holothuria (Thymiosycia)* Pearson, 1914

Holothuria (Thymiosycia) arenicola Semper, 1868 grayish cream or orange brown with 8-10 dark brown blotches dorsally
Buried in sub tidal sand below rocks (Tahera and Tirmizi, 1995)



(After Tahera and Tirmizi, 1995)

Subgenus *Holothuria (Semperothuria)* Deichmann, 1958

Holothuria (Semperothuria) flavomaculata Semper, 1868
In shallow waters, benthic; depth range 2 - 21 m
(Clark and Rowe, 1971 as *Halodeima flavomaculata* Semper)



(Picture courtesy F. Michonneau 2021, In Wikipedia.

<https://en.wikipedia.org/wiki/Holothuria>
Subgenus *Theelothuria* Deichmann, 1958

Holothuria (Theelothuria) hamata

Pearson, 1913
Offshore waters on the continental shelf (Moazzam and Moazzam, 2020)



(After Moazzam and Moazzam, 2020)

Holothuria (Theelothuria) notabilis Ludwig, 1875

Coastal, found exposed or buried in sea-grass flats (Ahmed and Ali, 2020)

Genus *Bohadschia* Jaeger, 1833

Bohadschia argus Jaeger, 1833

Found on reefs and in exposed areas (Ali, 2006)

Bohadschia marmorata Jaegar, 1833
35cm.

Exposed on dead coral bed covered with green algae

(Mukhopadhyay and Samanta, 1983)



Family Mesothuriidae Smirnov, 2012

Genus *Zygothuria* Perrier R., 1898

Zygothuria lactea (Théel, 1886)

Deep sea in oxygen gradient area (Murty *et al.*, 2009 as *Mesothurla* aff. *lactea*)

Zygothuria* aff. *abbreviata Koehler and Vaney, 1905

Deep sea in oxygen gradient area (Murty *et al.*, 2009 as *Mesothuria* aff. *abbreviata*)

Order Apodida Brandt, 1835

Family Synaptidae Burmeister, 1837

Genus *Leptosynapta* Verrill, 1867

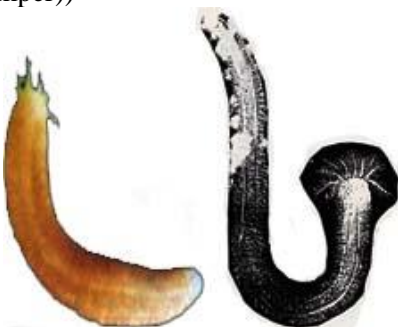
Leptosynapta inhaerens (Müller, 1776)

Between tides on wet sand, up to 100 fathoms

(Hoque, 1969 as *Synapta inhaerens*; *L. inhaerens* Asiatic populations in fact a different species cf. Massin *et al.*, 2014)



Genus *Synaptula* Orsted, 1849
Synaptula hydriformis (Lesueur, 1824)
 Colour highly variable ranging from bright reddish to deep brownish-purple. Exposed on flats, reef and sea grass bed, down to 20 meters depth, under rocks with sponges
 (Tahera and Naushaba, 1995; Moazzam and Moazzam, 2020 as *Synaptula recta* (Semper))



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Phylum Chaetognatha

Phylum Chaetognatha belongs to an exclusively marine phylum commonly known as arrow worms. There are around 100 species in the phylum. They are mostly holoplanktonic but there are a few benthic forms. The head bears 1 or 2 rows of sharp spines. The transparent body bears one or two pairs of lateral fins and the tail bears a caudal fin.

Phylum Chaetognatha (Leuckart, 1854)
Hyman, 1959
Class Sagittoidea Claus and Grobben, 1905
Order Apharagmophora Tokioka, 1965

Family Sagittidae Claus and Grobben, 1905
Genus *Zonosagitta* Tokioka, 1965
Zonosagitta bedoti (Beraneck, 1895)
Pelagic, neritic
(Haq and Khan, 1973 as *Sagitta bedoti* Beraneck)



Zonosagitta pulchra (Doncaster, 1902)
Neritic, surface water
(Khan and Khan, 1974 as *Sagitta pulchra* Doncaster)



Genus *Sagitta* Quoy and Gaimard, 1827
Sagitta bipunctata Quoy and Gaimard, 1827
Pelagic
(Khan and Khan, 1973)



Genus *Mesosagitta* Tokioka, 1965

Mesosagitta minima (Grassi, 1881)
Epipelagic
(Nair and Rao, 1973 as *Sagitta minima* (Grassi))



Genus *Aidanosagitta* Tokioka and Pathansali, 1963
Aidanosagitta neglecta (Aida, 1897)
Neretic zone
(Haq and Khan, 1973 as *Sagitta neglecta* Aida)



Aidanosagitta regularis (Aida, 1897)
Neritic and oceanic
(Khan and Khan, 1974 as *Sagitta regularis* Aida)



Genus *Serratosagitta* Tokioka and Pathansali, 1963
Serratosagitta pfacifica (Tokioka, 1940)
Pelagic
(Haq and Khan, 1973 as *Sagitta pacifica* Tokioka)



Genus *Decipisagitta* Bieri, 1991
Decipisagitta decipiens (Fowler, 1905)
Mesoplanktonic, shelf, 720 m
(Haq and Khan, 1973 as *Sagitta decipiens* Fowler)



Genus *Ferosagitta* Kassatkina, 1971
Ferosagitta robusta (Doncaster, 1902)
 Epipelagic, oceanic
 (Haq and Khan, 1973 as *Sagitta robusta*)



Genus *Flaccisagitta* Tokioka, 1965
Flaccisagitta enflata (Grassi, 1881)
 Pelagic, epipelanktonic, neritic
 (Khan and Khan, 1973 as *Sagitta enflata*
 (Grassi))



Flaccisagitta hexaptera (d'Orbigny, 1836) body length 15- 49 mm.
 Oceanic epipelanktonic; epipelagic to shallow mesopelagic waters
 (Khan and Khan, 1973 as *Sagitta hexaptera*)



Family Pterosagittidae Tokioka, 1965
 Genus *Pterosagitta* Costa, 1869
Pterosagitta draco (Krohn, 1853)
 Oceanic surface
 (Haq and Khan, 1973)



Order Biphragmophora Casanova, 1985

Family Krohnittidae Tokioka, 1965
 Genus *Krohnitta* Ritter Zahony, 1910

Krohnitta pacifica (Aaida, 1897)
 Epipelanktonic, mesoplanktonic
 (Haq and Khan, 1973)



Krohnitta subtilis (Grassi, 1881)
 Shallow water
 (Khan and Khan, 1973)



Family Spadellidae, Tokioka, 1965
 Genus *Spadella* Langerhans, 1880
Spadella cephaloptera (Busch, 1851)
 Benthic, neritic
 (Khan and Khan, 1973)



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Phylum Hemichordata

They are small group of animals that do not have backbones but possess the distinctive chordate characters. This phylum has been reported to contain about 130 extant species, according to a baseline report and it expected new species of Hemichordata will continue to be discovered and described as new marine habitats are characterized and explored. All are marine, and they are deuterostomes. These animals are interesting because they demonstrate other varieties of invertebrate life and because they provide information about deuterostome relationships and the origin of vertebrates.

Hemichordates are not chordates but invertebrates. They were unfortunately named before their structure was fully understood and subjected to molecular investigation. They are now recognized as a separate phylum, they are closer to echinoderms than to chordates. The class Enteropneusta inhabits benthic substrates from the intertidal to the deep sea. Although species like *Ptychodera flava* may measure >5cm, the miniaturized meiofaunal enteropneust *Meioglossus psammophilus* grows to a mere 0.6mm as an adult, and *Balanoglossus gigas* (Müller in Spengel 1893) has been observed to grow to 2.5m in length.

Phylum Hemichordata Bateson, 1885

Class Enteropneusta Gegenbaur, 1870

Family Ptychoderidae Spengel, 1893

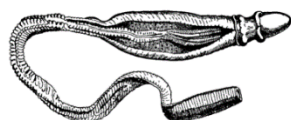
Genus *Ptychodera* Eschscholtz, 1825

Ptychodera flava Eschscholtz, 1825

Dredged from offshore at 60m.,

within a secreted fibrous tube

(Moazzam, 1977, unpublished)



Chapter 22

(Buckmann, 1972, Fenaux, 1973 as *Oikopleura longicauda* (Vogt)

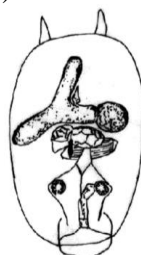
Phylum Chordata

Taxonomically, the phylum Chordata includes the subphylum Vertebrata, those living in ocean include the well known mammals, fish, reptiles and birds; subphylum Tunicata, which includes salps and sea squirts; and the subphylum Cephalochordata, comprising the lancelets. Of the more than 65,000 living species of chordates, about half are bony fish of the class Osteichthyes. Birds included in this inventory are those birds that are adapted to life within the marine environment. Marine reptiles are reptiles which have become secondarily adapted for an aquatic or semiaquatic life in a marine environment. Marine mammals are aquatic mammals that rely on the ocean and other marine ecosystems for their existence.

The smallest chordates are some of the tunicates and gobioid fishes which mature at a length of about 1 cm.

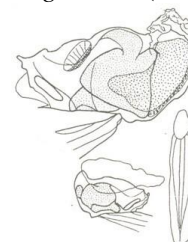
Phylum Chordata Haeckel, 1874
Subphylum Tunicata Lamarck, 1816
Class Appendicularia Lahille 1890
Order Copelata

Family Fritillariidae Lohmann, 1915
Genus *Fritillaria* Quoy and Gaimard, 1833
Fritillanria pellucida (Busch, 1851) 2.2 mm.
Pelagic
(Fenaux, 1966)



(After Buckmann and Kapp, 1975)

Family Oikopleuridae Lohmann, 1933
Genus *Oikopleura* Mertens, 1831
Subgenus *Oikopleura* (*Coecaria*) Lohmann, 1933
Oikopleura (*Coecaria*) *longicauda* (Vogt, 1854) 1.3 mm.
Oceanic, pelagic

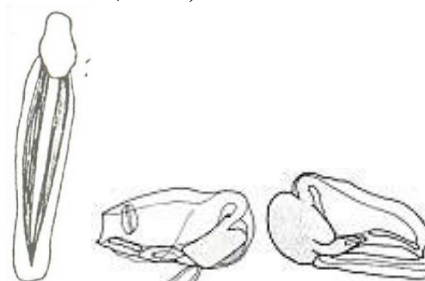


Different views of body (After Lohmann, 1896)

Subgenus *Vexillaria* Lohmann, 1933
Oikopleura (*Vexillaria*) *dioica* Fol, 1872
Mesoplankton, mangrove creeks
(Naz *et al.*, 2015 as *Oikopleura dioica*)



Genus *Megalocerus* Chun, 1888.
Megalocerus huxleyi (Ritter, 1905)
1.0mm.
Oceanic, pelagic
(Buckmann, 1972)



Different views of body (After Thomson, 1948)

Class Ascidiacea Nielsen, 1995
Order Aplousobranchia Lahille, 1887

Family Clavelinidae Forbes and Hanley, 1848f
Genus *Clavelina* Savigny, 1816
Clavelina robusta Kott, 1990
From intertidal and shallow, sub-tidal
(Ali, 2006)

Family Polyclindae Milne-Edwards, 1841
Genus *Polyclinum* Savigny, 1816
Polyclinum sp.

On coastal rocks
(Present study)



Botrylloides leachii (misidentified in literature)

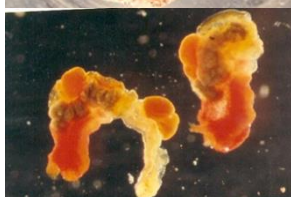
Different colour morphs may be found, including orange, brown orange, brown, and brown-white or purple-white/ In the intertidal zone encrusting on stones, colonizes on artificial substrates in harbours.

(Present study)

Genus *Aplidium* Savigny, 1816
Aplidium near *protectans* (Herdman, 1899)

Encrusting on stones, rock, weeds and shells

(Present study)



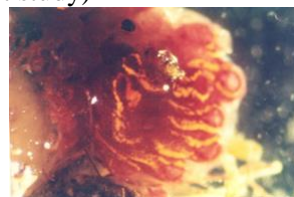
Tunic and zooids



Unidentified ascidian

Encrusting on stones

(Present study)



Family Didemnidae Giard, 1972
Genus *Didemnum* Savigny, 1816
Didemnum molle (Herdman, 1886)
Diameter 5-10 cm.

Encrusting on stones

(Ali, 2006)

Order Stolidobranchia Lahille, 1887

Family Styelidae Sluiter, 1895
Genus *Phallusa* Savigny, 1816
Phallusa arabica Savigny, 1816

On rocks

(Present study)



Genus *Botrylloides* Milne Edwards, 1841

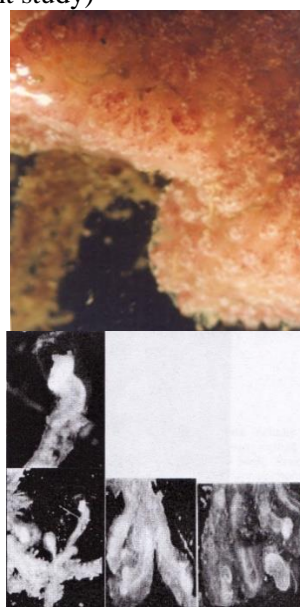
?*Botrylloides diegensis* Ritter and Forsyth, 1917 *Botrylloides violaceus* /

Genus *Perophora* Wiegmann, 1835

Perophora sp

Encrusting on stones

(Present study)



Class Thaliacea Nielsen, 1995

Order Salpida Forbes, 1853

Family Salpidae Lahille, 1888

Genus *Salpa* Forskal, 1775

Salpa fusuormis Cuvier, 1804 100-115 mm.

Pelagic 1000-0 m.

(Sewell, 1926)



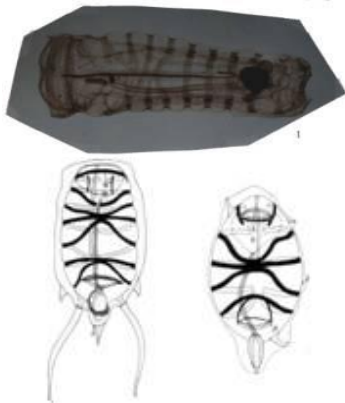
(Online image)

Genus *Weelia* Yount, 1954

Weelia cylindrical (Cuvier, 1804)

Pelagic

(Bhatti *et al.*, 1949 as *Salpa cylindrical*)



Genus *Thalia* Blumenbach, 1798

Thalia democratica (Forskal, 1775)

15-25 mm.

Epipelagic in upper 100 m

(Kannathasan *et al.*, 2014)

Thalia longicauda (Quoy and Gaimard, 1824)

Pelagic 2000-0 m .

(Sewell, 1926)

Thalia rhomboids(Quoy and Gaimard, 1824)

Length of solitary zooids 3.0-13.5 mm.

Pelagic.

(Soest, 1973)



(Online image)

Genus *Soestia* Kott, 1998

Soestia zonaria (Pallas, 1774)

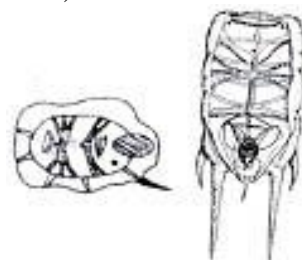
50 mm , planktonic, epipelagic

(Bhatti *et al.*, 1949 as *Iasis zonaria*)

Thalia cicar van Soest, 1973

Pelagic ,shelf

(Soest, 1973)

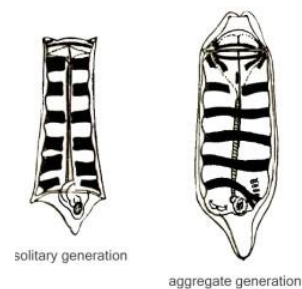


Zooids (After Soest,1973)

Thalia orientalis Tokioka, 1937

Between 50 m. and the surface

(Godeaux, 1979)



(After Berrill, 1950)

Genus *Pegea* Savigny, 1816

Pegea confoederata (Forskal, 1755)

predominantly pelagic 182-0 m.

(Sewell, 1953;Gul and Shahnaz,2018)



(After Gul and Shahnaz, 2018)

Order Doliolida Delage and Hérourard, 1898

Subphylum Cephalochordata Owen, 1846

Class Leptocardi Müller, 1845

Family Brachiostomidae Bonaparte, 1846

Genus *Branchiostoma* Costa, 1834

Branchiostoma lanceolatum (Pallas, 1774) Up to 6 cm.

Found on sand and gravel to 60 m, usually buried in daytime, although

sometimes found swimming on their sides
(Ishaq and Siddiqui,2017)



Superclass Pisces Linnaeus, 1758
Class Holocephali Bonaparte, 1832

Family Rhinochimaeridae Garman, 1901
Genus *Neoharriotta* Bigelow & Schroeder, 1950

Neoharriotta pumila Didier and Stehmann 1996.

Bathydemersal; depth range 150 - 500 m
(Hussain, 2003)

Neoharriotta quraishii Ali-Khan and Hussain 1999

Bathydemersal; depth range 150 - 500 m
(Hussain ,2003)

Neoharriotta pinnata (Schnakenbeck, 1931)dark brown

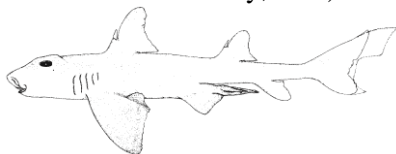
Bathydemersal; depth range 150 - 500 m
(FishBase)

Class Elasmobranchi Bonaparte, 1838
Order Heterodontiformes Berg, 1940

Family Heterodontidae Gray, 1851
Genus *Heterodontus* Blainville, 1816
?Heterodontus ramalheira (Smith, 1949)

Max. size 64.0 cm TL.

Demersal, depth range 40–275 m
(Hoda, 1988; further studies required to ascertain its presence in Pakistan cf.Moazzam and Osmany,2021)



(Online image)

Heterodontus omanensis Baldwin, 2005 Fins tipped with dark brown or blackish; additionally a white spot on apices of dorsal fins
Demersal; depth range 72 - 80 m.
(Khan,2010)



(Moazzam and Osmany, 2021a)

Class Actinopterygii Klein, 1885
Order Notacanthiformes Berg, 1947

Family Halosauridae Günther, 1868
Genus *Halosaurus* Johnson, 1864

Halosaurus sp.

Oxygen deficient zone (Murty *et al.*,2009)

Family Notacanthidae Rafinesque, 1810
Genus *Notacanthus* Bloch, 1788

Notacanthus sp.

Deep sea.Oxygen deficient zone
(Murty *et al.*,2009)

Order Synbranchiformes Nelson, 2006

Family Mastacembelidae Swainson, 1839

Genus *Macrognathus* Lacepède, 1800

Macrognathus aculeatus (Bloch, 1786)

Brackish, fresh

(Day, 1878 as *Rhynchobdella aculeata*; Abdulla el Husseini, 1965)



(Photo courtesy Moazzam)

Macrognathus pancalus Hamilton, 1822

Brackish, fresh

(Talwar and Jhingran,1991)



(Photo courtesy Moazzam)

Genus *Mastacembelus* Scopoli, 1777

Mastacembelus armatus (Lacepède, 1800)

Brackish

(Day,1878)



(Photo courtesy Moazzam)

Order Lampriformes Regan, 1909

Family Trachipteridae Swainson, 1839

Genus *Desmodema* Walters and Fitch, 1960

Desmodema polystictum (Ogilby, 1898)

Head and body silvery; fins red

Bathypelagic; depth range 0 500 m.

(Bauchot and Bianchi, 1994)



(Photo courtesy Moazzam)

Family Veliferidae Bleeker, 1859
Genus *Velifer* Temminck and Schlegel, 1850

Velifer hypselopterus Bleeker, 1879
(probability of occurrence) 40cm.
In shallow, coastal waters, of less than 100 m.

(Manilo and Bogorodsky, 2003)



(Online image)

Order Elopiformes Sauvage, 1875

Family Elopidae Valenciennes, 1847
Genus *Elops* Linnaeus, 1766
Elops machnata (Forsskal, 1775) Max. size 118 cm FL Back blue-grey, sides silvery with a yellow tinge; fins faint yellow.

Pelagic. Found in coastal waters, lagoon, estuaries and mangroves

(Qureshi, 1952)



(Photo courtesy Moazzam)

Family Megalopidae Jordan, 1923
Genus *Megalops* Lacepede, 1803
Megalops cyprinoides (Broussonet, 1782) Max. size 150 cm TL. Back blue-green, flanks silvery Benthopelagic, depth range 50 m. found in quiet waters of mangrove swamps and estuaries, frequently found in isolated fresh water lakes and up rivers many miles from the sea

(Gadsden, 1900)



(Photo courtesy Moazzam)

Order Albuliformes Greenwood, Rosen, Weitzman and Myers, 1966

Family Albulidae Bleeker, 1849

Genus *Albula* Scopoli, 1777

Albula argentea (Forster, 1801)

70cm. Head and body bright silvery, white on side and below; posterior margin of caudal fin black; base on pectoral and pelvic fins slightly yellow. Inshore, shallow waters on sandy and muddy bottoms

(Psomadakis *et al.* 2015)



(Photo courtesy Moazzam)

Albula vulpes (Linnaeus, 1758)

Brackish; reef-associated

(Bianchi, 1985)



Order Anguilliformes Berg, 1943

Family Synbranchidae Johnson, 1862

Ilyophis brunneus Gilbert, 1891

Offshore

(Froese and Pauly, 2015)

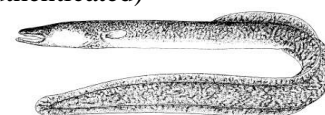
Family Anguillidae Rafinesque, 1810

Genus *Anguilla* Shaw, 1803

Anguilla bengalensis bengalensis

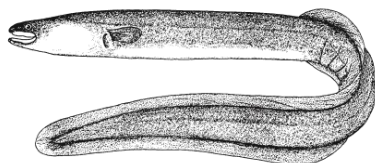
(Gray, 1831) Max. size 120 cm TL.

Demersal, brackish water, freshwater (Murray, 1880. Occurrence in Pakistan not authenticated)



(Online images)

Anguilla bicolor bicolor McClelland, 1844 Max. size 120 cm TL.
Demersal, brackish water, freshwater (Day, 1889; Hoda, 1988 Occurrence in Pakistan not authenticated.)



(Online image)

Family Muraenidae Rafinesque, 1815
Genus *Uropterygius* Rüppell 1838
Uropterygius marmoratus (Lacepède, 1803) Max. size 62.0 cm SL.
Reef-associated, brackish water, depth range 20 m.
(Qureshi, 1958 as *Gymnomuraena marmorata*).



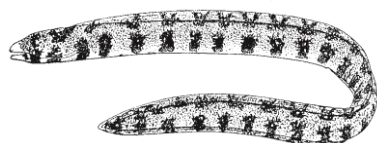
(Online image)

Genus *Muraena* Linnaeus, 1758
Muraena helena Linnaeus, 1758
Crevices, under rocks or corals (Map, 69 A, Key book to world map of Fisheries, 1983; Ahmad and Wazarat, 1993; possibly based on misidentification, presence in Pakistan considered to be doubtful)

Genus *Echidna* Forster, 1777
Echidna nebulosa (Ahl, 1789) Max. size 100.0 cm TL. Colour variable, but body typically pale with 2–3 rows of darker, star-like blotches along the body, each with a yellow center; the spots variably combined to form vertical bands; smaller spots and mottling between the starry blotches

Depth range 2–30 m. Found between rocks and corals of intertidal reef flats and in shallow lagoons.

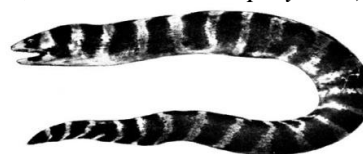
(Fischer and Bianchi, 1984).



(Online image)

Echidna polyzona (Richardson, 1844)

Max. Size 70.0 cm TL.
Shallow water
(Hoda, 1985 as *Muraena polyzona*)



(Online image)

Genus *Strophidon* McClelland 1844
Strophidon sathete (Hamilton, 1822)
Max. size 400 cm TL. Head, body and fins unicolor brown.
Reef-associated, brackish water, freshwater; depth range 15 m.
(Jalil and Khaliluddin, 1972 as *Thrysoidea macrura* (Bleeker))



(After Moazzam and Osmany, 2016)

Genus *Gymnothorax* Bloch, 1795
Gymnothorax favagineus (Bloch and Schneider, 180) Size 300 cm TL. Pale yellowish with numerous close-set large black spots, the pale interspaces forming a honeycomb-like pattern.

Reef-associated, brackish water, depth range 1–45 m.

(Sorley, 1932 as *M. tessellata* (Richardson))



(Photo courtesy Shabeeb Asghar)

Gymnothorax pictus (Ahl, 1789) Max. size 140 cm TL.

Reef-associated, depth range 5–100 m. Inhabits reef flats and rocky intertidal shorelines

(Khan,1924;Ajazuddin and Ahmed, 2001 as *Siderea picta*)



(After Moazzam and Osmany, 2016)

Gymnothorax pseudothyrsoides
(Bleeker, 1852)

Max. size 80.0 cm TL Pale yellowish, densely spotted with dark brown, the spots clustering to form dark blotches larger than eye in about 4 irregular rows on body. Found in shallow reefs, including tidepools

(Day, 1889 as *Muraena pseudothyrsoides*)



(After Moazzam and Osmany, 2016)

Gymnothorax punctatofasciatus

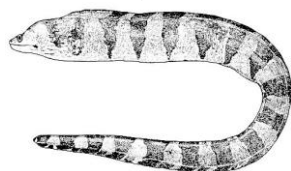
Bleeker, 1863 Max. size 50.5 cm TL. Reef-associated, depth range 0–264 m (Sorley, 1932 as *Muraena punctofasciata*).



(Photo after Randall,1995)

Gymnothorax rueppelliae (McClelland, 1844)

Max. size 80.0 cm TL. Reef-associated, depth range 1-30 m. Found in clear waters of lagoons and seaward reefs (Kapoor *et al.*, 2002).



(Online image)

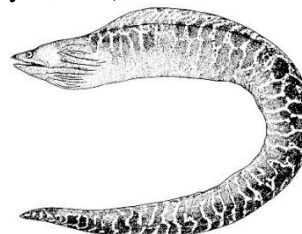
Gymnothorax tile (Hamilton, 1822)

Max. size 60.0 cm TL. Demersal, brackish water, freshwater (Qureshi, 1952 as *Muraena tile*)



(Online image)

Gymnothorax undulatus (Lacepède, 1803) Max. size 150 cm TL. Reef-associated, depth range 30 m. (Zugmayer,1913). .



(Online image)

Gymnothorax prolatus Sasaki and Amaoka, 1991 Body brown with dark fins

Probably inhabiting muddy or sandy bottoms

(MNH;Moazzam et al,2015)



(After Moazzam and Osmany, 2015)

Gymnothorax dorsalis Seale, 1917

Dark brown; fins darker than body. In holes and crevices, offshore, muddy or sandy bottoms

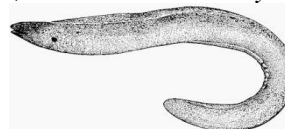
(MNH)



(After Moazzam and Osmany, 2016)

Gymnothorax thyrsoides (Richardson, 1845)

Reef-associated; depth range 0 - 30 m, in shallow tidal pools (Qureshi,1955 as *Muraena thyrsoides*).



(Online image)

Gymnothorax phasmatodes (Smith, 1962) Body pale tan to yellowish, shading to white ventrally; edge of fins white (the margin of dorsal fin appears sometimes light blue); head pores white; iris yellow
Shallow water, on sand and rocks
(Psomadakis *et al.*, 2015)



Gymnothorax reticularis Bloch, 1795
Demersal; depth range ? - 56 m.
(Zohra *et al.*, 2009)



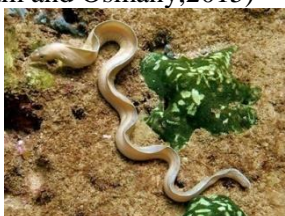
(After Moazzam and Osmany, 2015)

Gymnothorax meleagris (Shaw, 1795)
Freshwater; brackish; reef-associated;
depth range 1 - 51 m.
(Moazzam and Osmany, 2015)



(After Moazzam and Osmany, 2015)

Gymnothorax phasmatodes (Smith, 1962)
Demersal
(Moazzam and Osmany, 2015)



(After Moazzam and Osmany, 2015)

Family Ophichthidae Günther, 1870
Genus *Cirrhimuraena* Kaup, 1856
Cirrhimuraena playfairii (Günther, 1870)
Demersal
(Niazi, 2001)

Genus *Brachysomophis* Kaup, 1856
Brachysomophis cirrocheilos (Bleeker, 1857) 125cm.
Benthic, also in brackish water; reef-associated; inhabits the sandy and muddy bottoms close to coastal reef between 1 and 10 meters deep.
(Zohra and Osmany, 2016)



(Photo courtesy Osmany)

Genus *Pisodonophis* Kaup, 1856
Pisodonophis boro (Hamilton, 1822)
Max. size 100.0 cm TL Uniformly brownish olive above, lighter below; dorsal fin with a narrow black edge.
Found in lagoons and estuaries, freshwater and paddy fields
(Hussain and Khatoun, 2000a)



(After Moazzam and Osmany, 2015)

Pisodonophis cancrivorus (Richardson, 1848) Max. size 108 cm TL. Uniformly brownish olive above, light yellow below; dorsal fin with a narrow black edge
Occurs in lagoons, estuaries, creeks and mangroves swamps
(Ajazuddin *et al.*, 1985)



(After Moazzam and Osmany, 2015)

Genus *Lamnostoma* Kaup, 1856
Lamnostoma orientalis (McClelland, 1844) Max. size 36.0 cm TL.
Reef-associated, brackish water, freshwater
(Castle, 1984).



(Online images)

Genus *Myrichthys* Girard, 1859
Myrichthys colubrinus (Boddaert, 1781)
 Reef-associated; depth range 0 - 35 m.
 (Sorley, 1932).
 Genus *Muraenichthys* Bleeker, 1853
Muraenichthys schultzei Bleeker, 1857
 Max. size 24.0 cm TL.
 Depth range 13 m. Found in reef flats and lagoons soft sediment
 (Castle, 1984)
 Genus *Neenchelys* Bamber, 1915
Neenchelys buitendijki Weber and de Beaufort, 1916 Max. size 30.0 cm TL.
 Demersal, found burrowing in soft sediments
 (Castle, 1984).



Family Muraenesocidae Kaup, 1859
 Genus *Gavialiceps* Alcock, 1889
Gavialiceps arabicus (D'Ancona, 1928)
 Bathydemersal; depth range 380 - 497 m. (Moazzam and Osmany, 2015)



(After Moazzam and Osmany,2015)

Gavialiceps taeniola Alcock, 1889
 Offshore, deepwaters
 (Norman, 1939; Fanning *et al.*, 2010)
 Genus *Congresox* McClelland, 1844
Congresox talabonoides (Bleeker, 1853)
 Max. size 250 cm TL. Head and body yellow, tinged with bronze, white below; dorsal and anal fins with narrow black edges

Demersal, brackish water, depth range 100 m (Sorley, 1932; Qureshi, 1955 as *Muraenesox talabonoids*).



(Online image)

Congresox talabon (Cuvier, 1829)
 Brackish; demersal; depth range ? - 100 m.
 (Sorley,1932)
 Genus *Muraenesox* McClelland, 1844.
Muraenesox bagio (Hamilton, 1822)
 Max. size 200 cm TL. Light greyish brown with olive bronze above, lighter below; dorsal and anal fins with narrow black edges
 Demersal, brackish water, soft bottom,depth range 100 m.
 (Bianchi,1985 ;Ajazuddin and Ahmed,2001)



(After Moazzam and Osmany, 2015)

Muraenesox cinereus (Forsskal,775)
 Max. size 220 cm TL. Light to dark greyish brown above, lighter below; dorsal and anal fins with narrow black edges
 Demersal, brackish water, freshwater, depth range 740 m from the littoral zone to the upper bathy-benthic region on soft bottoms
 (Zugmayer, 1913; Kesteven, 1950 as *Muraena cinereus*)



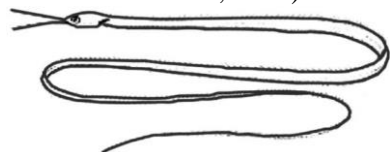
(After Moazzam and Osmany, 2015)
 Family Nemichthyidae Kaup, 1859
 Genus *Avocettina* Jordan and Davis, 1891
Avocettina infans (Günther, 1878)
 Meso-and bathypelagic
 (Moazzam and Osmany, 2015)



(After Moazzam and Osmany, 2015)

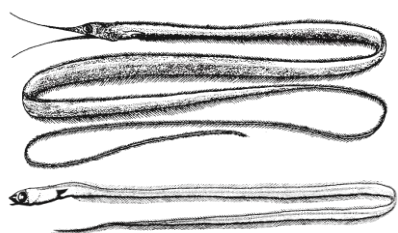
Genus *Nemichthys* Richardson, 1848
Nemichthys curvirostris (Strömman, 1896) Max. size 143 cm TL.
 Bathypelagic; marine; depth range 0–2000 m.

(Khatoon and Hussain, 2000)



Nemichthys scolopaceus Richardson, 1848 Max. size 130 cm TL.
 Bathypelagic, depth range 91–2000 m.

(Jalil and Khaliluddin, 1972; Hoda, 1988 as *Nemichthys scolopacea*)



Female
 (on line images) male

Family Congridae Kaup, 1856
 Genus *Rhynchoconger* Jordan and Hubbs, 1925

Rhynchoconger trewavasae Ben-Tuvia, 1993

Close to the bottom
 (Osmany, 2013)



(After Moazzam and Osmany, 2015)
Rhynchoconger squaliceps (Alcock, 1894) Dorsal side of head and body olive-grey, ventral side white; edges of dorsal and anal fins black
 Found on soft bottoms down to 500 m. depth.

(Psomadakis *et al.*, 2015)



(Photo after Osmany, 2013)

Genus *Conger* Oken (ex Cuvier), 1817
Conger cinereus Ruppell, 1830 Max. size 130 cm TL. Grey to brown with a broad black margin on median fins; a black spot on pectoral fins and a black bar under the eye; with dark crossbars.

Reef associated; brackish water, depth range 0–80 m.

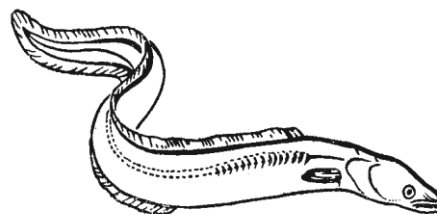
Found on reef flats and seagrass beds of shallow lagoons
 (Bianchi, 1985 as *Conger cinereus cinereus*).



(Online images)

?*Conger conger* (Linnaeus, 1758) Max. size 300 cm TL.

Demersal, depth range 0–500 m, on rocky and sandy bottoms
 (Jalil and Khaliluddin, 1972, possibly based on misidentification, doubtful cf Moazzam and Osmany, 2015)



(Online image)

Genus *Uroconger* Kaup, 1856
Uroconger lepturus (Richardson, 1845) Max. size 52.0 cm TL. Light greyish brown, darker on opercle, the lower surface of head and trunk white; lateral line pores white; posterior part of dorsal and anal fins black

Demersal, depth range 18–760 m.
Occurs offshore and coastal areas on soft sandy mud and sandy bottoms
(Qureshi, 1958)



(After Moazzam and Osmany, 2015)

Genus *Ariosoma* Swainson, 1838
Ariosoma gnanadossi Talwar and Mukherjee, 1977

Light brown above, paler below; dorsal and anal fins with a narrow blackish border; pectoral fins usually dusky. Soft bottoms down to 250 m. depth
(Talwar and Mukherjee, 1977 as *Ariosoma granadosi*; Psomadaki *et al.*, 2015)



(After Moazzam and Osmany, 2015)

Genus *Bathymyrus* Alcock, 1889
Bathymyrus echinorhynchus Alcock, 1889 Uniformly brownish yellowish; fins light. Apparently offshore on sandy or muddy bottoms
(Alcock, 1889)



(After Moazzam and Osmany, 2015)

Family Nettastomatidae Kaup, 1859
Genus + Jordan and Davis, 1802
Venefica proboscidea (Vaillant, 1888)
Max. size 100.0 cm TL.
Bathydemersal, depth range 1665–2000 m.
(Norman, 1939)



(Online image)

Genus *Nettastoma* Rafinesque, 1810
Nettastoma parviceps Gunther, 1877
Max. size 82.0 cm TL.

Bathydemersal, depth range 60–1190 m.
(Jalil and Khaliluddin, 1972).



(Online image)

Order Clupeiformes Bleeker, 1959

Family Engraulidae Gill, 1861
Genus *Thryssa* Cuvier, 1817
Thryssa baelama (Forsskal, 1775) Max. size 16.0 cm SL.
Reef-associated, found mostly in inshore bays, lagoons, harbours, mangrove pools and estuaries
(Hoda, 1988)



(FAO image)

Thryssa dayi Wongratana, 1983 Max. size 21.5 cm SL. Gill arches pinky orange, basibranchials black, inside of gill cover pale yellow or golden; a pair of dark lines along back Pelagic, depth range 0-50 m. inshore
(FishBase, 2022)



(Photo courtesy Osmany)

Thryssa dussumieri (Valencienne, 1848)
Max. size 11.0 cm SL. A dark blotch behind upper part of gill opening, sometimes joined to a dark saddle on nape
Pelagic, brackish water, found in coastal waters and estuaries
(Misra, 1962 as *Thrisoscles dussumieri*)



(Photo courtesy Osmany)

Thyryssa hamiltonii (Gray, 1835) Max. size 27.0 cm SL. A dark blotch of horizontal wavy black lines behind upper part of gill opening
Pelagic, brackish water, depth range 10–13 m.

(Day, 1878 as *Engraulis hamiltonii*)



(Photo courtesy Moazzam)

Thyryssa malabarica (Bloch, 1795) Max. size 17.5 cm SL. A dark blotch behind of gill opening; small spots on cheek, gill cover, maxilla and paired fins; gill arches pinky orange, inside of gill cover yellow and gold; inner part of anal fin deep yellow, the margin milky white

Pelagic, brackish water

(Day, 1878 as *Engraulis malabaricus*)



(Photo courtesy Moazzam)

Thyryssa vitrirostris (Gilchrist and Thompson, 1908)

Max. size 20.0 cm TL. Back blue-green, flanks silvery; a dark blotch behind upper part of gill opening; inside of gill cavity bright orange.

Pelagic, inshore and entering estuaries and lagoons (Bianchi, 1985)



(Photo courtesy Moazzam)

Thyryssa mystax (Bloch and Schneider, 1801) Max. size 15.5 cm SL. A dark blotch of wavy lines behind of gill

opening; gill cavity light orange; dorsal fin tip black, upper, lower and posterior border of caudal fin black.

Pelagic. Found in coastal waters, entering mangroves and adjacent brackish water

(Qureshi, 1957 as *Thrissocles mystax*)



(Photo courtesy Osmany)

Thyryssa purava (Hamilton, 1822) Max. size 15.5 cm SL.

Pelagic, brackish water, inshore

(Day, 1878 as *Engraulis purava*)



(After Day, 1878)

Thyryssa setirostris (Broussonet, 1782)

Max. size 18.0 cm SL. Head with gold tints; anal and caudal fins deep yellow; dark horizontal lines behind upper part of gills.

Pelagic, depth range 1–20 m found in coastal waters and estuaries

(Jalil and Khaliluddin, 1972 as

Thrissocles setirostris)



(Photo courtesy Moazzam)

Thyryssa supra (Hata, Psomadakis, Osmany and Motomura, 2021)

Found in coastal pelagic waters and often observed as entering mangroves and adjacent brackish waters

(Hata *et al.*, 2021 as *Thrissina supra*)



(After Hata *et al.*, 2021)

Genus *Coilia* Gray, 1831

Coilia borneensis Bleeker, 1852 Max. size 12.4 cm SL.

Pelagic, brackish water, freshwater
(Jalil and Khaliluddin, 1972)

Coilia dussumieri Valenciennes, 1848
Max. size 20.0 cm SL. Flanks and belly with golden or pearly spots (light organs) in rows below scales also along isthmus, lower jaw, on cheek and gill cover
Pelagic, brackish water, freshwater
(Qureshi, 1952)



(Photo courtesy Osmany)

Coilia neglecta Whitehead, 1967 Max. size 17.0 cm SL. Back light brown, flanks silvery, without golden or pearly spots.
Pelagic, in fully saline water along coasts and brackish water, depth range 0-50 m
(Whitehead, 1967; Bianchi, 1985)



(Photo courtesy Osmany)

Coilia ramcarati (Hamilton, 1822)
Brackish
(Kapoor *et al*, 2002)



Genus *Stolephorus* Lacepede, 1803
Stolephorus bengalensis (Dutt and Babu Rao, 1959)

Reported by Hata *et al.*, (2019; 2022)
Stolephorus commersonii Lacepede, 1803 Max. size 10.0 cm SL. Body light transparent fleshy brown, with silvery band down flanks; back with 2 pigmented areas behind head; a double pigmented line before dorsal fin origin
Pelagic, found in coastal waters, apparently entering brackish water water
(Misra, 1962 as *Anchoviella commersonii*)



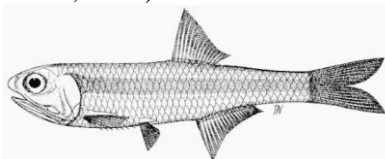
(Photo courtesy Osmany)

Stolephorus indicus (van Hasselt., 1823)
Max. size 15.5 cm SL. Light transparent fleshy brown, with a silver band down flanks; no dark pigment lines on back between head and dorsal fin origin
Pelagic, brackish water, depth range 20–50
(Qureshi, 1957 as *Anchoviella indica*)



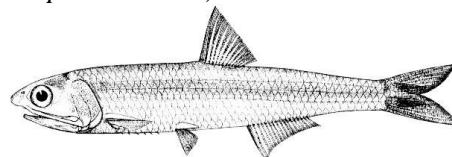
(Photo courtesy Osmany)

Stolephorus insularis Hardenberg, 1933 Max. size 8.0 cm SL.
Reef-associated, brackish water, depth range 0-50 m. Occurring in coastal waters
(FishBase, 2006)



(FAO image)

Genus *Encrasicholina* Fowler 1938
Encrasicholina devisi (Whitley, 1940)
Max. size 8.0 cm SL.
Reef-associated, brackish water, depth range 10-13 m
(Fischer and Bianchi, 1984 as *Stolephorus devisi*)

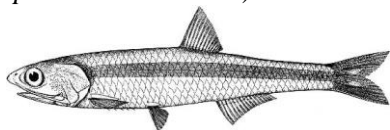


(FAO image)



Encrasicholina heteroloba (Rüppell, 1837) Max. size 12.0 cm SL.
Reef-associated, depth range 20–50 m. Found inshore, but also inhabits deep bays.

(Bianchi, 1985; Hoda, 1988 as *Stolephorus heterolobus*)

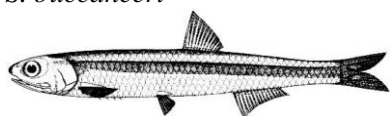


(Online image)

Encrasicholina punctifer Fowler, 1938
Max. size 13.0 cm TL.

Reef-associated, found inshore and in oceanic waters, hundreds of miles from land

(Hoda, 1988 as *Stolephorus punctifer* and *S. buccaneeri*)



(Online images)

Family Pristigasteridae Bleeker, 1872

Genus *Pellona* Valenciennes, 1847

Pellona ditchela Valenciennes, 1847
Max. size 16.0 cm SL. Head gold, snout and chin dusky; body dusky above, gold on flanks and silvery below.

Pelagic, brackish water, freshwater, depth range 10–55 m.

(Jalil and Khaliluddin, 1972)



(Photo courtesy Osmany)

Genus *Ilisha* Richardson, 1846

Ilisha elongata (Bennett, 1830) Max. size 40.5 cm SL.

Pelagic, brackish water, depth range 5 m. (Day, 1878 as *Pellona elongata*)



(Photo courtesy Osmany)

Ilisha megaloptera (Swainson, 1839)

Max. size 28.0 cm SL.

Pelagic, brackish water, freshwater

(Misra, 1962 as *Ilisha filigera*)



(Photo courtesy Moazzam)

Ilisha melastoma (Bloch and Schneider, 1801) Max. size 17.0 cm SL.

Pelagic, brackish water and coastal waters

(Qureshi, 1955 as *Pellona indica*)



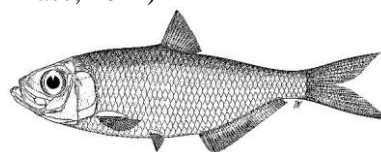
(Photo courtesy Osmany)

Ilisha sirishai Seshagiri Rao, 1975

Max. size 23.0 cm TL.

Pelagic, brackish water, depth range 0–50 m.

(FishBase, 2022)



(Online image)

Ilisha striatula Wongratana, 1983 Max. size 18.0 cm SL.

Pelagic, brackish water, depth range 0–50 m (FishBase, 2006)



(Photo courtesy Osmany)

Genus *Opisthopterus* Gill, 1861

Opisthopterus tardoore (Cuvier, 1829) Max. size 20.0 cm SL. Back blue-green or grey, flanks silvery.

Pelagic. Found close to shore and in estuaries. Ascends rivers into the tidal zone

(Day, 1878)



(Photo courtesy Moazzam)

Genus *Raconda* Gray, 1831
Raconda russelliana Gray, 1831
 Max. size 19.0 cm SL.
 Pelagic, brackish water
 (Rao, 1969; Hoda, 1988)



(Online image)

Family Chirocentridae Bleeker, 1849
 Genus *Chirocentrus* Cuvier, 1817
Chirocentrus dorab (Forsskal, 1775)
 Max. size 100.0 cm SL. Back with bands of green and blue; tip of dorsal fin and front of anal fin black
 Reef associated, brackish water, depth range 120 m. (Qureshi, 1952)



(Photo courtesy Moazzam)

Chirocentrus nudus Swainson, 1839
 Max. size 100.0 cm SL. Dorsal and anal fins colourless; back with bands of green and blue Pelagic, coastal waters. depth range 0–150 m.
 (Hoda, 1988)



(Photo courtesy Moazzam)

Family Dussumieridae Gill, 1861
 Genus *Dussumieria* Cuvier and Valenciennes, 1847
Dussumieria acuta Valenciennes, 1847
 Max. size 20.0 cm.
 Pelagic, depth range 10–20 m.
 Inshore, brackish
 (Day, 1878)



(Photo courtesy Moazzam)

Dussumieria elopsoides Bleeker, 1849
 Max. size 20.0 cm SL. Back iridescent greenish blue with a narrow lateral band of silvery grey below; flanks and abdomen silvery white; upper surface of eye and head
 Reef-associated, depth range 0-50 m.
 (FishBase, 202)



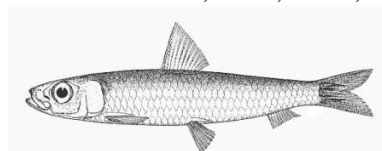
(Photo courtesy Moazzam)

Family Clupeidae Cuvier, 1816
 Genus *Gudusia* Fowler, 1911
Gudusia chapra (Hamilton, 1822)
 Brackish, fresh
 (FishBase, 2006)



(Photo courtesy Moazzam)

Genus *Spratelloides* Bleeker, 1851
Spratelloides delicatulus (Bennett, 1832) Max. size 7.0 cm SL. 2 prominent dark streaks on caudal fin base.
 Pelagic in shallow waters
 (Fischer and Bianchi, 1984; Hoda, 1988)



(FAO image)

Spratelloides gracilis (Temminck and Schlegel, 1846) Max. size 10.5 cm SL. Back blue-green, flanks with a distinct silvery stripe
 Pelagic, depth range 10 m. inhabiting clear waters of coastal, lagoon, and seaward reefs
 (Fischer and Bianchi, 1983)



(Online image)

Genus *Escualosa* Whitley, 1940
Escualosa thoracata (Valenciennes, 1847) Max. size 10.0 cm SL. Body white

to pale gray, inner edges of caudal fin darkish.

Pelagic, brackish water, freshwater, found in shallow water (Jenkins, 1910 as *Clupea lile*, Regan, 1922 as *Kowala thoracata*)



(Photo courtesy Moazzam)

Genus *Sardinella* Cuvier and Valenciennes, 1847

Sardinella albella (Valenciennes, 1847)
Max. size 14.0 cm SL. Back blue-green, flanks silvery; a dark spot at dorsal fin origin

Pelagic, found in coastal waters (Day, 1889)

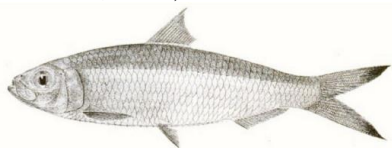


(Photo courtesy Moazzam)

Sardinella atricauda (Günther, 1868)

Coastal waters

(Qureshi, 1955 as *Clupea atricauda*; Anonymous (1999BMNH 1889.2.1.1883) misidentification fide Yousaf *et al.*, 2012)



(Online image)

Sardinella brachysoma Bleeker, 1852

Pelagic-neritic; depth range 0 - 50 m. (Jenkins, 1910 as *Clupea brachysoma*)



(Photo courtesy Moazzam)

Sardinella fimbriata (Valenciennes, 1847)

Pelagic-neritic, brackish, at 0-

(Qureshi, 1957; identification of this species from Pakistan is doubtful, fide Whitehead, 1985)



(Photo courtesy Moazzam)

Sardinella gibbosa (Bleeker, 1849) Back blue-green, flanks silvery; tip of dorsal fin and margin of caudal fin dusky, remainder of caudal faintly yellow, other fins clear; a small black spot at dorsal fin origin. Max. size 17.0 cm SL.

Reef-associated, pelagic, depth range 10–70 m. found in coastal water (Jalil and Khaliluddin, 1972)

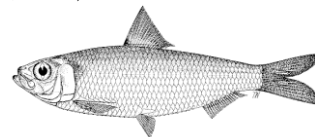


(Photo courtesy Moazzam)

Sardinella jussieui (Valenciennes, 1847)

Coastal

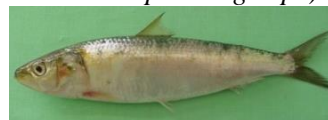
(Hoda, 1988)



Sardinella longiceps Valenciennes, 1847
Max. size 23.0 cm SL.

Back blue-green, flanks silvery; a black spot on hind edge of gill cover
Pelagic, depth range 20–200 m. mainly coastal

(Day, 1889 as *Clupea longiceps*)



(Photo courtesy Moazzam)

Sardinella melanura (Cuvier, 1829)

Max. size 15.2 cm SL. Back blue-green, flanks silvery; tips of caudal fin black
Pelagic, found in coastal water

(Day, 1889 as *Clupea melanura*)



(Photo courtesy Moazzam)

Sardinella sindensis (Day, 1878) Max. size 17.0 cm SL. Back blue-green, flanks silvery
Pelagic, found in coastal waters (Day, 1878 as *Clupea sindensis*)



(Photo courtesy Moazzam)

Genus *Amblygaster* Bleeker, 1849
Amblygaster leiogaster (Valenciennes, 1847) Max. size 23.0 cm SL.
Pelagic. depth range 0–50 m. (Hoda, 1988)



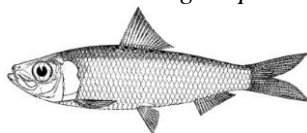
(Online image)

Amblygaster sirm (Walbaum, 1792)
Max. size 27.0 cm SL.
Reef-associated, depth range 10–75 m. occurring in coastal waters and lagoons (Hoda, 1988)



(Online image)

Genus *Herklotsichthys* Whitley, 1951
Herklotsichthys punctatus (Rüppell, 1837) Max. size 8.5 cm SL.
Pelagic, depth range 0–50 m. Found in coastal waters (Misra, 1962 as *Harengula punctatus*)



(Online image)

Herklotsichthys quadrimaculatus (Ruppell, 1837)
Max. size 25.0 cm SL. Back blue-green; flanks silvery with 2 orange spots behind gill opening and a blue midlateral band; no black spots laterally on body
Reef-associated, brackish water, depth range 10 m. near mangroves, shallow coastal bays and lagoons, further offshore into deeper water

(Hoda, 1988)
Genus *Ethmalosa* Regan 1917
Ethmalosa fimbriata (Bowdich, 1825) Max. size 45.0 cm TL.
Pelagic, depth range 200 m. Occurs in inshore waters, lagoons and more than 300 km up rivers (Day, 1878 as *Clupea fimbriata* a misidentification).

Genus *Tenualosa* Fowler, 1934
Tenualosa ilisha (Hamilton, 1822) Max. size 60.0 cm SL. Back blue-green, flanks silvery, with a dark blotch behind gill opening followed by a series of small spots along flanks
Pelagic, depth range 200 m. in coastal waters and ascending rivers for as much as 1200 km (Day, 1878 as *Clupea ilisha*)



(Photo courtesy Osmany)

Tenualosa toli (Valenciennes, 1847)
Max. size 60.0 cm TL. Back blue-green
Pelagic, brackish water, freshwater, depth range 10m. Inhabits fastflowing, turbid estuaries and adjacent coastal waters (Day, 1878 as *Clupea toli*)



(Photo courtesy Osmany)

Genus *Hilsa* Regan, 1917
Hilsa kelee (Cuvier, 1829) Max. size 35.0 cm TL. Back blue-green, flanks silvery with 4–10 dark spots
Pelagic, brackish water, freshwater; depth range 10m. (Day, 1878 as *Clupea kanagurta*)



(Photo courtesy Moazzam)

Genus *Anodontostoma* Bleeker, 1849

Anodontostoma chacunda (Hamilton, 1822) Max. size 22.0 cm SL. Large part of nape yellowish, flanks silvery, fins generally pale, caudal fin yellowish Pelagic, brackish water, freshwater, depth range 5 m.

(Jenkins, 1910 as *Chatoessus chacunda*)

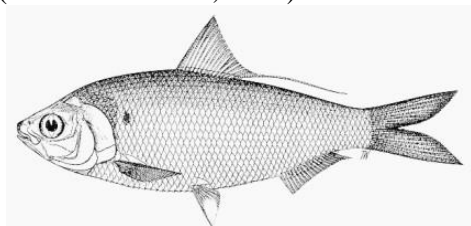


(Photo courtesy Moazzam)

Genus *Nematalosa* Regan, 1917

Nematalosa arabica Regan, 1917

A dark spot behind gill opening Pelagic (Psomadakis *et al.*, 2015)



(FAO image)

Nematalosa japonica Regan, 1917

Max. size 19.0 cm SL.

Benthopelagic. Found over sand or mud (Jalil and Khaliluddin, 1972 as *Spratelloides japonicus* in Dussumieridae). Report from Pakistan based on misidentification.

Nematalosa nasus (non Bloch, 1795) Dark bluish dorsally, silvery below; a dark spot behind gill opening

Pelagic, known from estuaries and coastal areas (Day, 1871; Jenkins, 1910 as *Chatoessus nasus*)



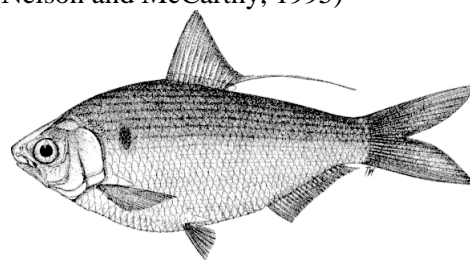
(Photo courtesy Moazzam)

Nematalosa persara Nelson and McCarthy, 1995

Max. size 15.2 cm SL.

Pelagic, brackish water, freshwater, depth range 0–30 m.

(Nelson and McCarthy, 1995)



(FAO)

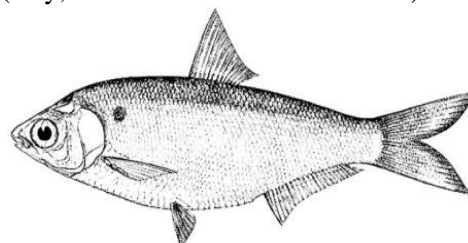
Genus *Gonialosa* Regan, 1917

Gonialosa manmina (Hamilton, 1822)

Max. size 14.1 cm TL.

Pelagic, Found in rivers and pools and estuarine water

(Day, 1878 as *Chatoessus manmina*)



(Online image)

Order Gonorhynchiformes Berg, 1940

Family Chanidae Günther, 1868

Genus *Chanos* Lacepede, 1803

Chanos chanos (Forsskal, 1775) Max. size 180 cm SL. Back olive green, flanks silvery; dorsal, anal and caudal fins with dark margins.

Benthopelagic, brackish water, freshwater, depth range 0–30 m.

(Jenkins, 1910 as *Chanos salmoneus* (Forster); Niazi, 1974)



(Photo courtesy Moazzam)

Order Siluriformes Cuvier, 1817

Family Bagridae Bleeker, 1858

Genus *Mystus* Hamilton, 1822

Mystus gulio (Hamilton, 1822)

Max. size 46.0 cm TL.

Demersal, brackish water, freshwater (Day, 1873 as *Macrones gulio*)



(Photo courtesy Moazzam)

Mystus cavasius (Hamilton, 1822)
Freshwater; brackish; demersal (Talwar and Jhingran, 1991)



(Photo courtesy Moazzam)

Family Heteropneustidae Hora, 1936
Genus *Heteropneustes* Müller, 1840
Heteropneustes fossilis (Bloch, 1794)
Brackish 30; depth range
(Talwar and Jhingran, 1991)



(Photo courtesy Moazzam)

Family Schilbeidae Bleeker, 1858
Genus *Eutropiichthys* Bleeker, 1862
Eutropiichthys vacha (Hamilton, 1822)
Brackish, pelagic
(Mirza and Sharif, 1996)



(Photo courtesy Moazzam)

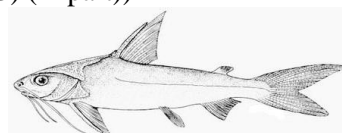
Family Ariidae Bleeker, 1862
Genus *Hemiaris* Bleeker, 1862
Hemiaris sumatranus (Anonymous, 1830)
Maximum size: 320 mm TL
Brackish and fresh waters.
(Marceniuk and Menezes, 2007)
Genus *Netuma* Bleeker, 1858
Netuma thalassina (Rüppell, 1837) Body greyish blue to fawn, back and sides iridescent coppery or golden.
Coastal marine and brackish waters
(Day, 1877 as *Arius serratus* (in part pl. 105, fig. 3); Zugmayer, 1913; Qureshi,

1955 as *Arius serratus*; Jalil and Khaliluddin, 1972 as *Tachysurus thalassinus*)



(Photo courtesy Moazzam)

Netuma bilineata (Valenciennes, 1840)
Body reddish or bluish brown, with bronze iridescence over back and sides; adipose fin dark brown. Brackish
(Day, 1877 as *Arius serratus*, pl. 105 (fig. 3) (in part))



(Online image)

Genus *Arius* Cuvier and Valenciennes, 1840

Arius arius (Hamilton, 1822) Max. size 40.0 cm SL. Body bluish brown above, white below; fins yellow; dorsal and caudal fins with dark margins; adipose fin with large black spot
Demersal. Enters brackish water waters and tidal rivers
(Jayaram, 1982; Hoda, 1988 as *Arius buchanaani*)



(Photo courtesy Moazzam)

Arius jella Day, 1877 Max. size 30.0 cm TL.
Found mostly in coastal marine waters, estuaries, and tidal rivers
(Jalil and Khaliluddin, 1972 as *Tachysurus jella*)



(Online image)

Arius maculatus (Thunberg, 1792) Max. size 80.0 m TL. Body bluish brown above, white below; fins yellow, dorsal

and caudal fins with dark margins; adipose fin with a large black spot
Demersal, brackish water freshwater, depth range 50–100 m.
(Jalil and Khaliluddin, 1972 as *Tachysurus maculatus*)



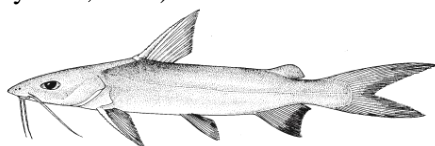
(Photo courtesy Moazzam)

Arius subrostratus Valenciennes, 1840
Max. size 39.5 cm. Silvery blue above, becoming lighter on sides and belly; series of vertical bands on body; fins edged with grey
Demersal, brackish water, depth range 20 m (Day, 1889; Jayaram, 1982)



(Online image)

Arius sumatranus (Bennett, 1830) Max. size 39.5 cm. Dark brown, reddish, or bluish green above, lighter on sides and belly; fins grey-edged; pectoral and pelvic fins dark above
Found in brackish and fresh waters, estuaries and tidal rivers
(Jayaram, 1982)



(Online image)

Arius malabaricus Day, 1877

Brackish; demersal
(Qureshi, 1955)

Genus *Galeichthys* Valenciennes, 1840

Galeichthys feliceps Valenciennes, 1840 (map Key book to world map of Fisheries, 1983 as *Tachysurus feliceps*). Presence in Pakistan doubtful.

Genus *Nemapteryx* Ogilby, 1908

Nemapteryx caelata (Valenciennes, 1840)

Max. size 45.0 cm TL. Body bluish-bronze on above, whitish below, body with metallic blue iridescence, edge of

fins black, dorsal and adipose fin entirely black

Brackish; demersal

(Day, 1889; Jayaram, 1982 as *Arius caelatus* Valenciennes)



(Photo courtesy Osmany)

Nemapteryx nenga (Hamilton, 1822)

Body bronze above; fins yellow; barbels and fin filaments black

Enters estuaries and tidal rivers
(Marceniuk and Menezes, 2007)



(After Kailola, 1999)

Genus *Plicofollis* Kailola, 2004

Plicofollis layardi (Günther 1866)

Bluish grey above, silvery grey on belly; tips of dorsal, pectoral and caudal fins blackish

Coastal marine waters and estuaries
(Psomadakis *et al.*, 2015)

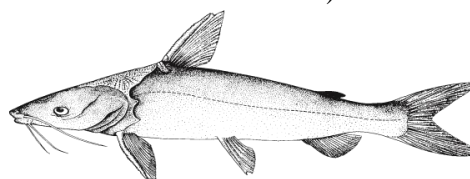


(Photo courtesy Osmany)

Plicofollis tonggol (Bleeker, 1846) Max. Size 40.0 cm TL.

Demersal, depth range 10–50 m. found in coastal waters, entering tidal rivers and estuaries

(Jayaram, 1982; Fischer and Bianchi, 1984 as *Arius crossocheilos*)



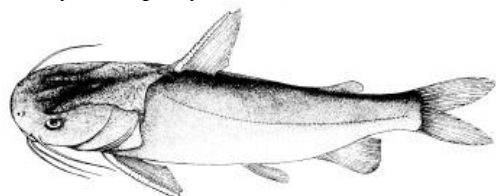
(Online image)

Plicofollis dussumieri (Valenciennes, 1840) Max. size 62.0 cm SL. Bluish black on dorsal surface and sides, dull white below; fin tips edged with black. Demersal, brackish water, freshwater, depth range (Day, 1878 as *Arius dussumieri* Valenciennes)



(Photo courtesy Moazzam)

Plicofollis platystomus (Day, 1877) Max. size 15.0 cm TL Bluish black above, lighter below; fins yellowish green; no distinctive markings Demersal, brackish water, found in coastal waters and estuaries (Jalil and Khaliluddin, 1972 as *Tachysurus platystomus*)



(Online image)

Plicofollis tenuispinis (Day, 1877) Max. size 36.0 cm TL. Bluish-black on above and lateral surface, pale white ventrally; each fin edges blackish. Demersal, brackish water, depth range 20–50 m. (Qureshi, 1955 as *Arius tenuispinis* Day)



(Photo courtesy Moazzam)

Genus *Sciades* Müller and Troschel, 1849

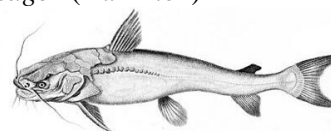
Sciades sona (Hamilton, 1822) Max. size 92.0 cm TL. Brownish above, dashed with gold on sides, dull white below; outer adipose, caudal and anal fins bluish black

Demersal, , brackish water, depth range 50–60 m. (Day, 1889; Jayaram, 1982 as *Arius sona* (Hamilton))



(Photo courtesy Osmany)

Genus *Hexanematichthys* Bleeker, 1858
Hexanematichthys sagor (Hamilton, 1822) Max. size 45.0 cm TL. Body bluish brown above, white below; fins dusky, paired fins with white margin; peritoneum fawn or dark grey. Found along the coastline, mainly around estuaries (Day, 1889; Fischer and Bianchi, 1984 as *Arius sagor* (Hamilton))



(Online image)

Genus *Osteogeneiosus* Bleeker, 1858
Osteogeneiosus militaris Linnaeus, 1758) Max. Size 35.0 cm TL. Bluish above, white or cream below; margins of dorsal and adipose fins dark blue. Found in coastal waters, estuaries and river mouths (Day, 1889; Niazi, 1975 in family Tachysuridae)



(Photo courtesy Moazzam)

Genus *Batrachocephalus* Bleeker 1846
Batrachocephalus mino (Hamilton, 1822) Max. size 25.0 cm TL. Body dark brown above, white below; fins dusky yellow, upper lobe of caudal fin dark Demersal, in coastal waters, also in estuaries and tidal rivers (Day, 1889; Jayaram, 1982)



(Photo courtesy Moazzam)

Family Plotosidae Bleeker, 1858
 Genus *Plotosus* Lacepede, 1803
Plotosus canius (Hamilton, 1822) Max.
 size 150 cm TL.
 Demersal, brackish water, freshwater
 (Jalil and Khaliluddin, 1972)



(Online image)

Plotosus limbatus Valenciennes, 1840
 Max. size 41.0 cm SL. Body reddish
 brown to dark brown ; fins often blackish
 brown, usually with a black border
 Demersal, brackish water, freshwater
 (Bianchii, 1985)



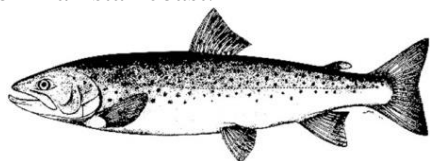
(Photo courtesy Osmany)

Plotosus lineatus (Thunberg, 1787) Max.
 size 32.0 cm TL. Brown or black above,
 whitish below, with 2–3 white or yellow
 stripes; 2 of the stripes from snout to near
 caudal peduncle.
 Reef-associated, brackish water, depth
 range 1–60 m.
 (Zugmayer, 1913; Qureshi, 1955 as
Plotosus arab)



(Photo courtesy Moazzam)

Order Salmoniformes Bleeker, 1859
 Family Salmonidae G. Cuvier, 1816
 Genus *Salmo* Linnaeus, 1758
Salmo trutta trutta Linnaeus, 1758 Max.
 size 140 cm SL.
 Pelagic, and littoral habitats, mostly close
 to coast, not very far from estuary,
 brackish water, freshwater
 (FAO,1988). Absolutely wrong report
 from Pakistan coast.



(Online image)

Order Stomiiformes Regan, 1909

Family Gonostomatidae Cocco, 1838
 Genus *Cyclothone* Goode and Bean,
 1883

Cyclothone braueri Jespersen and
 Tåning, 1926
 Mesopelagic
 (ZipcodeZoo)

Cyclothone acclinidens Garman, 1899
 May be found at depths of 50 to 1900
 meters. Usually found at depths of 500 to
 1000 meters. (IUCN)



(Online image)

Cyclothone alba Brauer, 1906
 Occurs from 200-1,200 m in depth
 (IUCN RedList)

Cyclothone pallida Brauer, 1902
 Lower depth limit 4650 m. Upper depth
 limit 16m.
 (IUCN RedList)

Cyclothone atraria Gilbert, 1905
 At 1500 m depth
 (Hussain and Mujib, 1970 as *Cyclothone
 pacifica*)

Family Sternoptychidae Duméril, 1805
 Genus *Maurolicus* Cocco, 1838
Maurolicus muelleri (Gmelin,
 1789) Max. size 8.0 cm TL.
 Bathypelagic, depth range 0–1524 m.
 Oceanic, found in deep water
 (Gjøsaeter, 1981)



(Online image)

Family Stomiidae Bleeker, 1859
 Genus *Echiostoma* Lowe, 1843
Echiostoma barbatum Lowe, 1843
 Max. Size 36.8 cm SL.
 Bathypelagic
 (Hoda, 1988)



(Online image)

Astronesthes cyaneus (Brauer, 1902)

Bathypelagic; 120 - 800 m .
(Khan,2010)



(Photo courtesy Moazzam)

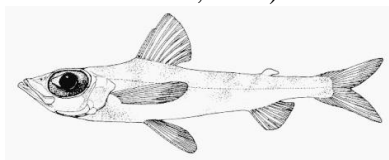
Order Aulopiformes Rosen, 1973

Family Ipnopidae Gill, 1884
Genus *Bathytyphlops* Nybelin, 1957
Bathytyphlops sewelli (Norman, 1939)
At 3840-3872 m.
(Norman, 1939)



(Online image)

Family Chlorophthalmidae Garman, 1899
Genus *Chlorophthalmus* Bonaparte, 1840
Chlorophthalmus agassizi Bonaparte, 1840 Max. size 40.0 cm TL.
Bathydemersal, brackish water, depth range 50–1000 m. over mud and clay bottom
(Fischer and Bianchi, 1984)



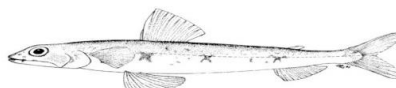
(FAO image)

Family Synodontidae Gill, 1861
Genus *Synodus* Scopoli, 1777
Synodus indicus (Day, 1873) Max. size 33.0 cm TL. Body dusky pink above, with pale bluegrey blotches and stripes; two small pigmented spots at upper distal corner of operculum; 9–11 peritoneal spots
Reef-associated, depth range 20–100 m. Found on current-prone sand or mud bottoms
(Jalil and Khaliluddin, 1972)



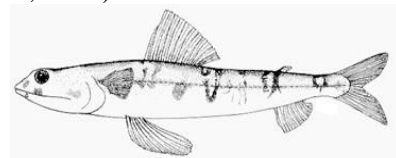
(Online image)

Synodus macrops Tanaka, 1917 Max. size 20.0 cm TL. Body tan, darker on back than on belly; 3 X-shaped spots on sides
Demersal, depth range 35–200 m. Found from coastal sand flats to deep off-shore
(Fischer and Bianchi, 1984)



(Online image)

Synodus variegatus (Lacepede, 1803) Max. Size 40.0 cm TL.
Depth range 4–91 m. Inhabits deep lagoon and seaward reefs; sometimes found on sandy bottoms concealing itself in the sand
(FAO, 1983)



(FAO image)

Genus *Trachinocephalus* Gill, 1861
Trachinocephalus myops (Forster, 1801) Max. size 40.0 cm TL.
Reef-associated, depth range 400 m. Found near shore over sandy bottoms of deep outer reef slopes
(Qureshi, 1955 as *Saurus myops*)



(Photo courtesy Moazzam)

Genus *Saurida* Valenciennes, 1849
Saurida longimanus Norman, 1939 Max. size 25.0 cm TL. Brownish above, silvery white below; upper half of pectoral fin and distal parts of dorsal fin and lower caudal lobe, dusky, no markings
Demersal, depth range 100–200 m.
(Fischer and Bianchi, 1984)



(Photo courtesy Osmany)

Saurida tumbil (Bloch, 1795) Max. size 60.0 cm FL. Back and sides brown, belly pale or silvery; distal parts of dorsal, pectoral and caudal fins dusky , no markings Reef associated, depth range 10– 60 m. Found on muddy bottoms (Qureshi, 1955)



(Photo courtesy Moazzam)

Saurida undosquamis (Richardson, 1848) Max. size 50.0 cm SL. Reef-associated, depth range 1–350 m. Found on the sublittoral zone over sand or mudbottoms (Fischer and Bianchi, 1984; may be new species fide Psomadakis *et al.*,2015)



(Photo courtesy Moazzam)

Saurida lessepsianus Russell, Golani and Tikochinski, 2015 benthopelagic; depth range 20 - 100 m (Zohra *et al.*, 2022)



Genus *Harpadon* Le Sueur, 1825
Harpadon nehereus (Hamilton, 1822) Max. size 40.0 cm TL. Uniform light grey or brownish Benthopelagic, brackish water, depth range 50m. Inhabit deep water offshore on sandy mud bottom (Qureshi, 1955)



(Photo courtesy Moazzam)

Harpadon squamosus (Alcock, 1891)

Bathydemersal; depth range 439 - 505 m (Norman, 1939)



(Photo courtesy Moazzam)

Order Myctophiformes Regan, 1911

Family Myctophidae Gill, 1893
Genus *Diaphus* Eigenmann and Eigenmann, 1890

Diaphus aliciae Fowler, 1934 Max. size 6.0 cm SL. Bathypelagic, depth range 489 m. (Hoda, 1988)

Diaphus coeruleus (Klunzinger, 1871) Max. size 13.7 cm SL. Bathypelagic, depth range 457– 549 m. (Hoda, 1988)



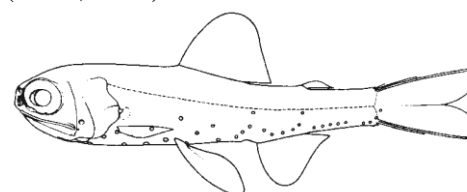
(Online image)

Diaphus dumerilii (Bleeker, 1856) May be found at depths of 0 to 805 meters. Usually found at depths of 450 to 500 meters. (ZipcodeZoo)



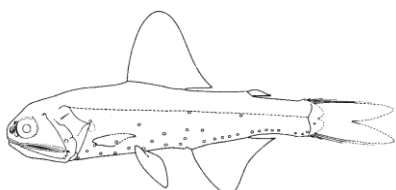
(Online image)

Diaphus fulgens Brauer, 1904 Max. size 4.5 cm SL. Bathypelagic (Hoda, 1988)



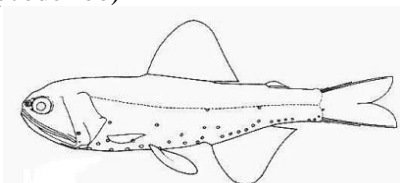
(Online image)

Diaphus garmani Gilbert, 1906 Max. size 6.0 cm SL. Bathypelagic, depth range 0–2091 m. (Hoda, 1988)



(Online image)

Diaphus malayanus Weber, 1913
Pelagic-oceanic; deep-water; depth range
1000 - 2000 m.
(ZipcodeZoo)



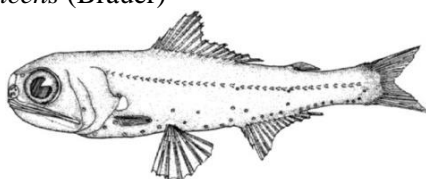
(Online image)

Diaphus meadi Nafpaktitis, 1978
Bathydemersal. May be found at depths
of 237 to 800 meters.
(ZipcodeZoo)



(Online image)

Diaphus perspicillatus (Ogilby, 1898)
Max. size 7.1 cm SL.
Bathypelagic, depth range 0–750 m .
(Jalil and Khaliluddin, 1972 as *Diaphus
elucens* (Brauer)



(Online image)

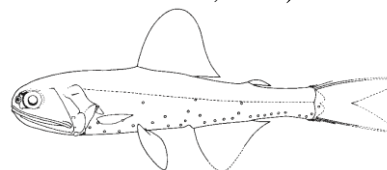
Diaphus rafinesqueii (Cocco, 1838)
Nektonic. Found at depths of 40- 1080 m.
(ZipcodeZoo)

Diaphus regani Tåning, 1932
Deep sea, offshore at 750 meters depth
(ZipcodeZoo as *Diaphus regain* Tåning)

Diaphus splendidus (Brauer, 1904) Max.
size 9.0 cm SL.

Mesopelagic during day, bathypelagic
during night, depth range 40–3872 m.

(Jalil and Khaliluddin, 1972)



(Online image)

Diaphus taaningi Norman, 1930
May be found at depths of 40 to 475
meters.

(Gjøsæter , 1981). May not occur in
Pakistan.

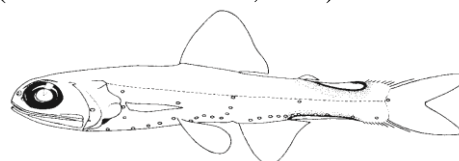
Diaphus termophilus Tåning, 1928
May be found at depths of 40 to 850
meters. Usually found at depths of 400 to
500 meters.

(ZipcodeZoo)

Genus *Lampadena* Goode and Bean,
1895

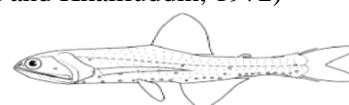
Lampadena chavesi Collett, 1905 Max.
size 8.0 cm SL.

Bathypelagic, depth range 40– 800 m.
(Jalil and Khaliluddin, 1972)



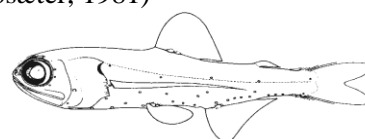
(Online image)

Genus *Lampanyctus* Bonaparte, 1846
Lampanyctus pusillus (Johnson, 1890)
Max. size 4.3 cm SL.
Bathypelagic, depth range 40–850 m.
(Jalil and Khaliluddin, 1972)



(Online image)

Genus *Bolinichthys* Girard, 1859
Bolinichthys longipes (Brauer, 1906)
Max. size 5.0 cm SL.
Bathypelagic, depth range 50– 725 m.
(Gjøsæter, 1981)



(Online image)

Genus *Benthosema* Goode and Bean,
1895

Benthoosema fibulatum (Gilbert and Cramer, 1897)

Max. size 10.0 cm TL. silvery with metallic green or blue scales .
Bathypelagic, depth range 0–2000 m. (1975-77 in Despoti ,2013 ;Gjørseter, 1981)



(Photo courtesy Osmany)

Benthoosema pterotum (Alcock, 1890)

Max. size 7.0 cm TL. silvery with metallic green or blue scales. Bathypelagic, depth range 10–300 m. Found in 130-300 m during the day and in 10-200 m at night (collected in 1976 in Despoti ,2013; Gjørseter, 1981)



(Online image)

Genus *Hygophum* Bolin, 1939

Hygophum proximum Becker, 1965

Max. size 5.0 cm SL.
Bathypelagic, depth range 600 m. (Gjørseter, 1981)

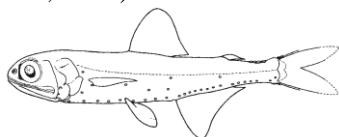


(Online image)

Genus *Symbolophorus* Bolin and Wisner, 1959

Symbolophorus evermanni (Gilbert, 1905)

Max. size 8.0 cm SL.
Bathypelagic (Gjørseter, 1981)



(Online image)

Order Ophidiiformes Berg, 1937

Family Ophidiidae Rafinesque, 1810

Genus *Brotula* Cuvier, 1829

Brotula multibarbata Temminck and Schlegel, 1846

Max. size 100.0 cm TL. Dark brown with a submarginal black band; narrow white border on the dorsal and anal fins
Benthopelagic, reef-associated, depth range 650 m. (Hoda, 1988)



(Photo courtesy, Moazzam)

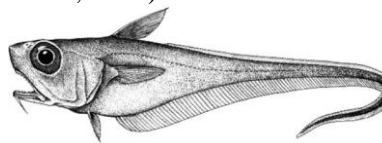
Order Gadiformes Goodrich, 1909

Family Macrouridae Bonaparte, 1831

Genus *Malacocephalus* Günther 1862

Malacocephalus laevis (Lowe, 1843)

Max. size 60.0 cm TL.
Bathydemersal, depth range 200-1000 m. Found on continental slopes (FishBase, 2006)



(FAO image)



(Image courtesy FishBase)

Genus *Odontomacrurus* Norman, 1939

Odontomacrurus murrayi Norman, 1939

Mesopelagic 300-3000 m. (IUCN)



(After Norman,1939)

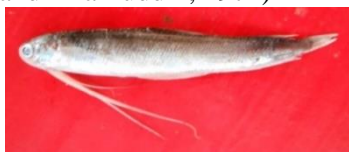
Family Bregmacerotidae Gill, 1872

Genus *Bregmaceros* Thompson, 1840

Bregmaceros mccllellandii Thompson, 1840 Max. size 9.6 cm SL. Upper part of pectoral fins black or rather dark; dark pigment usually present on caudal fin, anterior and posterior lobes of 2nd dorsal and anal fin.

Pelagic, brackish water, depth range 0–2000 m.

(Jalil and Khaliluddin, 1972)



(Photo courtesy Moazzam)



Order Batrachoidiformes Nelson, 1994.

Family Batrachoididae Jordan, 1896

Genus *Colletteichthys* Greenfield, 2006

Colletteichthys dussumieri

(Valenciennes, 1837) Max. size 27.0 cm TL.

Demersal, Shallow water on mud bottoms in seaweed beds

(Fischer and Bianchi, 1984 as

Austrobatrachus dussumieri

(Valenciennes)



(Photo courtesy Moazzam)

Colletteichthys occidentalis Greenfield, 2012 Light brown, shading to white ventrally, with four, irregular, branching, dark brown bars on body and dark bands and blotches on head and fins; pelvic fins white, crossed by 5 tan bars; dorsal, anal and caudal fins gray with distinct white markings.

May occur in coral reefs or in seagrass or weedy bottoms; in tidepools

(Greenfield, 2012)



(After Randall, 1999)

Genus *Allenbatrachus* Greenfield, 1997

Allenbatrachus grunniens (Linnaeus, 1758) Max. size 30.0 cm TL.

Demersal, brackish water

(Kenkins, 1910; Qureshi, 1955 as *Batrachus grunniens*)



(Photo courtesy Moazzam)

Order Lophiiformes Garman, 1899

Family Lophiidae Rafinesque, 1810

Genus *Lophiomus* Gill, 1883

Lophiomus setigerus (Vahl, 1797) Max. size 40.0 cm TL. Light to dark brown above, lighter below; dorsal surface frequently mottled; all fin rays with pale tips; 2nd cephalic dorsal fin spine darkly pigmented

Demersal; depth range 30–500 m. Found on sandy mud bottom

(Hoda, 1988 as *Lophiodes setigerus*)



(Photo courtesy Moazzam)

Family Antennariidae Gill, 1863

Genus *Antennarius* Daudin, 1816

Antennarius hispidus (Bloch and Schneider, 1801) Max. size 20.0 cm TL. Ground color of head and body lighttan with narrow blackish brown streaks, some radiating from eye; all fins with blackish brown spots; belly without stripes.

Reef-associated; depth range 90 m

(Kazmi and Qureshi, 1977 unpublished ms; Khan, 1977)



(Photo courtesy Osmany)

Antennarius nummifer (Cuvier, 1817)

Max. size 13.0 cm TL. Ground colour may be yellow, orange, pink, red, olive, brown, or brown mixed with another colour; a prominent ocellated black spot usually present at base of soft dorsal fin

Benthic, reef-associated, depth range 0–293 m.
(Qureshi, 1955)



Antennarius striatus (Shaw, 1794) Max. size 25.0 cm TL.
Depth range 10–219 m. Inhabit rocky and coral reefs, on rocks, sand or rubble, weedy estuaries
(Hoda, 1988 as *A. pinniceps* Valenciennes)



(Photo courtesy Moazzam)

Family Ogcocephalidae Jordan, 1895
Genus *Halieutaea* Cuvier and Valenciennes, 1837
Halieutaea indica Annandale and Jenkins, 1910 Yellow pectorals with a white band across
Occurs offshore on muddy substrates
(Moazzam, 2005)



(Photo courtesy Moazzam)

Order Perciformes Bleeker, 1859

Family Epigonidae Poey, 1861
Genus *Epigonus* Rafinesque, 1810
***Epigonus* sp.**
Oxygen deficient zone
(Murty *et al.*, 2009)

Family Centrolophidae Bonaparte, 1846
Genus *Psenopsis* Gill, 1862
Psenopsis cyanea (Alcock, 1890)
in deep water
(Psomadakis, 2015)



(Photo courtesy Osmany)

Family Pomatomidae Gill, 1863
Genus *Pomatomus* Lacepède, 1802
Pomatomus saltatrix (Linnaeus, 1766)
130cm .Back greenish blue, sides and belly silvery; dorsal and anal fins pale green tinged with yellow; pectoral fins bluish at base; caudal fin dull greenish tinged with yellow
Occurs in oceanic and coastal waters
(Psomadakis *et al.*, 2015)



(Photo courtesy Osmany)

Family Pentacerotidae Bleeker, 1859
Genus *Histiopterus* Temminck and Schlegel, 1844
Histiopterus typus Temminck and Schlegel, 1844
Reef-associated; depth range 40 - 421 m.
(Hussain and Kidwai, 1994)



(Photo courtesy Moazzam)

Family Channidae Fowler, 1934
Genus *Channa* Scopoli, 1777
Channa gachua (Hamilton, 1822)
Coastal
(Day, 1878 as *Ophiocephalus gachua*)



(Photo courtesy Osmany)

Channa striata (Bloch, 1793) Body white, dorsally grey dark irregular with, ventrally blackish bars
Fresh to brackish waters
(Qureshi, 1965)



(Photo courtesy Moazzam)

Suborder Mugiloidei Greenwood *et al.*, 1966

Family Mugilidae Jarocki, 1822

Genus *Rhinomugil* Gill, 1863

Rhinomugil corsula (Hamilton, 1822)

Brackish; pelagic

(FishBase)



Genus *Mugil* Linnaeus, 1758

Mugil cephalus Linnaeus, 1758 Max. size 120 cm SL.

Benthopelagic, brackish water, freshwater, depth range 0–120 m. Found over sand or mud bottom and dense vegetation in coastal water, in calm waters close to shore, around mouths of streams and inlets, and brackish bays and harbours. Usually found in schools over sand or mud bottom

(Day, 1878 as *Mugil oeur*)



(Photo courtesy Osmany)

Genus *Liza* Jordan and Swainson, 1884

Liza abu (Heckel, 1843) Max. size 20.0 cm TL. Pelagic, brackish water, freshwater

(Bianchi, 1985)



(FAO image)

Liza carinata (Valenciennes, 1836)

Max. size 18.0 cm TL.

Pelagic, brackish water mainly in coastal waters, also in inlet waters and estuaries of rivers

(Jenkins, 1910 as *Mugil carinatus*)



(Photo courtesy Osmany)

Liza klunzingeri (Day, 1888) Max. size 20.0 cm TL. Demersal

(Jenkins, 1910 as *Mugil klunzingeri*; FishBase, 2006 as *Lizaklunzingeri*)

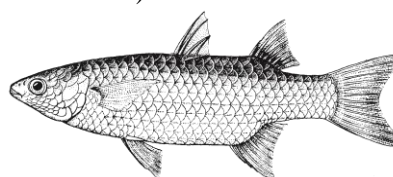


(Photo courtesy Osmany)

Planiliza melinoptera (Valenciennes, 1836) Max. size 30.0 cm SL.

Reef-associated, brackish water, freshwater

(Hoda, 1988 as *Liza melanoptera* (Valenciennes))



(Online image)

Genus *Ellochelon* Whitley, 1930

Ellochelon vaigiensis (Quoy and Gaimard, 1825) Max. size 63.0 cm TL.

Occurs in lagoons, reef flats, along protected sandy shorelines

(Qureshi, 1955 as *Mugil vaigiensis*)



(Photo courtesy Moazzam)

Genus *Planiliza* Whitley, 1945

Planiliza macrolepis (Smith, 1846)

Max. size 60.0 cm SL.

Demersal, brackish water, freshwater, depth range 10 m.

(Qureshi, 1960 as *Mugil poecilus*;

Qureshi, 1960 as *Mugil dussumieri*

Valenciennes; Osmany, 2013 as *Chelon macrolepis*)



(Photo courtesy Osmany)

Planiliza subviridis (Valenciennes, 1836) Brackish, fresh

(Talwar and Jhingran, 1991 as *Liza subviridis*)



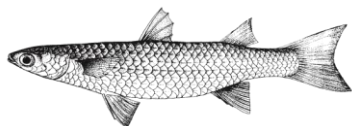
(Photo courtesy Moazzam)

Genus *Chelon* Artdi, 1793
Chelon planiceps (Valenciennes, 1836)
 Max. size 70.0 cm TL.
 Demersal, brackish water, freshwater,
 depth range 10 m
 (Day, 1876; Qureshi, 1955 as *Mugil
 belanak*, *Liza tade*)



(Photo courtesy Moazzam)

Chelon parsia (Hamilton, 1822) Max.
 size 16.0 cm TL.
 Demersal, brackish water, freshwater, in
 shallow coastal waters, depth range 10 m
 (Qureshi, 1960 as *Mugil parsia*)



(Online image)



(Photo courtesy Osmany)

Genus *Osteomugil* Luther, 1982
Osteomugil cunnesius (Valenciennes,
 1836) Max. TL 41.0 cm TL.
 Found in shallow coastal waters,
 including estuaries and backwaters,
 frequently enters freshwater
 (Day, 1878 as *Mugil
 amarulus*; Jenkins, 1910 as *Mugil
 cunnesius* and *Mugil kelaarti* Günther



(Photo courtesy Osmany)

Osteomugil speigleri (Bleeker, 1858)
 Max. TL 35.0 cm. Greenish dorsally;
 flanks and abdomen silvery First dorsal
 fin with black margin, other fins dusky.

Pectoral fins with dark spot dorsally at
 origin

Demersal. Found in shallow water, enters
 estuaries and freshwaters, in rice fields
 and mangrove swamps

(Qureshi, 1955 as *Mugil speigleri*)

Genus *Moolgarda* Whitley, 1945

Moolgarda seheli (Forsskål, 1775) Max.
 size 60.0 cm TL.

Reef-associated, brackish water,
 freshwater

(Qureshi, 1960 as *Mugil seheli*)

Taxonomy unclear.



(Online image)

Genus *Crenimugil* Schultz, 1946

Crenimugil crenilabis (Forsskål, 1775)

Coastal waters, over sandy or muddy
 areas of lagoons, reef flats and tide pools
 (Qureshi, 1960)

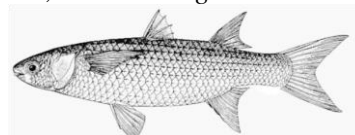


(After Randall, 1999)

Crenimugil buechanani (Bleeker, 1853)

Inhabits coastal waters, including
 estuaries and rivers

(Qureshi, 1960 as *Mugil buechanani*)



(Online image)

Genus *Paramugil* Ghasemzadeh,
 Ivantsoff and Aarn, 2004

Paramugil parmatus (Cantor, 1849)
 Max. size 30.0 cm TL.

Demersal. Found in coastal waters,
 entering estuaries and rivers

(Jalil and Khaliluddin, 1972 as *Liza
 oligolepis* (Bleeker) and *Liza parmata*
 (Cantor). Presence in Pakistan doubtful.

Taxonomy uncertain



(Picture Source:FishWise Professional)
Order Beloniformes Berg, 1937

Family Belonidae Bonaparte, 1835
Genus *Tylosurus* Cocco, 1833
Tylosurus acus (Lacepède, 1803) Max. size 100.0 cm TL. Dark bluish above, silvery white below
Pelagic, reef-associated, depth range 50 m
(Fischer and Bianchi, 1984) An Atlantic species may not occur in Pakistan



(Online image)

Tylosurus crocodilus (Péron and Lesueur, 1821) Max. size 150 cm. TL Dark bluish green above, silvery below; a dark blue stripe along sides; juveniles (to 20 cm body length) with elevated black lobe in posterior part of dorsal fin
Pelagic, depth range 0–13 m. in lagoon and seaward reefs
(Fischer and Bianchi, 1984)



(Photo courtesy Osmany)

Genus *Ablennes* Jordan and Fordice, 1886
Ablennes hians (Valenciennes, 1846)Max. size 140 cm.TL. Bluish green above, silvery white below. Pelagic, reef-associated, brackish water
(Bianchi, 1984)



(Photo courtesy Osmany)

Genus *Strongylura* Van Hasselt, 1824
Strongylura leiura (Bleeker, 1850) Max. size 100.0 cm TL. Back greenish, sides silvery, white ventrally; a black bar on cheek between opercle and preopercle; pectoral fins dark distally, the tip yellow. Reef-associated, brackish water
(Fischer and Bianchi, 1984)



(Photo courtesy Moazzam)

Strongylura strongylura (van Hasselt, 1823) Max. size 40.0 cm SL. Back greenish, sides silvery, white ventrally, pectoral, pelvic and anal fins light; dorsal fin lobe and distal margin of caudal fin yellow ; caudal fin with a prominent round black spot near its base; anterior margin of anal fin orange
Found in coastal areas and mangrovelined lagoons, also enters freshwater
(Jetkins,1910 as *Belone strongylurus*)



(Photo courtesy Moazzam)

Genus *Xenentodon* Regan, 1911
Xenentodon cancila (Hamilton, 1822)
Max. size 40.0 cm TL.
Pelagic, brackish water, freshwater
(Jalil and Khaliluddin, 1972)



Genus *Platybelone* Fowler, 1919
Platybelone argalus (Lesueur, 1821)
Max. size 38.2 cm SL. Bluish green above, silvery below; a dark blue stripe along sides; fins unpigmented; scales and bones green.
Reef-associated
(Fischer and Bianchi, 1984). May not occur in Pakistan. An Atlantic species.



(Online image)

Family Adrianichthyidae Weber, 1913
Genus *Oryzias* Jordan and Snyder, 1906
Oryzias setnai (Kulkarni, 1940)
Fresh and coastal brackish water in estuaries. Inhabits quiet rocks and corners of creeks, backwaters and pools along coastal regions
(IUCN)



(Online image)

Family Excoetidae Risso, 1827

Genus *Parexocoetus* Bleeker, 1866
Parexocoetus mento (Valenciennes, 1847) Max. size 11.0 cm SL.
 Pelagic, depth range 0–20 m. (Hoda, 1988)



(Online image)

Genus *Exocoetus* Linnaeus, 1758
Exocoetus monocirrhus Richardson, 1846 Max. size 20.0 cm SL. Body dark iridescent blue above, silvery white below; pectoral fins brown or dark brown and caudal fin greyish or brownish
 Pelagic, depth range 0–20 m.
 (Abdullah el Husseini, 1965; Hoda, 1988)



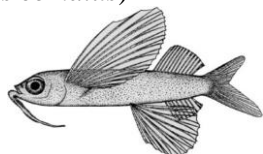
(FAO image)

Exocoetus volitans Linnaeus, 1758 Max. size 30.0 cm TL. Dark above, iridescent blue below ; dorsal fin greyish; pectoral fins grey
 Pelagic, depth range 0–20 m.
 (Qureshi, 1955)



(Online image)

Genus *Cypselurus* Swainson, 1839
Cypselurus comatus (Mitchill, 1815) Max. size 30.0 cm TL.
 Pelagic, inhabits near shore surface waters
 (Jalil and Khaliluddin, 1972 as *Exocoetus comatus*)



(Online image)

Cypselurus oligolepis (Bleeker, 1866) Max. size 27.7 cm TL.
 Pelagic, depth range 0–20 m.

(Hoda, 1988)



(Online image)

Cypselurus poecilopterus (Valenciennes, 1847) Max. size 27.0 cm TL.
 Pelagic, depth range 0–20 m.
 (Hoda, 1988 as *Exocoetus poecilopterus*)



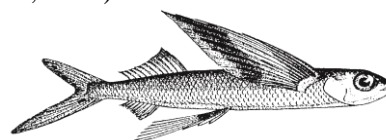
(Online image)

Genus *Cheilopogon* Lowe, 1840
Cheilopogon abei Parin, 1996 Max. size 22.0 cm SL. Dorsal and pelvic fins with a bright black spot; anal fin without pigmentation; pectoral fins black with an oblique bright yellow or gray stripe; caudal fin evenly dark gray
 Occurs in neritic surface waters
 (FishBase, 2006)



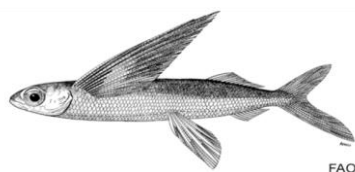
(Online image)

Cheilopogon furcatus (Mitchill, 1815) Max. size 35.0 cm TL. Pectoral fins light or dark grey with a pale margin, the central portion crossed by a pale stripe becoming narrower toward anterior fin margin; pelvic fins pale
 Pelagic, depth range 0–20 m.
 (Hoda, 1988)



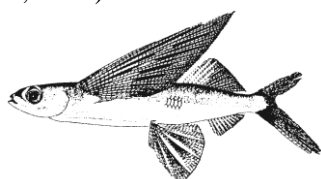
(Online image)

Cheilopogon intermedius Parin, 1961 Max. size 22.0 cm SL.
 Pelagic, depth range 0–20 m.
 (Hoda, 1988)



(FAO image)

Cheilopogon nigricans (Bennett, 1840)
 Max. size 28.0 cm SL.
 Pelagic, inhabits surface waters of the open ocean
 (Bianchi, 1984)



(Online image)

Cheilopogon cyanopterus
 (Valenciennes, 1847)
 Pelagic-oceanic
 (Moazzam, 2015)



(Online image)

Cheilopogon suttoni (Whitley and Colefax, 1938) Dorsal fin usually with a black spot; pectoral fins grey or brownish with numerous scattered dark spots ; pelvic fins usually without spots. Pelagic in open ocean and neritic surface waters
 (Psomadaki *et al.*, 2015)



(Photo courtesy Osmany)

Genus *Prognichthys* Breder, 1928
Prognichthys brevipinnis
 (Valenciennes, 1847) Max. size 19.0 cm SL.
 Pelagic, depth range 0–20 m. Found in neritic surface waters
 (Hoda, 1988)



(Online image)

Prognichthys gibbifrons (Valenciennes, 1847)
 Max. size 19.5 cm SL.
 Pelagic. Occurs in surface waters
 (Jalil and Khaliluddin, 1972 as *Exocoetus gibbifrons*)



(Online image)

Prognichthys sealei Abe, 1955 Max. size 19.0 cm SL. Pelagic, depth range 0–20 m. (Hoda, 1988)



(Online image)

Genus *Hirundichthys* Breder, 1928

Hirundichthys coromandelensis
 (Hornell, 1923)

Max. size 19.0 cm SL. Pectoral fins dark brown with a wide or narrow pale margin and virtually without pale transverse stripe; pelvic fins transparent; dorsal fin gray; anal fin semi-transparent, gray at the base, caudal fin light brown. Pelagic, inhabit surface waters of both neritic and oceanic areas
 (Fischer and Bianchi, 1984)



(Online image)

Hirundichthys oxycephalus (Bleeker, 1852) Max. size 18.0 cm SL.
 Nerito-oceanic. Pelagic, depth range 0–20 m/
 (Fischer and Bianchi, 1984)
Hirundichthys indicus indicus
 Shakhovskoy and Parin, 2013 Pectoral fins with a wide pale margin and with a

very large pale transverse stripe passing throughout the fin in specimens larger than 8 cm SL

Pelagic in oceanic surface waters (Psomadakis *et al.*, 2015)



(Online image)

Hirundichthys speculiger

(Valenciennes, 1847)

Dorsal fin unpigmented or greyish; pectoral fins dark with a pale triangle stripe and wide pale margin Pelagicoceanic; depth range 80-10400 m (Abdullah el Hussein, 1965)



(FAO image)

Family Hemiramphidae Gill, 1859
Genus *Oxyporhamphus* Gill, 1863
Genus *Rhynchorhamphus* Gill, 1859

Rhynchorhamphus georgii

(Valenciennes, 1847)

Max. size 23.1 cm SL.

Pelagic. brackish water

(Qureshi, 1955 as *Hemirhamphus cantor*)



(Online image)

Genus *Hyporhamphus* Gill, 1859

Hyporhamphus limbatus (Valenciennes, 1847) Max. size 25.0 cm SL. Greenish above, the silvery lateral stripe widening posteriorly, white ventrally; fleshy tip of beak reddish

Pelagic, brackish water, freshwater

(Qureshi, 1955 as *Hemirhamphus limbatus*)



(Online image)

Hyporhamphus quoyi (Valenciennes,

1847) Max. size 31.2 cm SL.

Pelagic, brackish water, freshwater (Hoda, 1988)



(Online image)

Hyporhamphus sindensis (Regan, 1905)

Max. size 25.0 cm TL. Grey with a narrow lateral silvery stripe broadens posteriorly, its upper edge green; fleshy tip of beak red

Pelagic

(Regan, 1905 as *Hemirhamphus sindensis* Regan)



(Photo courtesy Osmany)

Hyporhamphus xanthopterus

(Valenciennes, 1847)

Max. size 15.0 cm TL.

Pelagic, brackish water, freshwater

(PARC, unpublished, 1985; Hoda, 1988)



(Online image)

Hyporhamphus dussumieri

(Valenciennes, 1847)

Around islands and coral reefs in schools at surface of lagoons and seaward reefs (Bianchi, 1985)



(Photo courtesy Osmany)

Genus *Hemiramphus* Cuvier, 1816

Hemiramphus convexus Weber and de Beaufort,

1922) Max. Size 17.6 cm SL.

Pelagic, found near islands

(Hoda, 1988 as *O. meristocystis* Parin, 1966)



(Online image)

Hemiramphus far (Forsskal, 1778) Max.

size 45.0 cm TL. Dark bluish above, silvery white below; beak dark, with a bright red fleshy tip

Reefassociated, brackish water, freshwater on submerged vegetation (Qureshi, 1955)



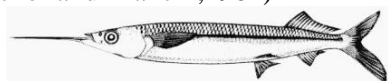
(Photo courtesy Osmany)

Hemiramphus marginatus (Forsskal, 1775) Max. size 26.0 cm SL. Estuaries, inlets and close to shore lines (Jalil and Khaliluddin, 1972)



(Online image)

Hemiramphus lutkei Valenciennes, 1847 Inhabits coastal waters rich in vegetation (Fischer and Bianchi, 1984)



(Online image)

Hemiramphus archipelagicus Collette and Parin, 1978 Dark bluish on back without any blotches on sides; a midlateral silvery stripe edged dorsally in dark green; silvery white on ventral side of body; beak dark, with a bright red fleshy tip; margin of caudal fin blackish as well as outer part of median fins Inhabits the immediate vicinity of coast (Tabassum *et al.*, 2015)



(Online image)

Family Zenarchopteridae Fowler, 1934 Genus *Zenarchopterus* Gill, 1864 *Zenarchopterus buffonis* (Valenciennes, 1847)

Max. size 23.0 cm TL. Reef-associated, brackish water (Hoda, 1988 as *Hemirhamphus buffonis*)



(Online image)

Order Cyprinodontiformes Berg, 1940

Family Cyprinodontidae Wagner, 1828 Genus *Aphanius* Nardo, 1827

Aphanius dispar (Ruppell, 1829) Max. size 7.0 cm TL. Demersal, brackish water, freshwater (Misra, 1962)



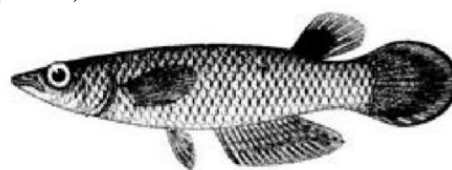
Male



Female

(Photo courtesy Moazzam)

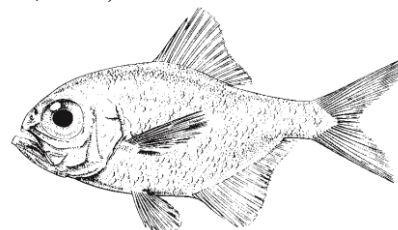
Family Aplocheilidae Bleeker, 1859 Genus *Aplocheilus* McClelland, 1839 *Aplocheilus panchax* (Hamilton, 1822) Brackish, fresh water benthopelagic (IUCN)



(FAO image)

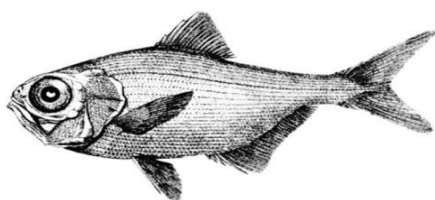
Order Beryciformes Nelson, 1984

Family Berycidae Lowe, 1839 Genus *Beryx* Cuvier, 1829 *Beryx decadactylus* Cuvier, 1829 Max. size 100.0 cm TL. Bathydemersal, depth range 180–800 m. Found on mud or sandy mud bottom (Hoda, 1988)



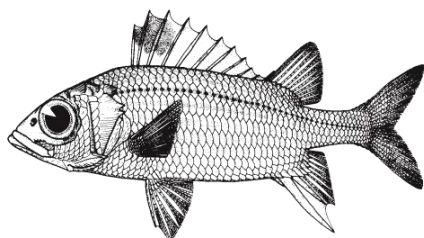
(Online image)

Beryx splendens Lowe, 1830 Max. size 70.0 cm TL. Benthopelagic, depth range 25–1300 m. (Fischer and Bianchi, 1984)



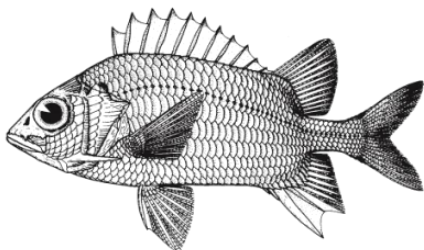
(Online image)

Family Holocentridae Bonaparte, 1833
Genus *Neoniphon* Castelnau, 1875
Neoniphon sammara (Forsskal, 1775)
Max. size 32.0 cm TL.
Inhabits seagrass beds and hardbottomed habitats from the reef flat to depths of 46 m or more on lagoon and seaward reefs (Hoda, 1988)



(Online image)

Genus *Sargocentron* Fowler, 1904
Sargocentron caudimaculatum (Ruppell, 1838) Max. size 25.0 cm TL.
Reef-associated, depth range 2–40 m. in outer reef areas, also in lagoons (Hoda, 1988)



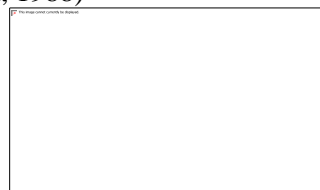
(Online image)

Sargocentron rubrum (Forsskal, 1775)
Max. size 32.0 cm TL. Body with alternate stripes of red and silvery white; spiny dorsal fin red with white tips and a median band of white spots; with elongate dark spots at bases of soft dorsal and anal fins
Reef-associated, depth range 1–84 m. silty reefs or wrecks in lagoons, bays, or harbours (Hoda, 1988)



(Photo courtesy Moazzam)

Sargocentron spiniferum (Forsskal, 1775) Max. size 51.0 cm FL.
Reef-associated, depth range 1–122 m. Inhabits reef zones from reef flats to lagoon and seaward reefs (Hoda, 1988)



(Online image)

Sargocentron cornutum (Bleeker, 1854)
Subtidal (Ali, 2006)
Genus *Myripristis* Cuvier, 1829
Myripristis murdjan (Forsskal, 1775)
Max. size 60.0 cm TL.
Reef-associated, depth range 1–50 m. (Hoda, 1988)



(Photo courtesy Moazzam)

Myripristis botche Cuvier, 1829 Light red; opercular margin black to or below level of lower edge of eye; median fins red, edges white, elevated part of soft dorsal and anal fins and caudal fin lobes tipped with black
Inhabits protected waters at depths greater than 25 m, in silty reef areas, hides in caves or crevices. (Psomadakis *et al.*, 2015)



(Photo courtesy Osmany)

Genus *Ostichthys* Cuvier, 1829

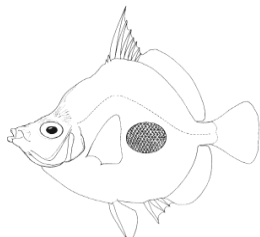
Ostichthys acanthorhinus Randall,
Shimizu and Yamakawa, 1982
Uniformly red, with no white markings
Reef-Associated at depths from 272 -
291m. (Greenfield *et al.*, 2017)



(Photo courtesy Osmany)

Suborder Caproidei Lowe, 1843

Family Caproidae Bonaparte, 1835
Genus *Antigonia* Lowe, 1843
Antigonia rubescens (Gunther, 1860)
Max. size 15.0 cm SL.
Bathydemersal, depth range 65- 600 m.
(Fischer and Bianchi, 1984)



(Online image)

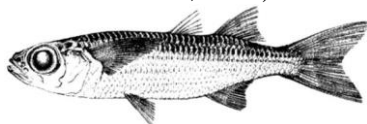
Infraclass Teleostei Müller, 1845
Order Atheriniformes Rosen, 1966

Family Atherinidae Risso, 1827
Genus *Atherinomorus* Flower, 1903
Atherinomorus duodecimalis
(Valenciennes, 1835)
Max. size 11.0 cm SL.
Reef-associated, brackish water. Inhabits
shallow coastal waters along calm
shorelines
(Hoda, 1988 as *Atherina duodecimalis*)



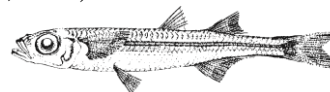
(Online image)

Atherinomorus lacunosus (Forster,
1801) Max. size 25.0 cm TL.
Reef-associated, brackish water
(Fischer and Bianchi, 1984)



(Online image)

Genus *Hypoatherina* Schultz, 1948
Hypoatherina temminckii (Bleeker,
1853) Max. size 12.0 cm TL.
Reef-associated, usually found in coastal
waters and harbours
(Hoda, 1988)



(Online image)

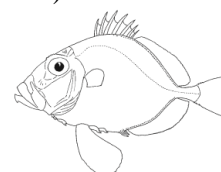
Family Notocheiridae Schultz, 1950
Genus *Iso* Jordan and Starks, 1901
Iso natalensis Regan, 1919
Max. size 8.0 cm TL.
Pelagic, close to shoreline
(Fischer and Bianchi, 1984)



(Photo courtesy Moazzam)

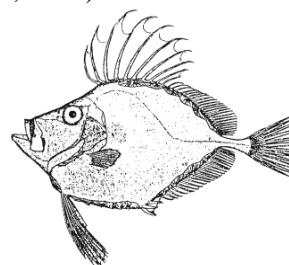
Order Zeiformes Nelson, 1994

Family Zeidae Latreille, 1825
Genus *Cyttopsis* Gill, 1862
Cyttopsis rosea (Lowe, 1843) Max. size
31.0 cm TL. Bathypelagic, depth range
150– 730 m.
(Bianchi, 1985)



(Online images)

Genus *Zenopsis* Gill, 1862
Zenopsis conchifer (Lowe, 1852) Max.
size 80.0 cm TL.
Benthopelagic, depth range 50–600 m.
over muddy substrates
(Bianchi, 1985)



(Online image)

Suborder Gasterosteoidi (no literature
reference available for this taxon)

Family Pegasidae Bonaparte, 1831
 Genus *Pegasus* Bleeker, 1863
Pegasus volitans Linnaeus, 1758 Max.
 size 18.0 cm TL.
 Demersal, brackish water, depth range
 1–73 m
 (Hoda, 1988 as *Parapegagus volitans*)



(Online image)

Order Syngnathiformes no literature
 reference available for this taxon

Family Syngnathidae Bonaparte, 1831
 Genus *Bryx* Herald, 1940
Bryx analicarens (Duncker, 1915) Max.
 size 12.5 cm SL.
 Benthopelagic, depth range 0–45 m. in
 tide pools and flats, among the brown
 alga *Cystoseira* sp.
 (FishBase, 2006)



(Online image)

Genus *Syngnathoides* Bleeker, 1851
Syngnathoides biaculeatus (Bloch,
 1785) Max. size 29.0 cm TL.
 Reef-associated, in shallow water with
 algae, seagrasses and floating weeds
 (Jalil and Khaliluddin, 1972 as
Syngnathus biaculeatus)



(Online image)

Genus *Hippocampus* Rafinesque, 1810
Hippocampus suzeensis Duncker 1940
 At 9–10 m. depth
 (Golani *et al.*, 2018)
Hippocampus jayakari Boulenger, 1900
 Max. size 14.0 cm. Pale cream or beige
 coloured; often with a pattern of large
 white spots on body and face; spines with
 a broad dark band near tip; dark
 midventral line
 Demersal, depth range 20 m.
 (Sara *et al.*, 2004)



(Online image)

Hippocampus kelloggi Jordan and
 Snyder, 1901
 Max. size 28.0 cm OT. Pale, often with
 tiny white spots running in vertical lines;
 otherwise uniform in colour
 Bathydemersal, depth range 120 m.,
 associated with corals
 (Lourie *et al.*, 1999)



(Photo courtesy Moazzam)

Hippocampus kuda Bleeker, 1852 Max.
 size 30.0 cm TL. Often totally black with
 a grainy texture; alternatively pale yellow
 or cream with fairly large, dark spots
 (especially females); may be sandy
 coloured, blending in with surroundings
 May occur on gorgonians and whip corals
 in relatively deep water Reef-associated,
 brackish water, depth range 68 m .
 (Qureshi, 1970; Kazmi, 1993)



Male (After Kazmi, 1993)

Hippocampus fuscus Rüppell 1838
 Maximum reported depth 10 m; In
 artificial structures, stones, gravel,
 harbours and bays with calm water;
 shallow, protected waters on edges of
 algal reefs or seagrass beds
 (Sara *et al.*, 2004; synonym of *H. kuda*
 fide Lourie *et al.*, 2016)
 Family Aulostomidae Rafinesque, 1815

Genus *Aulostomus* Lacepede, 1803
Aulostomus chinensis (Linnaeus, 1766)
 Max. size 80.0 cm TL.
 Depth range 3–122 m. Found in clear, shallow water in rocky and coral areas of protected and seaward reefs (Qureshi, 1970)



(Online image)

Family Fistulariidae Stark, 1828
 Genus *Fistularia* Linnaeus, 1758
Fistularia petimba Lacepede, 1803 Max. size 200 cm TL. Body red to orange-brown above, silvery below; vertical fins with an orange cast. Reef-associated, brackish water, depth range 10–200 m. (Qureshi, 1970 as *Fistularia villosa* (Klunzinger))



(Photo courtesy Moazzam)

Fistularia commersonii Rüppell, 1838
 Brownish to olive above, lighter to silvery below; a pair of blue stripes or a row of blue spots along back; dorsal and anal fins orange and transparent at base; caudal filament white
 At 1.6m. Reef-dweller, depth range 0 - 132 m. (Bianchi, 1985)



(Photo courtesy Osmany)

Genus *Coeroichthys* Kaup, 1856
Coeroichthys brachysoma Bleeker, 1855
 7 cm
 Inhabits tide pools, rocky coastlines, mangroves, and coral reef areas at depths of 2–25 metres (Ali *et al.*, 2017)



Family Centriscidae Bonaparte, 1831
 Genus *Centriscus* Linnaeus 1758
Centriscus scutatus Linnaeus, 1758
 Max. size 15.0 cm TL.
 Reef-associated, brackish water, depth range 3–100 m. on sandy or muddy floors (Qureshi, 1970)



Order Scorpaeniformes Greenwood, Rosen, Weitzman, and Myers, 1966

Family Dactylopteridae Gill, 1861
 Genus *Dactyloptena* Jordan and Richardson, 1908
Dactyloptena orientalis (Cuvier, 1829)
 Max. size 40.0 cm TL. Yellowish brown above, light brown below, with small orange spots over top of head and back; dusky, golden spots on pectoral fins Reef-associated, depth range 100 m. on sandy substrates (Qureshi, 1955 as *Dactylopterus orientalis*)



(Photo courtesy Osmany)

Dactyloptena cf. *gilberti* Snyder, 1909
 Pectoral fins dusky, with large dark spots arranged in row and especially dark over middle fin rays; separated anterior portion of pectoral fins paler
 Over sand or mudsands bottoms at depths of 20 to 71 m. (Psomadakis *et al.*, 2015)



(Photo courtesy Osmany)

Dactyloptena peterseni (Nyström, 1887)

Body reddish and orange in colour. Ventral side white in colour. Eyes orangish in colour

Commercial trawl landing, demersal; Found on the shelf and shelf edge, over sandy bottoms in coastal areas.

(Farooq and Muhammad, 2022)

Suborder Scorpaenoidei Klein, 1885

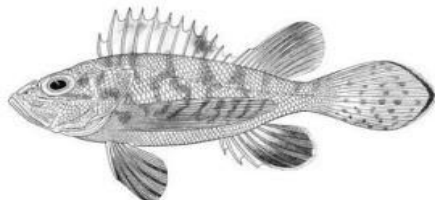
Family Scorpaenidae Risso, 1827

Genus *Brachypterois* Fowler, 1938

Brachypterois serrulifer Fowler, 1938

Reddish with five blackish bars on body; a black spot on opercle; pectoral fin membranes black; dorsal, anal, caudal and pelvic fins with orange-red spots

Benthic on muddy bottoms down to 82 m. (Psomadakis *et al.*, 2015)



(After Fowler, 1938)

Genus *Ebosia* Jordan and Starks, 1904

Ebosia falcata Eschmeyer and Rama-Rao, 1978 Two prominent bars radiate from eye ventrally; one oblique bar posterior to eye; five broad vertical bands on body below dorsal fin; a dark patch above base of pectoral fin; soft dorsal, caudal and anal fins with small dark spots; pectoral fins with large spots

Benthic at depths from 47 to 243 m.

(Matsunuma and Motomura, 2014; Psomadakis *et al.*, 2015)

Genus *Parapterois* Bleeker, 1876

Parapterois macrura (Alcock, 1896)

Head and body reddish brown with narrow vertical dark bands beneath eye and on sides.

Benthic on sandy and muddy bottoms down to 151 m.

(Psomadakis *et al.*, 2015)



(Photo courtesy Osmany)

Genus *Pterois* Oken, 1817

Pterois russelii Bennett, 1831 Max. size 30.0 cm SL. Reddish-brown with 4 dark crossbars on head; pectoral fin membrane usually covered with dark spots; pelvic fins mostly dusky, with light round spots on proximal half.

Reef-associated, depth range 60 m. offshore reefs (Ahmad and Qureshi, 1970)



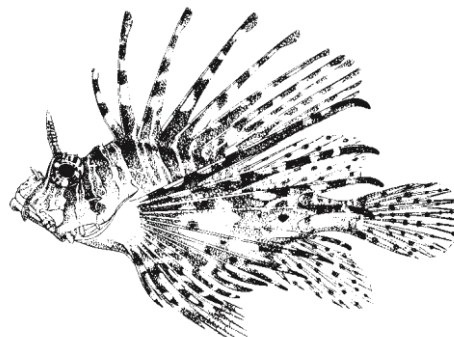
(Photo courtesy Osmany)

Pterois volitans (Linnaeus, 1758) Max. size 38.0 cm TL.

Reef-associated, depth range 2–55 m.

Inhabits lagoon and seaward reefs

(Ahmad and Qureshi, 1970)



(Online image)

Pterois mombasae (Smith, 1957)

Reddish brown with regular brown bars separated by paler lines of nearly equal width; bars on caudal peduncle thinner, extend posterodorsally; lines on head radiate from eye and enclose a brown ocellus on subopercle; upper half of pectorals with large dark spots on inner surface

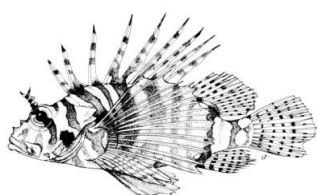
Benthic, normally found on soft bottoms or muddy substrates with rich rubble ridges amongst rich invertebrate growth, especially sponges down to 60 m.

(Psomadakis *et al.*, 2015)



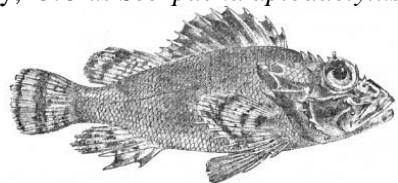
(Photo courtesy Osmany)

Genus *Dendrochirus* Swainson, 1839
Dendrochirus zebra (Cuvier, 1829)
 Max. size 25.0 cm SL.
 Reef-associated, depth range 3–60 m .
 (Ahmad and Qureshi, 1970 as *Pterois zebra*)



(FAO image)

Genus *Parascorpaena* Bleeker, 1876
Parascorpaena picta (Cuvier, 1829)
 Reef-associated; depth range ? - 15 m.
 (Day, 1875 as *Scorpaena aplodactylus*)



(Online image)

Genus *Scorpaenodes* Bleeker, 1857
Scorpaenodes guamensis (Quoy and Gaimard, 1824) Max. size 14.0 cm TL.
 Depth range 0–5 m. Found in rock crevices in reef flats, shallow lagoons, and channels
 (Hoda, 1988)

Scorpaenodes investigatoris Eschmeyer and Rama-Rao, 1972 Body probably reddish; pectoral fins with dark spots; buccal cavity dusky.

Demersal, depth range 170 m
 (Eschmeyer and Rama-Rao, 1972 part = *Scorpaenodes varipinnis*)

Scorpaenodes muciparus (Alcock, 1889) Max. size 8.7 cm SL. Body coloration in preservative pale, with dark pigment on the sides arranged in more or less definite bars; a large dark spot near

the posterior end of the spinous dorsal fin; fin membranes variably spotted
 Demersal, depth range 42-291 m.
 (FishBase, 2006)



(Photo courtesy Osmany)

Genus *Scorpaenopsis* Heckel, 1839
Scorpaenopsis lactomaculata (Herre, 1945)
 Demersal in sandy or muddy bottoms
 (USNM, Woods, Collected 1963-11-27, Dash *et al.*, 2013)



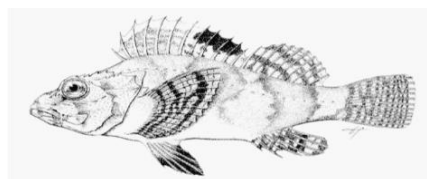
(Photo courtesy Moazzam)

Scorpaenopsis ramaraoi Randall and Eschmeyer, 2001 Max. size 16.5 cm SL.
 Dark reddish to brownish grey, strongly mottled with dark brown.
 Demersal, depth range 1-60 m. Found on silty sand and rocky bottom also from areas with coral (Randall and Eschmeyer, 2001)



(Photo courtesy Osmany)

Scorpaenopsis venosa (Cuvier, 1829)
 Reef-associated; depth range 2-95 m.
 (USNM, 1963
zipcodezoo.com/index.php/Scorpaenopsis)



(FAO image)

Scorpaenopsis cirrosa (Thunberg, 1793)
 Demersal; depth range 3 - 91 m.

(ZipcodeZoo.com/index.php/Scorpaenopsis)

Scorpaenopsis oxycephalus (Bleeker, 1849)

Subtidal
(Ali, 2006)

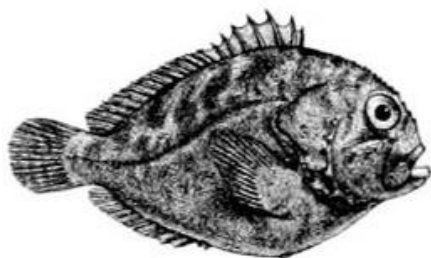
Scorpaenopsis barbata (Rüppell, 1838), reef-associated; depth range 0 - 30 m (Ali et al, 2017)

Genus *Caracanthus* Kroyer, 1845

Caracanthus unipinna (Gray, 1831) Max. size 5.0 cm TL.

Reef-associated. Found among branches of *Stylophora mordax* and certain *Acropora* corals

(Ahmed and Qureshi, 1970 as *Caracanthu zeylonicus* (non Day))



Family Apistidae Gill, 1859

Genus *Apistus* Cuvier, 1829

Apistus carinatus (Bloch and Schneider, 1801) Max. size 20.0 cm TL. Body greyish dorsally and rosy ventrally; spiny part of dorsal fin grey, darker grey distally, with a black patch between; pectoral fins black, uppermost pectoral fin ray white

Demersal, depth range 60 m. on soft bottoms of the continental shelf (Ahmad and Qureshi, 1970)



(Photo courtesy Moazzam)

Family Tetrarogidae Smith, 1949

Genus *Snyderina* Jordan and Starks, 1901 *Snyderina guentheri* (Boulenger, 1889)

Dark reddish brown with small pale spots; three dark bars radiating downward from eye and one above to dorsal fin

Demersal; depth range 24 - 300 m.

(Khan, 2010)

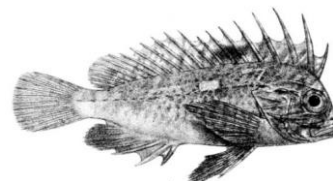


(Photo courtesy Moazzam)

Genus *Paracentropogon* Bleeker, 1876

Paracentropogon longispinis (Cuvier, 1829) Max. size 13.0 cm TL.

Found inshore on and around corals and hard bottoms, silty and muddy habitats (Ahmad and Qureshi, 1970)



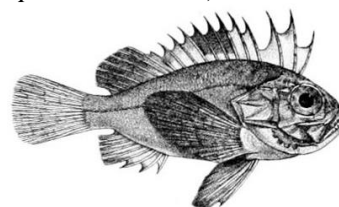
(Online image)

Genus *Pseudovespicula* Mandrytsa, 2001

Pseudovespicula dracaena (Cuvier, 1829) Max. size 7.5 cm TL.

Found inshore on sandy bottoms, often in bays

(Ahmad and Qureshi, 1970 as *Gymnapistus dracaena*)



(Online image)

Family Synanceiidae Swainson, 1839

Genus *Choridactylus* Richardson, 1848

Choridactylus multibarbus Richardson, 1848

Max. size 12.0 cm SL. Inner surface of pectoral fins black with several oblong orange bands; pelvic fins black or dark brown with numerous white spots.

Demersal, depth range 50 m. Found in sand or mud bottoms

(Qureshi, 1955)



(After Osmany and Moazzam, 2018)

Genus *Pseudosynanceia* Day, 1875
Pseudosynanceia melanostigma Day, 1875 Max. size 13.0 cm SL. Mottled grey, pale ventrally; a large black spot on distal part of spinous dorsal fin; anal and paired fins with black margins; inner and outer surface of paired fins yellow; caudal fin white with a broad black bar distally. Demersal, brackish water, occurs over muddy substrate (Day, 1875; Qureshi, 1955 as *Leptosynanceia melanostigma*)



(Photo courtesy Moazzam)

Genus *Synanceia* Bloch and Schneider, 1801

Synanceia horrida (Linnaeus, 1766) Brownish fawn above, lighter below. Irregular blotches on body and smaller ones on fins.

Estuarine

(Ahmed and Qureshi, 1970 this record may be from East Pakistan)

Synanceia nana Eschmeyer and Rama-Rao, 1973

Demersal; depth range 4 - 18 m.

(Osmany and Moazzam, 2018)



(After Osmany and Moazzam, 2018)

Synanceia verrucosa Bloch and Schneider, 1801

Lives on reef bottoms camouflaged as a rock

(Ahmed and Qureshi, 1970)

Genus *Minous* Cuvier and Valenciennes, 1826

Minous dempsterae Eschmeyer, Hallacher and Rama-Rao, 1979 Max. size 15.0 cm TL. Grey dorsally with oblique pale bands in dorsal fin which extend onto upper two-thirds of body, the lower third of body pale; pectoral fins black, becoming pale on base; inner surface of

pectoral fins grey with dark-edged white spots.

Demersal, depth range 5-117 m. Found on mud or clay bottoms (Eschmeyer *et al*, 1979; Randall, 1995)



(After Osmany and Moazzam, 2018)

Minous monodactylus (Bloch and Schneider, 1801).

Max. size 15.0 cm TL. Mottled light grey, pale ventrally; a large black spot distally on anterior part of dorsal fin; anal and paired fins dark brown distally; inner surface of pectoral fins pale, without distinctive markings; caudal fin with two broad dark bars

Demersal, depth range 55 m. Found near shore, including semi-enclosed sea areas on soft bottoms of the continental shelf

(Bloch and Schneider, 1801; Regan, 1905)



(After Osmany and Moazzaam, 2018)

Minous trachycephalus (Bleeker, 1854)

Max. size 12.0 cm TL.

Demersal, depth range 11–46 m. Occurs over soft bottoms

(Hoda, 1985)

Minous inermis Alcock, 1889 Dark grey, shading to white ventrally; outer part of median fins dark grey; pectoral fins increasingly dark distally; inside of pectoral fins light grey; pelvic fins dark grey with pale spots.

Depth range 35–420 m.

(Eschmeyer, 1986; Randall, 1995)



(After Osmany and Moazzam, 2018)

Minous coccineus Alcock, 1890

At 28 m.

(Eschmeyer, 1986)



(After Osmany and Moazzam, 2018)

Genus *Inimicus* Jordan and Starks, 1904
Inimicus didactylus (Pallas, 1769)
 Brackish; reef-associated; depth range 5 - 80 m.
 (Ahmed and Qureshi, 1970; doubtful record cf. Osmany and Moazzam, 2018)

Family Triglidae Rafinesque, 1815
 Genus *Lepidotrigla* Gunther, 1860
Lepidotrigla bispinosa (Steindachner, 1898) Max. size 16.0 cm TL. Red with belly and lower flanks light or white; broad reddish spot on posterior part of spinous dorsal fin
 Demersal, depth range 9–115 m. Found on sand or mud on continental shelves (Fischer and Bianchi, 1984)



(Photo courtesy Moazzam)

Lepidotrigla faurei Gilchrist and Thompson, 1914
 Max. size 18.0 cm TL.
 Demersal, depth range 50– 175 m. on sandy or muddy bottoms (Hoda, 1988)



(Photo courtesy Osmany)

Lepidotrigla omanensis Regan, 1905
 Max. size 13.5 cm TL., red in colour
 Demersal, depth range 56–329 m.
 (Ahmed and Qureshi, 1970)



(Photo courtesy Osmany)

Lepidotrigla spiloptera Günther, 1880
 10cm, body red with definite silvery white breast, belly and lower flanks; pectoral membranes and rays between 2nd and 9th rays black

Occurs over soft bottom of the continental shelf (Bianchi, 1985)



(Photo courtesy Moazzam)

Lepidotrigla multispinosa J.L.B. Smith, 1934

(Zohra *et al.*, 2009, abstract only)

Genus *Pterygotrigla* Waite, 1899

Pterygotrigla arabica (Boulenger, 1888)

Head and upper half of body light orange red with small dark spots on back and postorbital head; lower half of body silvery white

Inhabits mud bottoms to depths beyond 200 m.

(Psomadakis *et al.*, 2015)



(Photo courtesy Moazzam)

Pterygotrigla hemisticta (Temminck and Schlegel, 1843) 30cm.

Demersal at 10-442m depth on the continental shelf and in the open sea (Zohra *et al.*, 2009; Fanning *et al.*, 2010)

Genus *Trigla* Linnaeus, 1758

Trigla lyra Linnaeus, 1758

Bathydemersal; depth range 100 - 700 m. (Hussain and Kidwai, 1994). Definitely a misidentification.

Suborder *Platycephaloidei* Eschmeyer, 1998

Family *Platycephalidae* T. N. Gill, 1872

Genus *Grammolites* Fowler, 1904

Grammolites scaber (Linnaeus, 1758)
 Max. size 30.0 cm TL. Head and body brownish above, whitish below; back crossed by about 6 dark bands

Demersal, brackish water, depth range 55 m. Found over mud and sand
(Qureshi, 1955 as *Platycephalus scaber*)



(Photo courtesy Moazzam)

Grammopolites suppositus (Troschel, 1840) Max. size 25.0 cm TL. Whitish below, back crossed by dark bands; fins more or less dusky; upper pectoral rays and 2nd dorsal rays with dark spots; anal fin white

Demersal, depth range 30–94 m. Found on sand or mud bottoms

(Regan, 1905; Hoda, 1988 as *Platycephalus maculipinna*)



(Photo courtesy Moazzam)

Genus *Sorsogona* Herre, 1934

Sorsogona tuberculata (Cuvier, 1829) Max. size 14.0 cm TL. Body dark brown dorsally and dorsolaterally, pale ventrally. Five vertical bands on body. First dorsal dark, second dorsal rays with brown spots. Pectora I with brown spots on rays giving the appearance of 5-6 stripes; lower half of pectoral and pelvic dark. Anal pale, caudal with 3 vertical stripes

Demersal, depth range 9–80 m. Found on the continental shelf on sand or mud bottoms

(Ahmed and Qureshi, 1970 as *Platycephalus tuberculatus*)

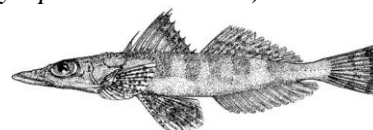


(Photo courtesy Moazzam)

Sorsogona prionota (Sauvage, 1873) Max. size 22.0 cm TL. Brownish in colour, with 4-5 bands crossing back; spiny dorsal dusky brown, other fins dark spotted; under opercle flap dark purple with light lines.

Demersal in sandy areas, depth range 1-100 m

(Norman, 1939; Randall, 1995 as *Platycephalus townsendi*)



(On line image)

Sorsogona melanoptera Knapp and Wongratana, 1987 Brown shading to paler ventrally; pelvic, 1st dorsal and caudal fin uniformly dusky; 2nd dorsal fin rays with dark blotches; humeral area under opercle pale or dusky

Benthic over sand or mud bottoms from depths of 15 to 117 m.

(Knapp and Wongratana 1987)



(Photo courtesy Moazzam)

Genus *Platycephalus* Bloch 1795

Platycephalus indicus (Linnaeus, 1758) Max. size 100.0 cm TL. Brownish or greyish above, whitish below; small dark blotches on back and head; pectoral and pelvic fins with numerous brown blotches; caudal fin centrally yellow with black stripes on upper and lower margins Reef-associated, brackish water, depth range 20–200 m. Found on sandy and muddy bottoms

(Jenkins, 1910 as *Platycephalus insidiator*; Ahmed and Qureshi, 1970)



(Photo courtesy Moazzam)

Genus *Cociella* Whitley, 1940

Cociella crocodila (Tilesius, 1812) Max. size 50.0 cm TL. brown, lighter below, 4-5 dark vertical bands on sides, head and body with numerous black spots

Reef-associated, brackish water, Occurs ear shore to 100 m. depth on sand or mud bottoms

(Ahmed and Qureshi, 1970 as *Platycephalus crocodilus*)



(Photo courtesy Osmany)

Cociella punctata (Cuvier, 1829) Max. size 35.0 cm TL. Numerous small dark spots on back reaching to below lateral line; soft dorsal fin with dark spots on rays; caudal fin usually with a broad dark marginal band or series of dark spots Reef-associated, depth range 10-300 m. (FishBase, 2006)

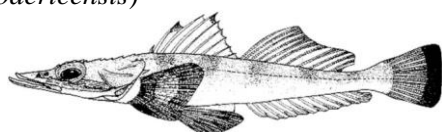


(On line image)

Genus *Kumococius* Matsubara and Ochiai, 1955

Kumococius rodericensis (Cuvier, 1829) Max. size 25.0 cm TL. Brown with 4-5 faint dark bars on back; pectoral fins dark brown, with a clear or whitish central area; pelvic fins dark brown with a light edge; caudal fin dusky on posterior half Demersal, depth range 6-75 m. Found on sand or mud bottoms of the continental shelf

(Ahmed and Qureshi, 1970 as *Platycephalus rodericensis*; Hoda, 1988 as *Suggrundus rodericensis*)



(After FAO)

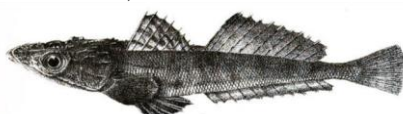
Genus *Suggrundus* Whitley, 1930

Suggrundus macracanthus (Bleeker, 1869)

Max. size 26.0 cm TL.

Benthic

(Qureshi, 1955 as *Platycephalus macracanthus*)



(Online image)

Genus *Rogadius* Jordan and Richardson, 1908

Rogadius asper (Cuvier, 1829) Max. size 17.0 cm TL. Dorsal and dorsolateral sides brown, ventral side pale. Four broad vertical bands on body. Upper half of first dorsal dark, second dorsal with spots on rays. Pectoral spotted, pelvic dark. Anal pale, posterior half of caudal dark. Demersal, depth range of 15-95 m. Found on sand or mud bottoms of the continental shelf

(Hoda, 1988)



(online image)

Rogadius serratus (Cuvier, 1829) Max. Size 24.0 cm TL. Body light tan above, pale below, back crossed by about 7-8 dark bands, side with a series of dark blotches; pectoral fins dark below with whitish edge, pale above with dark spots; pelvic fins with white base, black distally Found on sand around coral reefs depth range 11-45 m.

(Winterbottom *et al.*, 1990)



(Online image)

Genus *Onigocia* Jordan and Thompson, 1913

Onigocia pedimacula (Regan, 1908) Max. size 11.0 cm TL. Grey or brown with 4-6 dark bars on back, whitish below; pelvic fins with a prominent dark blotch in middle, a smaller dark blotch near base

Demersal, depth range 15-110 m. Found over sand or coral rubble bottom

(Fish Base, 2006)



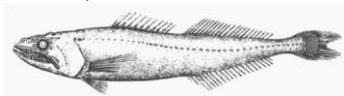
Order Perciformes Bleeker, 1859

Family Chiasmodontidae T. N. Gill, 1883

Genus *Kali* Lloyd, 1900

Kali parri Johnson and Cohen, 1974

Bathypelagic
(ZipcodeZoo)



(After Johnson and Keene, 1986)
Suborder Percoidei Rafinesque, 1810

Family Toxotidae Bleeker, 1859
Genus *Toxotes* Cloquet, 1816
Toxotes chatareus (Hamilton, 1822)
Pelagic, brackish mangrove
estuaries, freshwater
(Allen, 1991)

Family Latidae Jordan, 1888
Genus *Lates* Cuvier and Valenciennes,
1828

Lates calcarifer (Bloch, 1790) Max. size
200 cm TL. Blue above and silver below;
eyes bright pink, glowing at night
Demersal, brackish water, freshwater,
depth range 10–40 m.
(Gadsden, 1900)



(Photo courtesy Moazzam)

Family Ambassidae Klunzinger, 1870
Genus *Ambassis* Cuvier and
Valenciennes, 1828

Ambassis gymnocephalus (Lacepede,
1802) Max. size 16.0 cm TL.
Found in shallow waters, estuaries and
lower reaches of rivers
(Jalil and Khaliluddin, 1972)



(Photo courtesy Moazzam)

Ambassis natalensis Gilchrist and
Thompson, 1908 body completely
transparent; first two dorsal spines with
slightly black margins; small scales
present over entire body; lateral
line highlighted in silver
Freshwater, demersal, benthic
(Shaikh and Panhwar, 2021)



(After Shaikh and Panhwar, 2021)

Ambassis ambassis (Lacepède, 1802)
Genus *Chanda* Hamilton, 1822
Chanda nama Hamilton, 1822
Brackish; benthopelagic
(Moazzam and Osmany, 2021)
Genus *Pseudambassis* Bleeker, 1874
Parambassis ranga (Hamilton, 1822)
Brackish; demersal
(Ahmad et al., 1976)
Parambassis baculis (Hamilton-
Buchanan, 1822)
Brackish; demersal
(Moazzam)

Family Acropomatidae Gill, 1893
Genus *Acropoma* Temminck and
Schlegel, 1843

Acropoma japonicum Gunther, 1859
Max. size 20.0 cm. Body pink, ventral
surface abruptly silvery and thickly
covered with dark dots
Bathydemersal, depth range 100–500 m.
Inhabits sand and sandy mud bottoms
(Ona, 1984)



(Photo courtesy Moazzam)

Parascombrops pellucidus Alcock 1889
Synagrops adeni Kotthaus, 1970 Head
and body pale brown or dusky.
Occurs over trawlable bottoms from 280
m to 600 m.
(Fanning et al., 2011) (*Synagrops adeni*
Kotthaus, 1970 is a synonym)



(Photo after Moazzam and Osmany,
2022)

Genus *Kaperangus* Schwarzhan and
Prokofiev 2017

Kaperangus microlepis (Norman 1935)
Bathypelagic
(Norman, 1935 as a synonym Hussain and Kidwai, 1994. Occurrence in Pakistan doubtful)

Family Serranidae Swainson, 1839
Genus *Sacura* Jordan and Richardson, 1910

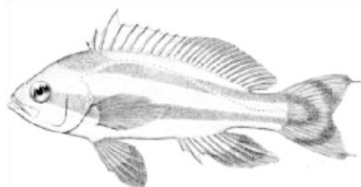
Sacura boulengeri (Heemstra, 1973)
Max. size 19.0 cm TL. Yellowish brown with irregular lavender pink stripes or series of irregular blotches; bands and blotches on head violet
Demersal, depth range 49 m.
(Moazzam and Osmany, 2004)



(Photo courtesy Osmany)

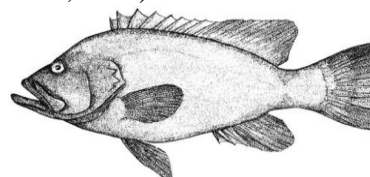
Genus *Serranus* Cuvier, 1816
Serranus cabrilla (Linnaeus, 1758)
Shelf and upper slope on rocks, *Posidonia* beds, sand and mud bottoms
(Map, code 42 Key book to world map of Fisheries, 1983) May not occur in Pakistan.

Genus *Pseudanthias* Bleeker, 1871
Pseudanthias townsendi (Boulanger, 1897)
Demersal on rocky bottoms at depths between 15 and 63 m.
(Feild, 2013)



(After Carpenter *et al.*, 1997)
Pseudanthias cf. conspicuus (Heemstra, 1973)
Male: head and body pale, with 2 longitudinal dark brown bands, joined on caudal fin by V-shaped curved dark band. Female: pale with faint, subvertical series of dark spots
Depth range 21–93 m
(Psomadakis *et al.*, 2015)

Pseudanthias pleurotaenia (Bleeker, 1857)
In corals
(Ali, 2006)
Genus *Aethaloperca* Fowler, 1904
Aethaloperca rogae (Forsskal, 1775)
Max. size 60.0 cm TL.
Found in coastal reefs and lagoons, depth range 1-60 m.
(FishBase, 2006)



(Online image)

Genus *Variola* Swainson, 1839
Variola louti (Forsskal, 1775) Max. size 83.0 cm.
Reef-associated, depth range 3–250 m. Usually found in clear-water areas around islands and offshore reefs
(Hoda, 1988)
Genus *Epinephelus* Bloch, 1793
Epinephelus hexagonatus (Forster, 1801)
Reef-associated; depth range 0 - 30 m.
(Qureshi, 1955 as *Serranus hexagonatus*)



(After Heemstra and Randall, 1993)

Epinephelus areolatus (Forsskal, 1775)
Max. size 47.0 cm TL. Head, body and fins pale, covered with numerous brown to yellowish brown spots; caudal fin with a white posterior margin
Depth range 6–200 m. Usually found in seagrass beds or on fine sediment bottoms near rocky reefs
(Hoda, 1988)



(Photo courtesy Moazzam)

Epinephelus bleekeri (Vaillant, 1878)
Max. size 76.0 cm TL. Brownish to

purplish grey with numerous orange-yellow spots on head, body, dorsal fin and upper third of caudal fin

Demersal, depth range 30–104 m .
(Jalil and Khaliluddin, 1972)



(Photo courtesy Moazzam)



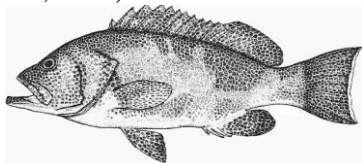
Epinephelus chlorostigma

(Valenciennes, 1828)

Max. size 75.0 cm TL.

Depth range 4–300 m. Found in seagrass beds and outer reef slopes, also found on mud bottoms

(Qureshi, 1962)



(Online images)

Epinephelus coeruleopunctatus (Bloch, 1790) Max. size 76.0 cm TL.

Depth range 2–65 m. Occurs in rocky or coral-rich areas of deep lagoons, channels and outer reef slopes, usually in or near caves

(Hoda, 1988)

Epinephelus coioides (Hamilton, 1822)

Max. size 120 cm TL. Head, body and usually median fins with numerous orange, brownish orange or reddish brown spots; body with 5 faint irregular greyish bars which bifurcate ventrally

Depth range 100 m. Inhabit turbid coastal reefs, in brackish water over mud and rubble, mangroves

(FishBase, 2006)



(Photo courtesy Moazzam)

Epinephelus diacanthus (Valenciennes, 1828)

Max. size 55.0 cm TL. Body pale greyish brown, usually with 5 dark vertical bars broader than interspaces

Demersal, depth range 10–300 m. Occurs over muddy sand or mud substratum

(Day, 1876; Jetkins, 1910 as *Serranus diacanthus*)



(Photo courtesy Moazzam)

Epinephelus epistictus (Temminck and Schlegel, 1842)

Max. size 80.0 cm TL.

Pale brownish to greyish; faint brownish black dots on dorso-lateral part of body and on postorbital part of head; faint dark band from eye to end of operculum

Demersal, depth range 71–291 m. Occurs in the continental shelf over soft bottom

(Hoda, 1988)



(Photo courtesy Moazzam)

Epinephelus erythrurus (Valenciennes, 1828)

Max. size 45.0 cm TL. Head and body dark brown or greenish brown, marbled with irregular pale spots and blotches; 1 or 2 faint dark streaks running posteriorly from eye

Reef-associated, brackish water, depth range 10–18 m. Inhabits areas with muddy or silty-sand bottoms

(Boulenger, 1898 as *Epinephelus townsendi*)



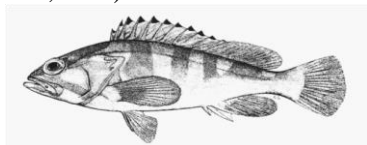
(Photo courtesy Moazzam)

Epinephelus fasciatus (Forsskal, 1775)

Max. size 40.0 cm TL.

Reef-associated, brackish water, depth range 4–160 m

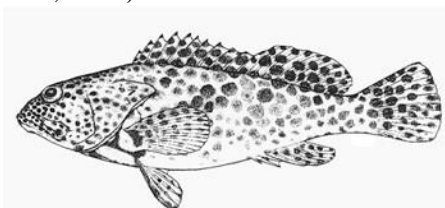
(Qureshi,1962)



(FAO image)

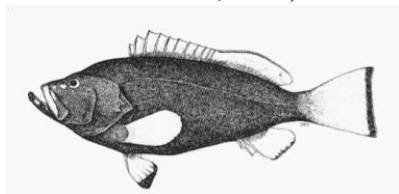


Epinephelus faveatus (Valenciennes, 1828) Max. size 32.0 cm TL. Depth range 1–30 m. Occurs in shallow waters over coral reefs or rocky substrate (Hoda, 1988)

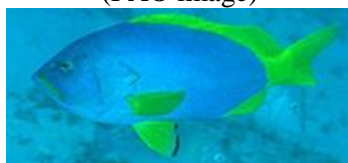


(After Heemstra and Randall,1993)

Epinephelus flavocaeruleus (Lacepede, 1802) Max. size 90.0 cm TL. Reef-associated, depth range 10–150 m. (Jalil and Khaliluddin, 1972)



(FAO image)



Epinephelus fuscoguttatus (Forsskal, 1775) Max. size 120 cm TL. Brown with many small dark spots on body and fins and large irregular dark blotches on head and body overlying smaller dark spots; a brownish black saddle-blotch on top of caudal peduncle. Depth range 1–60 m. Occurs in lagoon, channels, and outer reef slopes (Day, 1976; Bianchi, 1984)



(Online image)

Epinephelus lanceolatus (Bloch, 1790) Max. size 270 cm TL. Dark greyish or brown with pale mottlings, the fins with numerous small black spots. Reef-associated, brackish water, depth range 100 m. (Jetkins, 1910 as *Serranus lanceolatus*)



(Photo courtesy Moazzam)

Epinephelus latifasciatus (Temminck and Schlegel, 1842) Max. size 137 cm SL. Head and body of large adults uniformly grey with dark lines, breaking into dashes and spots. Demersal, depth range 20–230 m. on coarse sand or rocky areas, or / and silty-sand and muddy bottom (Bianchi, 1984)



(Photo courtesy Moazzam)

Epinephelus longispinis (Kner, 1864) Max. size 55.0 cm TL. Reef-associated, depth range 1–70 m. and rocky areas and occasionally on sandy bottom (Jalil and Khaliluddin, 1972 as *Epinephelus fario* (Thunberg))



(Online image)

Epinephelus malabaricus (Bloch and Schneider, 1801) Max. size 234 cm TL. Head, body and fins brownish covered

with small, well separated, blackish brown spots; irregular white or pale spots or blotches usually present on head and body; fins with scattered small black spots; often irregular brown bars visible on body

Found in coral and rocky reefs, tide pools, estuaries, mangrove swamps and sandy or mud bottom from shore to depths of 150 m

(Qureshi, 1962)



(Photo courtesy Osmany)

Epinephelus merra Bloch, 1793 Max. size 31.0 cm TL.

Reef-associated, depth range 0–50 m. Found in shallow lagoon and semi-protected seaward reefs

(Qureshi, 1955)

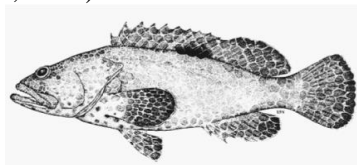


(Online image)

Epinephelus melanostigma Schultz, 1953 Max. size 35.0 cm TL.

Reef-associated, depth range 0–30 m. Occurs in outer reef flats and shallow lagoon

(Hoda, 1988)



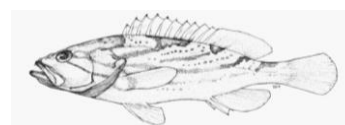
(FAO image)

Epinephelus morrhua (Valenciennes, 1833)

Max. size 90.0 cm TL. Light brownish with dark brown bands; dark bands on head; dark band from upper edge of opercle to blotch below dorsal fin

Reef-associated, depth range 80–370 m. Common in atolls

(Jalil and Khaliluddin, 1972)



(FAO image)



Epinephelus cf. *multinotatus* (Peters, 1876)

Max. size 100.0 cm TL. Background colour of head and body purplish grey with whitish spots and blotches; usually dark reddish brown spots ventrally

Reef-associated, depth range 1–100 m. Inhabit clear to turbid water in shallow as well as deep water

(Psomadakis *et al.*, 2015)



(Online image)

Epinephelus ongus (Bloch, 1790) generally dark grey or greyish brown covered with small spots of pale grey or blue-grey; some Fish with an overlying pattern of pale blotches; maxillary groove black; pale spots of large adults joined to form horizontal bands. Max. size 40.0 cm TL.

Brackish water, depth range 5–25 m. and lagoon reefs

(Hoda, 1988, probability of occurrence)

Epinephelus polylepis Randall and Heemstra, 1991

Max. size 61.0 cm TL. Head, body except ventral parts of head and body and fins covered with numerous small close-set dark brown spots; rear edge of caudal fin with white line and a row of blackish brown spots; dark maxillary streak present

Demersal, depth range 33–100 m.

(Randall and Heemstra, 1991)



(Photo courtesy Moazzam)

Epinephelus radiatus (Day, 1868) Pale greyish to yellowish brown with five, irregular, oblique, dark edged, brown bands which bifurcate ventrally, the first on nape and extending onto head, the second to fourth extending into dorsal fin, and the last on caudal peduncle.

Found over hard substrates (Psomadakis *et al.*, 2015)

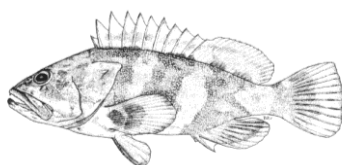


(Photo courtesy Moazzam)

Epinephelus rivulatus

(Valenciennes, 1830) Max. size 39.0 cm TL.

Depth range 1–150 m. Occurs on coral reefs, areas with rocky substrata, algal flats and seagrass beds (Hoda, 1988)



(FAO image)

Epinephelus tauvina (Forsskal, 1775)

Max. size 75.0 cm TL.

Reef-associated, depth range 1–300 m. (Qureshi, 1955 as *Serranus pantherinus*)



(FAO Image)



Epinephelus tukula Morgans, 1959 Max. size 200 cm TL. Pale brownish grey with several large round or oval dark brown to black widely spaced blotches, arranged in ventral series; streaks radiating from eye Reef-associated, depth range 1–100 m. Found in deep reef channels and seamounts

(Bianchi, 1984)



(Photo courtesy Moazzam)

Epinephelus stoliczkae (Day, 1875)

Max. size 38.0 cm TL. Yellowish grey with a broad dark greyish brown bar on body below posterior spinous portion of dorsal fin, two more dark bars close together beneath soft portion of dorsal fin, and one on caudal peduncle; numerous dark reddish brown spots on head and anterior half to two-thirds of body; a dark blotch behind eye

Reef-associated. Lives around small coral heads on shallow sandy bottoms

(Day, 1875; Qureshi, 1955 as *Serranus stoliczkae*)



(Photo courtesy Moazzam)

Epinephelus itajara (Lichtenstein, 1822)

Lower depth limit 100 m.

(Map, code 43 Key book to world map of Fisheries,

1983). May not occur in Pakistan. An Atlantic species

Epinephelus chabaudi (Castelnau, 1861) 137 cm.

Reef-associated; depth range 9 - 300 m. (Froese and Pauly, 2010)



(After Jawad *et al.*, 2013)

Genus *Hyporthodus* Gill, 1861

Hyporthodus octofasciatus (Griffen, 1926) Pale, with 8 broad dark bars; dark maxillary streak present.

Rocky reefs from 150 m to 300 m. (Psomadakis *et al.*, 2015)



(Photo courtesy Osmany)

Epinephelus undulosus (Quoy & Gaimard, 1824)
 Reef-associated, depth range 24–90 m.
 Found on muddy open substrate (Bianchi, 1984).



Genus *Cephalopholis* Bloch and Schneider, 1801

Cephalopholis argus Bloch and Schneider, 1801

Dark brown, covered with small dark-edged blue ocelli; 5 or 6 pale bars often visible on rear half of body

Reef-associated, depth range 1–40 m. (Hoda, 1988)

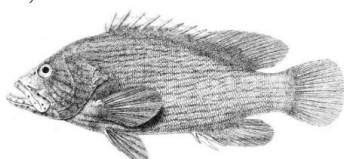
Cephalopholis aurantia (Valenciennes, 1828) Max. size 60.0 cm TL. orange-yellow to orange red or golden, with red to orange dots on head and dorsally on body

Reef-associated, depth range 20–250 m. Found on steep seaward reefs (Hoda, 1988)

Cephalopholis boenak (Bloch, 1790) Max. size 30.0 cm TL.

Reef-associated, depth range 1–64 m. Inhabits silty dead reefs in protected waters

(Qureshi, 1955 as *Serranus boenack*)



(Online image)

Cephalopholis hemistiktos (Rüppell, 1830) Max. size 35.0 cm TL. From brownish red to reddish with numerous small blue ocelli on lower part of head and body, few dorsally; caudal fin and rear part of dorsal and anal fins darker than the body and covered with small blue ocelli, their margins having a pale blue line; pectoral fins brown to reddish brown, with a few small blue ocelli at the base, the outer margin broadly yellow

Reef-associated, depth range 4–55 m. (Moazzam, *et al.*, 1987)



(Photo courtesy Moazzam)

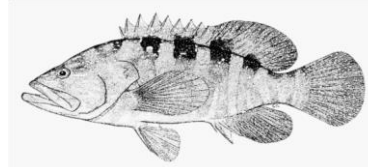
Cephalopholis miniata (Forsskal, 1775)

Max. size 45.0 cm TL.

Depth range 2–150 m. Inhabits clear waters of exposed coral reefs (Hoda, 1988)

Cephalopholis sexmaculata (Ruppell, 1830) Max. size 50.0 cm TL.

Reef-associated, depth range 6–150 m (Randall, 1984)



(online images)

Cephalopholis sonnerati (Valenciennes, 1828)

Max. size 57.0 cm TL. with orange-red to reddish brown body, often with scattered small whitish or purple spots; purple network on head, maxilla, and lips; pectoral fins orange distally; membranes of soft dorsal, caudal, anal, and pelvic fins dusky; dorsal fin rays orange distally

Depth range 10–150 m. Occurs in deep lagoon reefs and steep outer reef slopes, also in coastal areas with rocky substrates (Hoda, 1988)

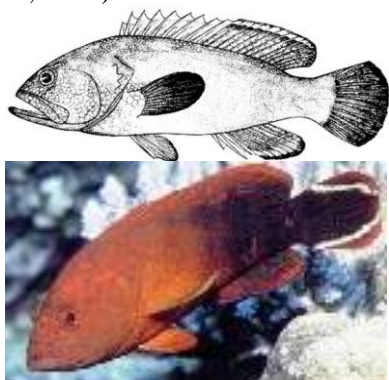


(Photo courtesy Osmany)

Cephalopholis urodeta (Forster, 1801)

Max. size 28.0 cm TL.

Reef-associated, depth range 1–60 m.
Inhabits clear, shallow waters of outer reef areas
(Hoda, 1988)



(Online images)

Genus *Chelidoperca* Boulenger, 1895
Chelidoperca occipitalis Kotthaus, 1973
Body pinkish orange with a dark stripe running along body, from opercular spine to base of caudal fin; ventral portion of trunk with 8–9 white bands on side; yellow spots on dorsal, caudal and anal fins, bright yellow suborbital markings
Found on continental shelf and slope muddy bottoms
(Bineesh *et al.*, 2014)



(Photo courtesy Osmany)

Cephalopholis formosa (Shaw, 1812)
Max. size 30.0 cm TL. Dark brown to yellowish brown colour with narrow blue stripes
Reef-associated, depth range 1–80 m.
Inhabits bays, coastal grassy areas and shallow banks
(Hoda, 1988 ;Osmany,2021)



(Photo courtesy Osmany)

Family Pseudochromidae Müller and Troschel, 1849
Genus *Halidesmus* Günther 1872
Halidesmus thomaseni (Nielsen, 1961)
Max. size 15.5 cm TL.
Reef-associated, depth range 1–15 m.
Found in shallow reefs, in areas with rock and rubble
(Nielsen, 1960 as *Pholioides thomaseni* (Forsskål))



(Online image)

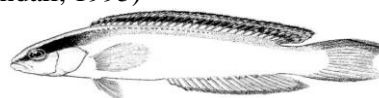
Genus *Pseudochromis* Ruppell, 1835
Pseudochromis springeri Lubbock, 1975
reef-associated; depth range 2 - 60 m.
(Ali *et al.*, 2017)



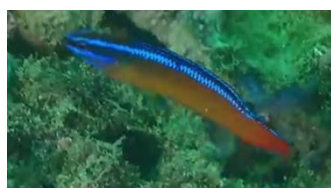
Pseudochromis omanensis Gill & Mee, 1993 12.0 cm
coral reef-associated; depth range 11 - 15 m
(Ali *et al.*, 2017)

Pseudochromis aldabraensis Bauchot-Boutin, 1958
Max. size 10.0 cm TL. Bright orange with 3 blue bands, the uppermost along dorsal fin base and along top of head to upper jaw, the middle one ending at yellow-rimmed dark spot on opercular flap; dorsal fin blackish with 2 blue stripes; upper and lower edges of caudal fin blue, the upper with a black streak within the blue. Ground colouration may be brownish rather than yellow-orange .
Defined in literature into two or more species as the species exhibits geographic variation in several meristic characters cf.Gill,2004.

Inhabits holes and crevices in shallow offshore rocky reefs and is usually found between depths of 1 – 20 m)
(Randall, 1995)



(Online images)



(Photos Courtesy Kamran Shaikh; Ketabi and Jamili, 2023)

Pseudochromis caudalis Boulenger, 1898 Max. size 11.0 cm TL.

Demersal, depth range 12–30 m. Found in crevices and caves on rocky substrata. Around coral rubble at depths ranging to 30 m., this species appears to be common in tidal pools.

(Boulenger, 1898; Klauswitz, 1961 as *Pseudochromis ranjhai*)



Pseudochromis dutoiti Smith, 1955 Max. size 9.0 cm TL. A pair of blue lines on the top and bottom of the tail and is an olive green overall, rather than an orange-colored body.

Found among shallow shoreline rocks and corals. Inhabits holes and crevices (*Pseudochromis dutoiti* [non Smith, 1955]; Klauswitz, 1961; Hoda, 1988)



Pseudochromis linda Randall and Stanaland, 1989 Max. size 8.1 cm TL.

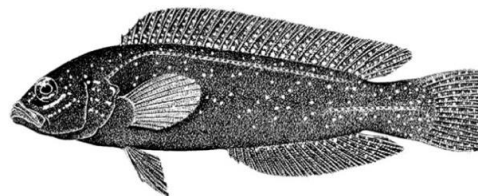
Demersal, depth range 1-15 m. Found in tidal pools, coral and rock reefs, associated with live and dead branching corals *Acropora* and *Pocillopora* (Randall and Stanaland, 1989)

Pseudochromis olivaceus Rüppell, 1835 *Montipora*, *Pocillopora*, *Stylophora*, *Acropora* and *Seriatopora*, and fire corals, has been collected at depths ranging to 40 m, but appears to be more abundant in the shallower parts of the sea (Gill, 2011)

Pseudochromis persicus Murray, 1887 Max. size 15.4 cm TL.

Around coralline algae, coral and rock reefs and rubble areas at depths ranging from 1 to 25 m

(Murray, 1887; BMNH, 1899)



(Online image)

Pseudochromis paccagnellae Axelrod, 1973

Reef-associated; depth range 0-50 m (Ali, 2006)

Pseudochromis nigrovittatus Boulenger, 1897

Coral associated, inhabits equally frequently mixed communities of macroalgae and hard corals and sparse hard coral communities on rock platform, including those dominated by *Acropora*, *Porites*, *Galaxea*.

(Ali *et al.*, 2017)

Family Opistognathidae Bonaparte, 1835

Genus *Opistognathus* Cuvier, 1816

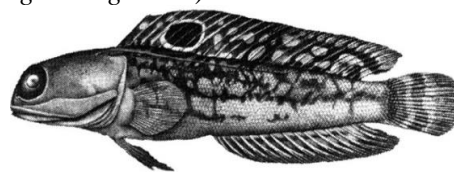
Opistognathus nigromarginatus

Rüppell, 1830

Max. size 18.6 cm TL.

Demersal. Inhabits burrows in shallow coastal waters

(Regan, 1905 as *Opisthognathus nigromarginatus*)



(Online image)

Family Dinoperidae Heemstra and Hecht, 1986

Genus *Dinoperca* Boulenger, 1895

Dinoperca petersi (Day, 1875) Max. size 75.0 cm TL. Body, head and fins blackish brown; body with numerous white faded specks; cheek brown, with a black band from front of snout to angle of preopercle. Reef-associated, depth range 50 m. Found under ledges and cave entrances and in reef area

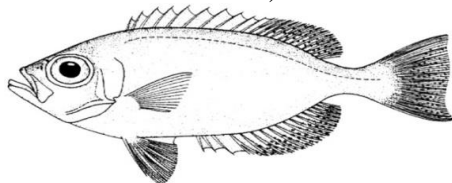
(Day, 1875; Qureshi, 1955 as *Haplogenyis petersi*)



(Photo courtesy Moazzam)

Family Priacanthidae Günther, 1859
Genus *Heteropriacanthus* Fitch and Crooke, 1984

Heteropriacanthus cruentatus
(Lacepede, 1801) Max. size 50.7 cm TL. Reef-associated, depth range 3–300 m. Found in lagoons and seaward reefs especially around islands (Jalil and Khaliluddin, 1972 as *Priacanthus boops*; Hoda, 1988 as *Priacanthus cruentatus*)



(Online image)

Genus *Priacanthus* Oken, 1817
Priacanthus arenatus Cuvier, 1829 Max. size 50.0 cm TL. Reef-associated, depth range 10–200 m. Found on coral reefs and rocky bottoms (Jalil and Khaliluddin, 1972 An Atlantic species could be misidentification)

Priacanthus hamrur (Forsskal, 1775) Max. size 45.0 cm TL. Reef-associated, depth range 8–250 m. Found in outer reef slopes and deep lagoons (Jalil and Khaliluddin, 1972)



(Photo courtesy Osmany)

Priacanthus prolixus Starnes, 1988 ax. size 25.0 cm SL. Red in colour with 7 small dark spots along lateral line; black spot at base of pelvic fins; median and

pelvic fins more or less uniformly tinged with red.

Demersal
(Starnes, 1988)



(Photo courtesy Osmany)

Priacanthus sagittarius Starnes, 1988 Head and body reddish silvery or, alternately, pale yellowish with gray mottling; iris of eye pink to bright red; dorsal, anal, and caudal fins pink with reddish brown spots in membranes, or yellowish with dusky spots Occurs in rocky and reef areas and occasionally in more open areas at depths of 60 to 100 m or more (Psomadasik *et al.*, 2015)



(Photo courtesy Osmany)

Priacanthus tayenus Richardson, 1846 Max. size 35.0 cm TL. Reef-associated, depth range 20–200 m. Inhabits corals or rocky areas (Qureshi, 1955 as *Priacanthus holocentrum*)

Genus *Cookeolus* Fowler, 1928
Cookeolus japonicus (Cuvier, 1829) Background silvery reddish, paler ventrally; membranes of dorsal and anal fins dark anteriorly; ventral membrane blackish, rays pale. Inhabits waters from 60 m to 400 m. (Psomadakis *et al.*, 2015)



(Photo courtesy Osmany)

Family Apogonidae Günther, 1859

Pristiapogon fraenatus (Valenciennes, 1832) small to near pupil-sized basicaudal spot at the level of the lateral stripe, its lower edge at level with the lower ray of the central two rays in the caudal fin, spot usually absent in deep water or at night and often fades in the afternoon

Coral associated, depth range 3 - 50 m

(Ali *et al.*, 2017)

Genus *Taeniamia* Fraser, 2013

Taeniamia pallida (Gon and Randall, 1995)

Reef-associated; depth range ? - 12 m

(Moazzam and Osmany, 2023)

Genus *Jaydia* Smith, 1961

Jaydia striata (Smith and Radcliffe, 1912)

Body with 7–11 narrow dark brown bars; scale pockets above lateral line with dark edge; cheek stripe usually present; distal half of 1st dorsal fin dusky to dark brown; 2nd dorsal and caudal fins with dark distal edge; other fins pale.

Found in lagoon reefs from 10 to 82 m depth

(Kotthaus 1970 as *Apogon striata*)



(Photo courtesy Moazzam)

Jaydia truncate (Bleeker, 1855) Light grey dorsally shading to silvery on side and ventrally, with 4–6 large dusky spots in a longitudinal row above lateral line ; scale pockets above lateral line with dark edge; front of snout and chin blackish; outer half of 1st dorsal fin black; 2nd dorsal and anal fins with a middle blackish band, the 2nd dorsal and caudal with a distal blackish margin.

Depth range 15–110 m

(Psomadakis *et al.*, 2015)



(Photo courtesy Osmany)

Jaydia queketti (Gilchrist, 1903)

benthopelagic; depth range 66 - 73 m

(FisBase)

Jaydia lineata (Temminck and Schlegel, 1842)

(FisBase probability of occurrence)

Genus *Holapogon* Fraser, 1973

Holapogon maximus (Boulenger, 1888)

Pinkish tan to brownish yellow dorsally, shading to brassy with pink iridescence on side and ventrally; body and nape with numerous small brown spots, some on ventral part of body tending to merge to form irregular stripes; two slightly diagonal bars on head, one from top of iris across lower cheek, the 2nd from nape across opercle; fins yellowish, the 1st dorsal with a black spot anteriorly at base
Depths of from 83 to 100 metres ,rocky reefs

(Psomadakis *et al.*, 2015)



(Photo courtesy Osmany)

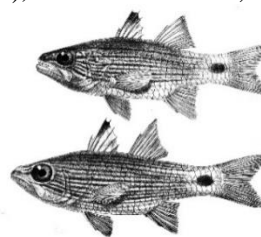
Genus *Cheilodipterus* Lacepède, 1801

Cheilodipterus arabicus (Gmelin, 1789)

Max. size 25.0 cm TL.

Reef-associated, depth range 0–40 m. Found in caves and ledges of clear lagoon and seaward reefs

(Day,1876 as *Cheilodipterus lineatus* (Linnaeus); Gon and Randall, 2003)



Cheilodipterus quinquelineatus Cuvier, 1828 Max. size 13.0 cm TL.

Reef-associated, depth range 0–40 m.

Inhabits reef flats and lagoon and seaward reefs

(Jalil and Khaliluddin, 1972)



(Online image)

Cheilodipterus macrodon (Lacepède, 1802)

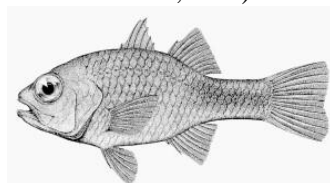
Reef-associated; depth range 0 - 40 m.
(Gon and Randall, 2003 as
Cheilodipterus lineatus)



(After FishBase)

Genus *Apogon* Lacepede, 1802

Apogon coccineus Rüppell, 1838
Reef-associated; depth range 8 - 35 m.
(Hussain and Kidwai, 1994)



(After Carpenter *et al.*, 1997)

Apogon multitaeniatus Cuvier, 1828

Max. size 18.0 cm TL.
Reef-associated
(Regan, 1919 as *Apogon polylepis* Hoda,
1988)



(Photo courtesy Moazzam)

Apogon quekettii Gilchrist, 1903 Max.
size 8.0 cm TL. Light pinkish grey
dorsally shading to silvery on sides and
ventrally, with a dark brown spot on
scales on side of body below lateral line
forming longitudinal rows; 1st dorsal fin
with a large black spot in outer posterior
part of fin; anal and caudal fins with a
blackish outer margin

Benthopelagic, depth range 73 m.
(Jalil and Khaliluddin, 1972 as
Apogonichthys quekettii)



(Photo courtesy Osmany)

Apogon spilurus Regan, 1905

reef-associated, known from trawls in 37-
65 m
(Regan, 1905)

Apogon dhofar Mee, 1995
chromatophores concentrated under the
posterior edge of each scale producing a
reticulate pattern on the body, narrow
dark vertical bar, a small caudal spot
often absent. body silvery grey covered
with tiny dark chromatophores; head
sometimes faintly greenish in life;
anterior spines or rays of dorsals, anal,
and pelvics black with the pelvics darkest,
outer margin of pelvics white, pectorals
hyaline

At 3m.depth, unusual in occurring both
in very shallow and relatively deep
habitats in the open near shadowed areas
during the day

(Collected by M.M. Khan, 2015)



Apogon maculatus (Poey, 1860)

Reef-associated; depth range 0 - 128 m
(Murray, 1880, may not occur in Pakistan)
Apogon fugax Gon, Bogorodsky, Mal
and Alpermann, 2020 1961 Entirely
opaque red
20-100m.

(Psomadakis *et al.*, 2015 as *Apogon* cf.
talboti Smith)



Apogon indicus Greenfield, 2001

Demersal; depth range 6 - 8 m
(Moazzam and Osmany, 2023)
Genus *Ostorhinchus* Lacepède, 1802
Ostorhinchus spilurus Regan, 1905
Reef-associated; depth range 37 - 65 m
(Regan 1905)

Ostorhinchus apogonoides (Bleeker,
1856) Max length: 7.4 cm SL. Body
brown, shading to silvery brown
ventrally, the edges of scales dark brown;
2 narrow dark brown bars on body, each
continuing onto front of a dorsal fin.

Rocky bottom occurring at depths from less than 1 to at least 10 m. Reef-associated

(Psomadakis *et al.*, 2015 as *Apogonichthyoides enigmaticus* Smith)



(After Gon and Randall, 2003)

Ostorhinchus endekataenia (Bleeker, 1852)

Max. size 14.0 cm TL.

Reef associated. Occurs along cliffs and slightly deep water, in reef crevices (Moazzam and Rizvi, 1980 as *Apogon endekataenia*)



(Online image)

Ostorhinchus fleurieu Lacepède, 1802

Max. size 12.5 cm. SL., Coppery with iridescence; juveniles with peduncular spot, expanding to a broad blackish bar in adults; broad blackish stripe from front of snout to orbit, continuing diffusely behind eye; maxilla with a narrow blue streak.

Common in shallow coastal reefs with moderate currents, in tidal channels of estuaries. depth range 30 m.

(Jalil and Khaliluddin, 1972 as *Apogon fleurieu* (Lacepède)).



(Photo courtesy Osmany)

Ostorhinchus aureus (Lacepède, 1802)

Distinct black band around the caudal fin. Max. size 14.5 cm TL.

Reef-associated, depth range 1–40 m.

(Jalil and Khaliluddin, 1972 as *Apogon aureus* (Lacepede))



(Online image)

Ostorhinchus gularis (Fraser and Lachner, 1984)

Body pale, with a narrow blackish stripe from front of snout to eye, sometimes continuing across operculum and onto body as a double line; another dusky narrow stripe below 1st dorsal fin base sometimes present; fins pale. Silt or sand bottoms at depths between 30–290 m.

(Psomadakis *et al.*, 2015)

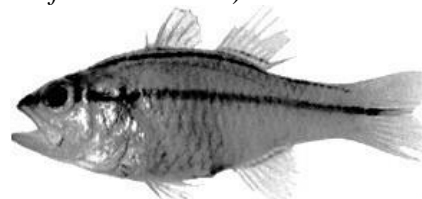


(Photo courtesy Osmany)

Ostorhinchus novemfasciatus (Cuvier, 1828) Max. size 10.0 cm TL.

Reef-associated, depth range 1–4 m. in reef flats and shallow lagoons

(Jalil and Khaliluddin, 1972 as *Apogon novemfasciatus* Cuvier)



(Online image)

Ostorhinchus spilurus (Regan, 1905)

Reef-associated; depth range 37 - 65 m. (Regan, 1905)

Ostorhinchus fasciatus (White, 1790)

Max. size 13.0 cm TL. Grey dorsally shading to silvery white on sides and ventrally, with 2 blackish stripes, the 1st narrow from interorbital to upper edge of caudal peduncle, the 2nd from front of snout through eye to posterior end of caudal fin

Demersal, depth range 50 m. above sandy bottom (Jalil and Khaliluddin, 1972 as *Apogon quadrifasciatus* Cuvier)



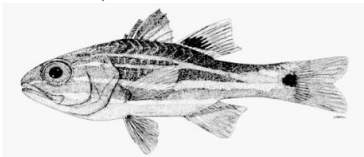
(Photo courtesy Osmany)

Ostorhinchus cookii (MacLeay, 1881)

Interspaces between dark brown stripes bright white on head, changing to pale bluish on body; lowest (6th) stripe reddish, continuing onto anal fin as a basal stripe with pale bluish upper and lower margins; pelvic fins reddish with pale leading edge

Inshore protected waters of lagoons and lee reefs; often found in tidepools and on shallow seagrass beds

(BMNH 1898; Regan, 1905 as *Apogon melanotaenia*)



(FAO image)

Ostorhinchus flagelliferus Smith, 1961

Coral associated

(Ali et al)

Genus *Fibramia* Fraser and Mabuchi In Mabuchi,

Fraser, Song, Zauma and Nichida, 2014

Fibramia amboinensis (Bleeker, 1853)

Neritic, coral reef, inter-reef rubble substrate, estuaries, intertidal, mangrove submerged roots

(ZipcodeZoo as *Ostorhinchus lateralis* (Valenciennes))

Genus *Lepidamia* Gill, 1863

Lepidamia natalensis (Gilchrist and

Thompson, 1908) Light red, the body with longitudinal dark brown lines along the upper and lower edges of scales, those above lateral line following its curvature, those below straight; fins light red, the 1st dorsal with a black spot on third membrane near base; a semicircular dark brown spot across pectoral fin base; margin of caudal fin narrowly blackish

Usually around rocky and coral outcrops at depths between 1 and 10 m

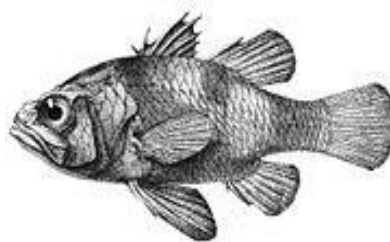
(Gon, 1995 as *Apogon natalensis*)

Genus *Apogonichthyoides* Smith, 1949

Apogonichthyoides pharaonis (Bellotti, 1874) Part of 1st dorsal base containing a large ocellus above pectoral fins; 2nd bar between bases of 2nd dorsal and anal fin; 3rd bar at caudal fin base, masking slightly wider caudal spot; faint bars present between main 3 bars

Inshore on silty reefs, seagrass beds, and in mangrove areas

(Fanning *et al.*, 2011)



(Online image)

Apogonichthyoides taeniatus (Cuvier, 1828) Max. size 17.0 cm TL.

Inhabits coastal reefs, in shallow silty areas, and mangroves

(Jetkins, 1910 as *Apogon taeniatus* Cuvier, 1828)



(Photo courtesy Osmany)

Apogonichthoides uninotatus (Smith and Radcliffe,

1912) Max. size 5.5 cm SL.

Pelagic

(Hoda, 1988; Only occurs on Philippines. In FishBase listed as *Apogonichthyoides uninotatus* (non Smith and Radcliffe), as misidentification for *Apogon nigripinnis* Cuvier)

Apogonichthyoides cf. maculipinnis (Regan, 1908)

Few scattered small irregular dark spots on head and body; upper part of 1st dorsal fin blackish; 2nd dorsal, anal and pelvic fins with a series of small dark spots; caudal fin with numerous dark dots

Depth range 39–70 m.

(Psomadakis *et al.*, 2015)

Apogonichthyoides pseudotaeniatus (Gon, 1986) Light reddish brown to grey dorsally, shading to light silvery grey with iridescence on side, with two narrow dark brown bars on body, the 1st continuous with a band at front of 1st dorsal fin, the 2nd originating below anterior part of 2nd dorsal fin; distinct dark, small basicaudal spot
Reef-associated
(Psomadakis *et al.*, 2015)



(Photo courtesy Osmany)

Apogonichthyoides sialis (Jordan and Thompson, 1914) Body brownish to greenish grey anteriorly, shading to dark grey posteriorly, the edges of scales pale; two black bars below dorsal fins extending ventrally beyond pectoral fin; axil of pectoral dark; pelvic fins dark brown with white leading edge; distinct dark, small basicaudal spot Found in silty coastal reefs around rocks and ledges in 8–15 m.
(Psomadakis *et al.*, 2015)



(Online image)

Genus *Sphaeramia* Fowler and Bean 1930
Sphaeramia orbicularis (Cuvier, 1828) Max. size 10.0 cm TL.
Reef-associated, depth range 0–5 m. Found in coastal waters, among mangroves, rocks, debris, and shallow sheltered shorelines
(Hoda, 1988 as *Apogon orbicularis*)
Genus *Archamia* Gill, 1863
Archamia lineolata (Cuvier, 1828) Max. size 10.3 cm TL.
Found in shallow coral reef lagoons
(Hoda, 1988 as *Archamia lineolatus*)
Archamia bleekeri (Günther, 1859) Body translucent, without striped or barred

patterns; snout, lips and lower jaw greenish yellow; dark basicaudal spot not larger than pupil; no stripes or other marks in dorsal, anal pectoral or pelvic fins
Reef-associated; depth range 10 - 30 m .
(Psomadakis *et al.*, 2015)

(Photo courtesy Osmany)

Genus *Fowleria* Jordan and Evermann, 1903

Fowleria aurita (Valenciennes, 1831) Max. size 9.0 cm TL.

Reef-associated, depth range 1–37 m. Occurs inshore in reef areas and among weeds in tide pools

(Hoda, 1988 as *Papillapogon auritus*)

Genus *Rhabdamia* Weber, 1909

Rhabdamia nuda (Regan, 1905)

Reef-associated

(Regan, 1905 as *Apogonichthys nudus*)

Family Sillaginidae Richardson, 1846

Genus *Sillago* Cuvier, 1817

Sillago chondropus Bleeker, 1849 Back pale brown; lower ventral flanks and belly paler; silver-grey; fins pale, the 1st dorsal fin with dusky tip

Shallow coastal waters and bays; also in estuaries down to 5 m.

(McKay, 1992)



(Photo courtesy Osmany)

Sillago arabica McKay and McCarthy, 1989 Silvery without dark markings
Shallow sandy bottoms offshore and bays; also in estuaries down to 10 m.
(Psomadakis *et al.*, 2015)



(Photo courtesy Osmany)

Sillago sihama (Forsskal, 1775) Max. size 30.0 cm SL. Back light brown; lower ventral flanks and belly whitish or silvery, without dark blotches

Reef-associated, brackish water, depth range 0–60 m. Found along beaches, sandbars, mangrove creeks and estuaries (Jenkins, 1910)



(Photo courtesy Osmany)

Sillago indica McKay, Dutt and Sujatha, 1985

Coastal waters at a depth range of 0-30 m.

(Xiao, *et al.*, 2015(abstract), 2016)



(FAO image)

Sillago panhwar Panhwar, Farooq, Qamar, Shaikh and Mairaj, 2017 upper half of the body pale brown to dull brown, with a light brown lower half; with a faint mid-lateral streak from the base of the pectoral fin to the base of caudal fin; dorsal fins dusky; posterior head region yellowish; pectoral and pelvic fins yellowish; caudal fin dusky

Demersal

(Panhwar *et al.*, 2017)

Genus *Sillaginopsis* Gill, 1861

Sillaginopsis panijus (Hamilton, 1822)

Max. size 44.0 cm TL.

Demersal, brackish water, freshwater.

Found in shallow, open muddy bays and estuaries

(Jalil and Khaliluddin, 1972 as *Sillago*

panijus; Psomadakis *et al.*, 2015 as

Sillaginopsis domina (Cuvier)



(Photo courtesy Osmany)

Genus *Sillaginopodys* Fowler, 1933

Sillaginopodys chondropus (Bleeker, 1849)

brackish; demersal; depth range 0 - 5 m

(Shaikh and Panhwar, 2017)

Family Lactariidae Gill, 1862

Genus *Lactarius* Cuvier and Valenciennes, 1833

Lactarius lactarius (Bloch and Schneider, 1801) Max. size 40.0 cm TL. Silvery grey with blue iridescence above; silvery white below; a dusky spot on upper part of gill cover; fins all pale yellow; dorsal and caudal fins sometimes with dusky margins; fins blue or yellow iridescence

Pelagic, brackish water, depth range 15–90 m. in coastal waters

(Qureshi, 1955 as *Lactarius delicatulus*)



(Photo courtesy Osmany)

Family Echeineidae Rafinesque, 1810

Genus *Echeneis* Linnaeus, 1758

Echeneis naucrates Linnaeus, 1758

Max. size 110 cm TL 90cm, dark longitudinal band on sides bordered with white

In shallow inshore areas and around coral reefs, brackish water, depth range 20–50 m.

(Fischer and Bianchi, 1984)



(Photo courtesy Moazzam)

Genus *Remora* Gill, 1862

Remora albescens (Temminck and Schlegel, 1850)

Max. size 30.0 cm SL. Pale grey to white

Pelagic, oceanic and coastal waters

(Hoda, 1988)



(Photo courtesy Osmany)

Remora australis (Bennett, 1840) Max. size 76.0 cm TL. Dark blue to slate grey; fins with narrow white edge
Pelagic, oceanic, attaches itself only to whales and porpoises

(Hoda, 1988 as *Remora scutata*
(Gunther)



(Photo courtesy Moazzam)

Remora remora (Linnaeus, 1758) Max. size 86.4 cm TL. Dark brownish grey Oceanic and coastal. Usually associated with sharks but also attaches itself to other large Fishes, sea turtles and even ships.

(Hoda, 1988)



(Photo courtesy Moazzam)

Family Rachycentridae Gill, 1896

Genus Rachycentron Kaup, 1826

Rachycentron canadum (Linnaeus, 1766) Max. size 200 cm TL. Back and sides dark brown, with 2 sharply defined narrow light bands; belly yellowish

Brackish water, depth range 0–1200 m. Found over mud, sand and gravel bottoms, over coral reefs, off rocky shores and in mangrove sloughs, inshore around pilings and buoys, and offshore around drifting and stationary objects

(Jenkins, 1910 as *Elacate nigra*)



(Adult and Juvenile Photo courtesy, Moazzam)

Family Coryphaenidae Rafinesque, 1815

Genus *Coryphaena* Linnaeus, 1758

Coryphaena equiselis Linnaeus, 1758 Max. size 127 cm TL. Back brilliant

metallic bluegreen ; sides silvery with a golden sheen and numerous black spots; dorsal fin dark

Pelagic. Found in oceanic water but may enter coastal waters

(Fischer and Bianchi, 1984)



(Photo courtesy Moazzam)

Coryphaena hippurus Linnaeus, 1758 Max. size 210 cm TL. Back brilliant metallic blue-green ; sides silvery with a golden sheen and rows of dark spots or golden blotches; dorsal and anal fins black, the latter with a white edge

Pelagic, brackish water, depth range 0–85 m.

(Jalil and Khaliluddin, 1972)



(Photo courtesy Moazzam)

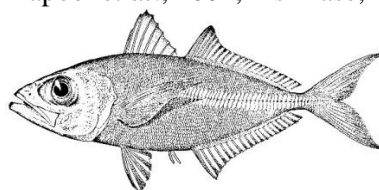
Family Carangidae Rafinesque, 1815

Genus *Selar* Bleeker, 1851

Selar boops (Cuvier, 1833) Max. size 25.0 cm FL.

Reef-associated, depth range 35-500 m. Found inshore

(Talwar and Kacker, 1984; questionable fide Kapoor *et al.*, 2002; FishBase, 2006)



(Online image)

Selar crumenophthalmus (Bloch, 1793) Max. size 70.0 cm TL. Body and top of head metallic blue or bluish green; lower 2/3 of body and head silvery or whitish; small, elongated blackish opercular spot on edge near upper margin; a narrow yellowish stripe may be present from edge of opercle to upper part of caudal peduncle.

Reef-associated, depth range 0–170 m. Found in clear oceanic waters around islands to neritic waters (Qureshi, 1955 as *Caranx crumenophthalmus*)



(Photo courtesy Moazzam)

Genus *Selaroides* Bleeker, 1851
Selaroides leptolepis (Cuvier, 1833) Max. size 22.0 cm TL. Metallic blue above, silvery white below, with a broad yellow stripe from upper margin of eye to caudal peduncle; dorsal, anal, and caudal fins pale to dusky yellow; pelvic fins white.

Reef-associated, brackish water, depth range 1–25 m. (Qureshi, 1955 as *Caranx leptolepis*)



(Photo courtesy Moazzam)

Genus *Seriola* Cuvier, 1816
Seriola dumerili (Risso, 1810) Bluish grey or olivaceous above, sides and belly silvery white, sometimes brownish or with a pinkish tinge; usually a darker nuchal bar through eye to dorsal fin origin; often an amber stripe from eye along middle of body

Found in deep seaward reefs; occasionally entering coastal bays; smaller ones in shallow water

(IUCN, 2015; Qamar *et al.*, 2016)



(Photo courtesy Osmany)

Seriola rivoliana Valenciennes, 1833 Silvery blue-green to silvery olive dorsally, shading to silvery ventrally; a midlateral yellowish stripe present on

body; an oblique, dark yellowish brown band from nape through eye to edge of upper lip; fins yellowish grey Pelagic and epipelagic, oceanic (IUCN)



(Photo courtesy Moazzam)

Genus *Alectis* Rafinesque, 1815
Alectis ciliaris (Bloch, 1787) Max. size 150 cm TL. Max. size 165 cm TL. Ivory with a dusky green tinge dorsally; dorsal fin pale with leading edges at tips of rays dusky; anal fin pale yellow and caudal fin dusky green / silvery with a light metallic bluish tinge on upper 1/3 of body and head; filaments black distally.

Brackish, depth range 20–100 m. found over coral reefs in coastal waters below 60 m

(Jetkins, 1910 as *Caranx gallus*)



Juvenile



Adult

Juvenile and adult (Photo courtesy Moazzam)

Alectis indica (Rüppell, 1830) Mostly silvery with a dusky green tinge dorsally; juveniles with dark bars on body; dorsal fin pale with leading edges at tips of rays dusky; anal fin pale yellow and caudal fin dusky green.

14 m depth,

(Bianchi, Psomadakis *et al.*, 2015)

Genus *Ulua* Jordan and Synder, 1908

Ulua mentalis (Cuvier, 1833) Max. size 100.0 cm TL.

Reef-associated, found in shallow coastal waters (Ona, 1984)



(Photo courtesy Moazzam)

Genus *Gnathanodon* Bleeker, 1851

Gnathanodon speciosus (Forsk., 1775)

Max. size 120 cm TL. Silvery to yellow with 7–11 black bands, usually alternating broad and narrow, the 1st band oblique through eye; upper margin of opercle black; all fins yellow; tips of caudal fin lobes black.

Reef-associated, depth range 10 m. Occurs in deep lagoons and seaward reefs (Fischer and Bianchi, 1984)



(Photo courtesy Osmany)

Genus *Decapterus* Bleeker, 1851

Decapterus macrosoma Bleeker, 1851

Max. size 35.0 cm TL. Metallic blue above, silvery below; small black blotch on margin of opercle near upper edge; dorsal fin lobe may be dark distally; other fins mostly pale

Reef-associated, depth range 20–170 m (Fischer and Bianchi, 1983)



(Photo courtesy Osmany)

Decapterus russelli (Ruppell, 1830)

Max. size 45.0 cm TL. Bluish green above, silvery below; small black blotch or margin of opercle near upper edge; 2nd dorsal fin hyaline basally; other fins mostly hyaline

Benthopelagic, depth range 40–275 m. (Jalil and Khaliluddin, 1972)



(Photo courtesy Moazzam)

Decapterus cf. smithvanizi Kimura, Katahira and Kuriwa, 2013 Bluish pale black above, silvery white below; small black blotch or margin of opercle near upper edge; margins of both dorsal and pectoral fins, and dorsal finlet red; anal, pelvic fins, and ventral finlet pale white

Deep water

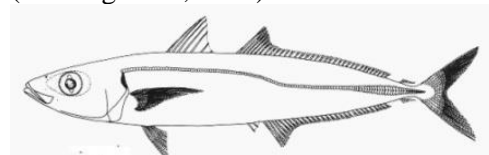
(Psomadakis *et al.*, 2015)

Decapterus macarellus (Cuvier, 1833)

Metallic blue above, silvery below; small black blotch on margin of opercle near upper edge; dorsal fin lobe may be dark distally; other fins pale

Occurring from 40 m to 200 m.

(Fanning *et al.*, 2011)



(Online image)

Decapterus muroadsi (Temminck and Schlegel, 1844) Bluish green above, silvery below; small black blotch on margin of opercle near upper edge; amber stripe present on sides; dorsal fin lobe dark distally; other fins mostly pale

Occurring from 30 m to 170 m. (Psomadakis *et al.*, 2015)



(Photo courtesy Osmany)

Genus *Megalaspis* Bleeker, 1851

Megalaspis cordyla (Linnaeus, 1758)

Max. size 80.0 cm TL. Head and body bluish grey to green dorsally, sides and belly silvery; large black opercular spot; dorsal and anal fins with upper half dusky; caudal fin dark, on edges of fins.

Reef-associated, primarily oceanic, lives near the surface of coastal waters (Jetkins, 1910 as *Caranx rottleri* (Bloch); Jalil and Khaliluddin, 1972)



(Photo courtesy Moazzam)

Genus *Atropus* Oken (ex Cuvier) 1817
Atropus atropos (Bloch and Schneider, 1801) Max. size 25.0 cm SL. Head and body bluish green above, silvery below; membranes of pelvic fins black, with the rays white basally; other fins pale; young with indistinct dark bands and opercular spot
 Pelagic. Common in shallow coastal waters near the surface
 (Jalil and Khaliluddin, 1972 as *A. atropus*)



(Photo courtesy Moazzam)

Genus *Carangoides* Bleeker, 1851
Carangoides armatus (Ruppell, 1830) Max. size 57.0 cm TL. Bluish grey above, silvery below; blackish blotch on upper margin of opercle; spinous dorsal fin blackish; 2nd dorsal and anal fins pale to dusky, leading edge of lobes dusky to blackish; caudal fin grey with leading and trailing edges black
 Found in coastal waters near corals and rocks, also in shallow lagoons
 (Jalil and Khaliluddin, 1972)



(Photo courtesy Moazzam)

Carangoides bajad (Forsskal, 1775) Max. size 55.0 cm TL. Brassy dorsally, shading to silvery white on sides, with numerous conspicuous orangeyellow spots; sometimes changes colour to almost entirely orange.
 Inshore waters, depth range 2–50 m. Found along coastal reef slopes or around large coral heads in lagoons
 (Fischer and Bianchi, 1983)



(Photo courtesy Osmany)

Carangoides chrysophrys (Cuvier, 1833) Max. size 72.0 cm FL. Silvery with head and body greenish above; silvery with yellow-green reflections below; a small black blotch on upper edge of opercle; head and fins blackish
 Reef-associated, brackish water, depth range 30–60 m (Jalil and Khaliluddin, 1972)



(Photo courtesy Moazzam)

Carangoides coeruleopinnatus (Ruppell, 1830) Max. size 40.0 cm TL. Bluish green above, silvery grey below; sides with numerous, small yellow spots; small black blotch on upper margin of opercle; 2nd dorsal, anal and caudal fins dusky or yellowish; pectoral fins pale yellow; pelvic fins hyaline to pale grey
 Found in deep coastal reefs
 (Fischer and Bianchi, 1984)



(Photo courtesy Moazzam)

Carangoides ferdau (Forsskal, 1775) Max. size 70.0 cm TL. Head and body generally silvery, blue-green above, paler below; caudal fin yellow-green with trailing edge and lobe tips dark; pelvic fins hyaline whitish
 Reef-associated, brackish water, depth range 60 m. in coastal waters adjacent to sandy beaches
 (Jalil and Khaliluddin, 1972)



(Online image)

Carangoides fulvoguttatus (Forsskal, 1775) Reef-associated; depth range ? - 100 m.
 (Qamar *et al.*, 2016)



Carangoides gymnostethus (Cuvier, 1833) Max. size 90.0 cm TL. Olive-green above, silverywhite below ; opercular spot dusky and inconspicuous; dorsal, anal and caudal fins pale olive-green to greenishgrey; leading edge and distal margin of anal fin white; pelvic and pectoral fins pale green to hyaline
Found near corals and rocks
(Fischer and Bianchi, 1984)



(Photo courtesy Osmany)

Carangoides malabaricus (Bloch and Schneider, 1801) Max. size 60.0 cm TL. Silvery with bluish grey above, silvery white below; caudal, soft dorsal and anal fins pale greenish yellow to dusky; interradiation of soft anal fin rays often with a white spot basally; tongue greyish brown to brown
Depth range 20–140 m. Found in the continental shelf near rocks and coral reefs
(Day, 1875 as *Caranx malabaricus*)



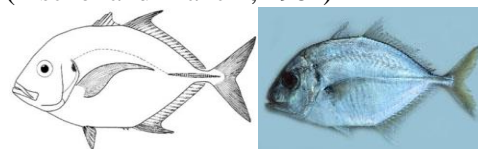
(Photo courtesy Moazzam)

Carangoides praeustus (Anonymous [Bennett], 1830) Max. size 25.0 cm TL. Bluish grey above, silvery white below; distal half of second dorsal fin lobe abruptly black, or with a white margin, widest anteriorly; remainder of fin pale dusky; caudal fin pale yellowish, other fins hyaline to whitish Demersal. Found in coastal waters
(Fischer and Bianchi, 1984)



(Photo courtesy Moazzam)

Carangoides talamparoides Bleeker, 1852 Max. size 30.0 cm TL. Silvery, bluish grey above, silvery white below; opercle with a small black spot on upper margin; tongue white to pale grey; soft dorsal and anal fins dusky; caudal fin with central rays dusky yellow with black distal margin Reef-associated. Inhabits coastal waters of the continental shelf
(Fischer and Bianchi, 1984)



(Online images)

Carangoides hedlandensis (Whitley, 1933) 30cm. Greenish blue above, silvery grey below; blackish blotch on upper opercular margin; Spinous dorsal fin, elongated dorsal rays and edges of caudal fin blackish; interradiation of soft anal fin rays with a white spot basally
Inhabits coastal waters of the continental shelf (Bianchi,1985)



(Photo courtesy Moazzam)

Carangoides oblongus (Cuvier, 1833) 40 cm.
Reef-associated
(Bianchi,1985)



(Photo courtesy Moazzam)

Carangoides plagiotaenia Bleeker, 1857
40 cm. Silvery, greyish above, paler below; no opercular spot but adults with opercle posterior vertical margin distinctly dark to black; sides with 6 or 7 dusky oblique bands
Generally along the edges of lagoons and seaward reef slopes
(Bianchi, 1985)



(Online image)

Genus *Alepes* Swainson, 1839

Alepes djedaba (Forsskal, 1775) Max. size 40.0 cm TL. Greyish green above, silvery to white below; a distinct black blotch on margin of opercle, bordered above by a smaller white spot; interradial membranes of spinous dorsal fin pale to dark dusky; caudal fin yellowish, except upper lobe often dusky to black distally; other fins pale

Reef-associated. Found near inshore reefs (Qureshi, 1955 as *Caranx djeddaba*)



(Photo courtesy Moazzam)

Alepes kleinii (Bloch, 1793) Max. size 16.0 cm FL. Silvery, with dark bars on upper half of body; a large black spot at upper end of gill opening; caudal fin yellowish, more so on upper lobe with narrow dusky edge.

Coastal waters, reef-associated, Inshore (Jalil and Khaliluddin, 1972 as *Selar kalla*; Bianchi, 1985 as *Caranx para* Cuvier)

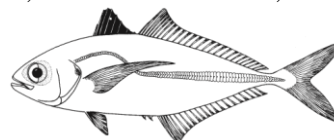


(Photo courtesy Moazzam)

Alepes melanoptera (Swainson, 1839) Max. TL 25.0 cm M Grey-blue above, silvery to white below; a diffuse dusky

blotch on margin of opercle; interradial membranes of spinous dorsal fin black; second dorsal fin greyish, lobe pale distally; caudal fin dusky yellow, with darker trailing edges, other fins pale
Pelagic, brackish water

(Ahmed *et al.*, 1973 as *Selar malam* Bleeker; Fischer and Bianchi, 1984)



(Online image)

Alepes vari (Cuvier, 1833) Max. TL 56.0 cm Dusky blotch on margin of opercle; interradial membranes of spinous dorsal fin pale to dark dusky; second dorsal fin, anal, and caudal fins dusky; mature males develop black pigmentation in spinous dorsal fin, lobes of soft dorsal and anal fins, and in pelvic fins

Pelagic, brackish water, shallow coastal waters (Fischer and Bianchi, 1984)



(Photo courtesy Osmany)

Genus *Atule* Jordan, 1923

Atule mate (Cuvier, 1833) Max. size 30.0 cm TL. Bright olive-green dorsally, yellowish green laterally and whitish ventrally; dorsolaterally, 9 or 10 faint grey bars; a black spot on upper margin of opercle and adjacent area of shoulder
Reef-associated, brackish water, depth range 50 m. Inhabits mangroves and coastal bays

(Kesteven, 1950 as *Caranx affinis*; Fischer and Bianchi, 1984)



(Photo courtesy Moazzam)

Genus *Caranx* Lacepede, 1801

Caranx heberi (Bennett, 1830) Max. size 85.0 cm TL. Dark bronze to yellow-green

above, silvery bronze to yellowish below; blacktipped caudal fin
Inhabits clear coastal waters, over rocky reefs

(Hoda, 1988 as *Caranx sem* Cuvier)



(Photo courtesy Moazzam)

Caranx hippos (Linnaeus, 1766)

Brackish; reef-associated
(Jenkins, 1910; Indian Ocean records are probably misidentifications of *Caranx ignobilis* fide FishBase)

Caranx ignobilis (Forsskal, 1775) Max. TL 170 cm Body silvery grey to black above, paler below; fins uniformly pigmented grey to black, except for leading edges and tips of dorsal and paler anal fin lobes

Reef-associated, in clear lagoon and seaward reefs brackish water, depth range 10–100 m.

(Jalil and Khaliluddin, 1972)



(Photo courtesy Osmany)

Caranx lugubris Poey, 1860 100cm. Head, body, and fins essentially uniform grey to brown, median fins and lateral line scutes usually dark brown to black; upper end of opercle frequently with a dark spot Pelagic over sand and rock; adults inhabit clear lagoon and seaward reefs

(IUCN)



(Photo courtesy Moazzam)

Caranx melampygus Cuvier, 1833 Max. size 117 cm FL. Head and dorsal half of

body brassy, suffused with blue, and covered with small blue-black spots; ventrally, body generally silvery white; 2nd dorsal, anal and caudal fins electric blue; pectoral fins mostly pale yellow
Reef-associated, brackish water, depth range 0–190 m. in coastal and oceanic waters

(Jalil and Khaliluddin, 1972)



(Photo courtesy Osmany)

Caranx papuensis Alleyne, and. Macleay, 1877

Predominantly on seaward reef also in estuaries

(Jenkins, 1910 as *Caranx sansum*)

Caranx sexfasciatus Quoy and Gaimard, 1825 Max. TL 120 cm Head and body silvery-olive to iridescent blue-green above, silvery olive whitish below; small blackish spot, at upper margin of opercle; 2nd dorsal fin olive to blackish; caudal fin yellowish to black; lateral line scutes dark to black

Reef associated, brackish water, freshwater, depth range 96 m.

(Jalil and Khaliluddin, 1972 as *Carangoides sexfasciatus*)



(Photo courtesy Moazzam)

Caranx tille Cuvier, 1833 Head and body dark olive green to bluish grey above, shading to silvery white below; blackish spot at upper margin of opercle; 2nd dorsal fin olivegrey to blackish; anal and caudal fins yellow-olive to blackish; lateral-line scutes grey, dark in caudal peduncle region

Inshore neritic waters, mainly around rocky and coral reefs

(Fanning *et al.*, 2010)



(Photo courtesy Osmany)

Caranx crysos (Mitchill, 1815)

Nektonic

(Map, code 32B Key book to world map of Fisheries, 1983). An Atlantic species. May not occur in Pakistan.)

Genus *Trachurus* Rafinesque, 1810

Trachurus indicus Necrasov, 1966 Max.

TL 35.0 cm. Black opercular spot on edge near upper margin; body and head dorsally dusky to nearly black or grey to bluish green; lower 2/3 of body and head usually paler whitish to silvery

Reef-associated, depth range 20–100 m . (Fischer and Bianchi, 1984)



(Photo courtesy courtesy Moazzam)

Genus *Uraspis* Forster, 1801

Uraspis helvola (Forster, 1801) Max. TL 58.0 cm Body and head leaden blue–black or dusky; traces of nuchal and opercular bands ; caudal fin pale yellowish dusky with trailing edges and tips of lobes blackish

Depth range 50–300 m. Found in sandy bottoms at the edge of the outer reefs, continental coasts and around islands

(Fischer and Bianchi, 1984)



(Photo courtesy Moazzam)

Uraspis uraspis (Günther, 1860) Max. size 28.0 cm FL. Body and head dusky to black dorsally, shading to dusky or pale grey ventrally; with 6 dusky or blue-black

bars; caudal fin pale to dusky with trailing edges dusky

Reef-associated, depth range 20–50 m. (Majid *et al.*, 1992)



(Photo courtesy Osmany)

Uraspis secunda (Poey, 1860)

Pelagic-oceanic; depth range 1 - 50 m. (Bianchi, 1985)



(Photo courtesy Moazzam)

Genus *Parastromateus* Cuvier, 1831

Parastromateus niger (Bloch, 1795)

Max. TL 75.0 cm . Adults uniformly silvery grey to bluish brown or yellowish brown ; fins with dark edges; young with dark vertical bars and long black jugular pelvic fins.

Reef-associated, brackish water, depth range 15–105 m .

(Qureshi, 1955 as *Stromateus niger*; Hoda, 1988 as *Formio niger* in Formioinidae)



(Photo courtesy Moazzam)

Genus *Naucrates* Rafinesque, 1809

Naucrates ductor (Linnaeus, 1758) Max.

size 70.0 cm TL. Head dark; 5–6 dark broad bars on body and a similar bar at end of caudal peduncle; 3–6 bars extending through soft dorsal and anal fin membranes, and bars persistent at all sizes; rest of body bluish, or light or dusky; white tips prominent on upper and lower caudal fin lobes and smaller white tips on 2nd dorsal and anal fin lobes; most fins dusky to dark

Reef-associated, depth range 0–30 m.
Pelagic in oceanic waters
(Jalil and Khaliluddin, 1972)



(Photo courtesy Moazzam)

Genus *Seriolina* Wakiya, 1923

Seriolina nigrofasciata (Ruppell, 1829)

Max. size 70.0 cm TL. Head and body bluish grey to black dorsally, white to dusky below; young with 5–7 dark oblique bands and blotches on upper body that fade with age; spiny dorsal fin black; caudal and pelvic fins yellowish brown to black.

Brackish water, depth range 20–150 m. in offshore reefs on the continental shelf on rocky bottoms (Jalil and Khaliluddin, 1972 as *Colyichthys nigrofasciata*)



(Photo courtesy Moazzam)

Genus *Elagatis* Bennett, 1840

Elagatis bipinnulata (Quoy and Gaimard, 1825)

Max. TL 180 cm . Dark olive-blue or green above and white below; 2 narrow light blue or bluish white stripes along sides, with a broader olive or 1 yellowish stripe between them; fins dark white on oliveyellow tinge

Reefassociated, depth range 0–150 m.
(Fischer and Bianchi, 1984)



(Photocourtesy: https://commons.wikimedia.org/wiki/File:_Pakistan.jpg)

Genus *Trachinotus* Lacepede, 1803

Trachinotus africanus Smith, 1967 Max. TL 92.0 cm Bluish dorsally, ventral half of body silvery, the 2 areas separated by an indistinct orangepink stripe; 2nd dorsal fin base and fin lobe dusky, distal half of

fin yellow; caudal fin, pectoral, and pelvic fins yellowish

Reef-associated, brackish water, depth range 20-50 m.

(Fischer and Bianchi, 1984)



(Photo courtesy Osmany)

Trachinotus baillonii (Lacepede, 1801)

Max. TL 60.0 cm . Sides with 1–5 small black spots ; half of spots below lateral line; caudal, 2nd dorsal and anal fins grey to black, lobes usually darker; pectoral fins pale to dusky yellow; pelvic fins pale yellow to orange-yellow

Reef-associated, found near surface waters of lagoon and seaward reefs, brackish water

(Fischer and Bianchi, 1984)



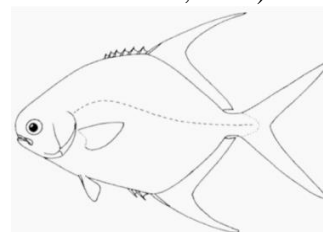
(Photo courtesy Moazzam)

Trachinotus blochii (Lacepede, 1801)

Max. size 110 cm FL. Head and body generally bluegrey above, paler below; or most of body golden-orange; 2nd dorsal fin dark, lobe of fin dusky orange; caudal fin dark to dirty orange, leading edges darkest

Reef-associated, brackish water, depth range 7 m. Found near coral and rock reefs

(Jalil and Khaliluddin, 1972)



(FAO image)

Trachinotus mookalee Cuvier, 1832

Max. TL 90.0 cm. Head and body silvery, greenish to bluish grey dorsally, paler

below; 2nd dorsal and caudal fins dusky yellow, leading edges and fin tips darkest; pelvic fins pale yellow to white; pectoral fins dark

Demersal in shallow coastal waters (Occurrence Records FishBase, 1978)



(Photo courtesy Moazzam)

Trachinotus botla (Shaw, 1803)

Sides with 1–5 large plumbeous spots on a longitudinal row near lateral line; 2nd dorsal and anal fins black to blueblack, lobes usually darker; caudal fin dusky with leading edges and most of lobes blue-black; pectoral fins pale. Inhabits coastal waters

(Psomadasik et al, 2015; Qamar et al, 2016 as *Trachinotus russelii*)



(Photo courtesy Osmany)

Trachinotus ovatus (Linnaeus, 1758)

Brackish; pelagic-neritic (Jenkins, 1910 as *Trachynotus ovatus*) Genus *Scomberoides* Lacepede, 1801

Scomberoides tala (Cuvier, 1832) 60cm. FL. Greenish grey dorsally, grey to silvery below; dorsal and anal fins dusky to dark and uniformly pigmented; pectoral fins yellow and pelvic fins white

Found near the surface in coastal waters (Jenkins, 1910 as *Chorinemus tolo*)



(Photo courtesy Moazzam)

Scomberoides commersonianus

Lacepede, 1801 Max. TL 120 cm. Head and body dusky green to bluish dorsally,

grey to silvery below; large individuals often golden especially ventrally; sides with 5–8 large, plumbeous blotches above or touching lateral line, 1st two may intersect lateral line; dorsal and anal fins dusky to dark

Depth 15–18m. Brackish water. Found in coastal waters near reefs and offshore islands

(Fischer and Bianchi, 1984)



(Photo courtesy Moazzam)

Scomberoides lysan (Forsskal, 1775)

Max. TL 110 cm. With a double series of 6–8 dusky roundish blotches above and below lateral line; distal half of dorsal fin lobe heavily pigmented; anal fin lobe white or pale yellow.

Reef-associated, brackish water, depth range 0–100 m. in clear lagoon and seaward reefs

(Jenkins, 1910 as *Chorineus moadetta*)



(Photo courtesy Osmany)

Scomberoides tol (Cuvier, 1832) Max. size 60.0 cm TL. Body bluish dorsally, white ventrally; blotches faint; distal half dorsal fin lobe abruptly and heavily pigmented; anal fin lobe usually immaculate, white

Reef-associated, brackish water, depth range 20–50m.

(Qamar et al., 2016)



(Photo courtesy Moazzam)

Family Menidae Fitzinger, 1873

Genus *Mene* Lacepede, 1803

Mene maculata (Bloch and Schneider, 1801) Max. TL 30.0 cm. Dark blue dorsally and silvery white below.

Reef-associated, brackish water, depth range 50–200 m. near the bottom (Jalil and Khaliluddin, 1972)



(Photo courtesy Moazzam)

Family Leiognathidae Gill, 1893
Genus *Aurigequula* Fowler, 1918
Aurigequula fasciata (Lacepède, 1803)
Max.TL 21.0 cm . Body silvery; about 11 widely spaced, dark vertical lines on back superimposed by a few yellow blotches and fading gradually towards lower sides; axil of pectoral fins yellow
Demersal, depth range 20–50 m. Found in coastal waters, also enters semi-enclosed sea areas and estuaries
(Jenkins, 1910 as *Equula fasciata*)



(Photo courtesy Moazzam)

Genus *Leiognathus* Lacepede, 1803
Leiognathus longispinis (Valenciennes, 1835) Belly more silvery than back with a few faint, unevenly spaced and horizontally elongate blotches, a few blotches below lateral line; tip of snout grey; dorsal and anal fins with yellow colouring, particularly on margins; caudal fin faint yellow with a more intense yellow blotch on lower lobe
Coastal shallow waters near bottom down to 40 m
(Psomadakis *et al.*, 2015 as *Aurigequula longispina* (Valenciennes)



(Photo courtesy Osmany)

Genus *Karalla* Chakrabarty and Sparks, 2008

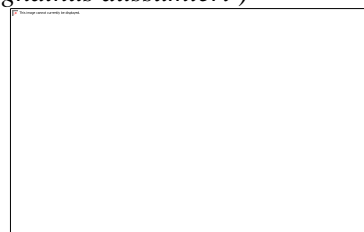
Karalla daura (Cuvier, 1829) Max. TL 14.0 cm Back grey-greenish, belly silvery; black dots all over ventral half of body; a golden hue on dorsal half of body and on head; very faint vertical lines above lateral line; tip of snout black; distal half of anal fin golden yellow from 2nd spine onwards; broad yellow band over the lateral line.

Demersal; depth range 40 m. Found in shallow waters over muddy bottoms (Jalil and Khaliluddin, 1972; Robins *et al.*, 1991 *Leiognathus daura*)



(Photo courtesy Moazzam)

Karalla dussumieri (Valenciennes, 1835) Max. TL 14.0 cm.
Demersal, brackish water, depth range 40 m. in coastal waters
(Jalil and Khaliluddin, 1972 as *Leiognathus dussumieri*)



(Online image)

Genus *Eubleekeria* Fowler, 1904
Eubleekeria splendens (Cuvier, 1829) Max. TL 17.0 cm .
Demersal, brackish water, depth range 10–100 m.
(Qureshi, 1955 as *Equula splendens* (Cuvier)



(Photo courtesy Osmany)

Genus *Nucchequula* Whitley, 1932

Nuchequula blochii (Valenciennes, 1835) Max. TL 10.0 cm . Head and body almost uniformly silver; snout dusky; four horizontal rows of dark blotches or broken lines dorsolaterally on body, uppermost row along dorsal fin base, third on lateral line; dorsal, anal, caudal, and pectoral fins yellowish

Demersal, brackish water, on shallow waters

(Qureshi, 1955 as *Equula blochii* (Valenciennes))



(Photo courtesy Moazzam)

Nuchequula gerreoides (Bleeker, 1851)

Head and body almost uniformly silver, tiny black spots scattered ventrolaterally on body; a black blotch distally on the spinous dorsal fin membrane; pectoral fin axil light brown; distal part of soft anal fin yellowish

Found in coastal waters. Enters estuaries and fresh waters

(Psomadakis, *et al.*, 2015)



(Online image)

Genus *Secutor* Gistel, 1848

Secutor insidiator (Bloch, 1787) Max. size 11.3 cm SL. Back greenish to brownish, with 10–13 dark broken vertical bars and spots extending below lateral line; a black, curved band from lower margin of eye to posterior angle of lower jaw; caudal fin partly yellow

Demersal, brackish water, depth range 10–150 m. Found in shallow waters

(Jenkins, 1910 as *Equula insidiatrix*; Qureshi, 1955 as *Equula insidiator*)

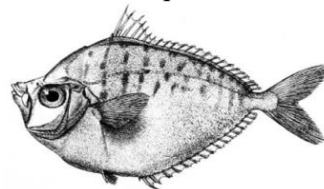


(Photo courtesy Moazzam)

Secutor ruconius Hamilton, 1822) Max. TL 8.0 cm

Demersal, brackish water; freshwater, depth range 40 m .

(Qureshi, 1955 as *Equula ruconius*)



(Online image)

Genus *Deveximentum* Fowler, 904

Deveximentum interruptum

(Valenciennes 1835). Body silvery brownish dorsally, white ventrally; 9–12 series of vertical dark bars or blotches on dorsal half of body; tip of spinous dorsal fin black.

Shallow coastal waters; enters estuaries.

(Psomadakis *et al.*, 2015 as *Secutor interruptus*)



(Photo courtesy Osmany)

Deveximentum insidiator (Bloch, 1787)

Silvery

Brackish; demersal; depth range 10 - 150 m

(Bianchi, 1985)

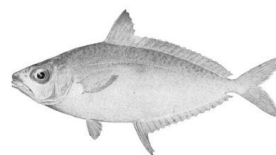
Genus *Equulites* Fowler, 1904

Equulites leuciscus (Günther, 1860)

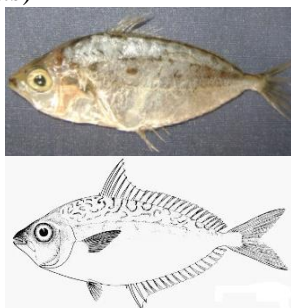
Belly silvery, back with irregular, partly semi-circular, greyish green vermiculations; membrane between dorsal fin spines yellow and mid-height edge of soft part of dorsal fin also yellow, superimposed with light grey; anal fin of similar colour to dorsal; posterior margin of caudal fin yellowish

Found in coastal inshore waters over mud or sand bottoms, rarely near reefs; depth range 5 - 70 m

(Bianchi, 1985 as *Leiognathus leuciscus*)



Equulites lineolatus (Valenciennes, 1835) Max. TL 9.5 cm
Demersal, depth range 20–50 m. Found in coastal waters
(Bianchi, 1984 as *Leiognathus lineolatus*)



(Photo courtesy Osmany) (Photo courtesy FAO)

Equulites oblongus (Valenciennes 1835)
Silvery grey dorsally with numerous, short, dark vermiculations extending a short distance below lateral line; anterior edge of snout blackish; borders of dorsal and anal fins yellow; caudal fin yellowish grey; axil of pectoral fins blackish
Coastal shallow waters down to at least 20 m.

(Psomadakis *et al.*, 2015 as *Equulites oblongus* (Valenciennes))



(Photo courtesy Osmany)

Genus *Gazza* Ruppell, 1835

Gazza achlamys Jordan and Starks, 1917
On sandy or muddy substrates in brackish and coastal, inshore waters to a depth of 20 m.

(FishBase, 2016)



(Photo courtesy Moazzam)

Gazza minuta (Bloch, 1795) Max. size 21.0 cm FL. Silvery, back greyish, with dark yellow irregular marks extending to

below lateral line; soft part of dorsal, pectoral and pelvic fins colourless; anterior part of anal yellow; underside of pectoral fin bases and snout with black dots; spiny dorsal fin black-edged
Demersal, brackish water, depth range 10–110 m.

(Jalil and Khaliluddin, 1972)



(Photo courtesy Moazzam)

Gazza rhombea Kimura, Yamashita and Iwatsuki, 2000 Max. size 17.6 cm SL. Head and body bluish dorsally, brilliant silvery white ventrally; snout dusky; anal fin base yellow; pectoral fin pale yellow with faintly bluish base; caudal fin pale yellow with faintly dark margin
Demersal, depth range 10-50 m
(USNM, collected 1963 in Kimura *et al.*, 2000)



(Photo courtesy FishBase)

Genus *Photopectoralis* Sparks, Dunlap and Smith, 2005

Photopectoralis aureus (Abe and Haneda, 1972). Silvery upper half with irregular greybrown blotches and marbling; outer half or peak of spinous part of dorsal fin pale yellow, margin of spinous part edged in black

Lives in deeper offshore coastal waters at depths greater than 70 m and down to 140 m.

(Psomadakis *et al.*, 2015)



(Photo courtesy Osmany)

Photopectoralis bindus (Valenciennes, 1835) Max. TL 11.0 cm. Body silvery, with short dark vermiculations on back; tip of snout, head, and ventral half of body with grey dots; spinous part of dorsal fin black at 1/2 height, above which the membrane between second and fifth spines bears a bright orange blotch
Demersal, brackish water, depth range 10–160 m.

(Bianchi, 1984 as *Leiognathus bindus* (Valenciennes))



(Photo courtesy Osmany)

Genus *Leiognathus* Lacepède, 1802
Leiognathus berbis (Valenciennes, 1835)

In coastal waters, at a depth of about 40 m., demersal, also in brackish water (Bianchi, 1985)



(Photo courtesy Osmany)

Leiognathus brevirostris (Valenciennes, 1835)

Max. TL 13.5 cm .

Demersal, brackish water, found in shallow waters

(Jenkins, 1910 as *Equula brevirostris* Valenciennes)



(Photo courtesy Osmany)

Leiognathus equula (Forsskal, 1775)

Max. TL 28.0 cm . Back greyish, belly silvery, and close-set faint bars on back

and sides; a dark brown saddle on caudal peduncle; axil of pectoral fins grey to black; margin of soft dorsal fin black; membrane between anal fin spines conspicuously yellow

Reef-associated, brackish water, and muddy inshore areas and mangrove, freshwater; depth range 10–110 m (Jalil and Khaliluddin, 1972)



(Photo courtesy Moazzam)

Family Bramidae Bonaparte, 1831

Genus *Brama* Bloch and Schneider 1801

Brama dussumieri Cuvier, 1831 Max. size 19.0 cm SL .Uniform silvery blue, slightly darker dorsally; underside of pectoral fin base pale or dusky; vertical fins dark; pectoral and pelvic fins translucent

Epipelagic, found near the edge of the continental shelf

(Hoda, 1988)



(Photo courtesy Moazzam)

Genus *Taractichthys* Mead and Maul, 1958

Taractichthys steindachneri (Döderlein, 1883)

Max. TL 60.0 cm . Body uniform dark grey; caudal fin with a posterior white margin

Benthopelagic, depth range 50–360 m. (Moazzam, *et al.*, 1987)



(Photo courtesy Moazzam)

Family Emmelichthyidae Jordan, 1923

Genus *Erythrocles* Jordan, 1919
Erythrocles schlegelii (Richardson, 1846) Reddish brown dorsally, silvery pink on sides and ventrally; lips and caudal fin red; remaining fins with red rays and translucent membranes
 Inhabits the continental shelf area.
 (Psomadasik *et al.*, 2015)



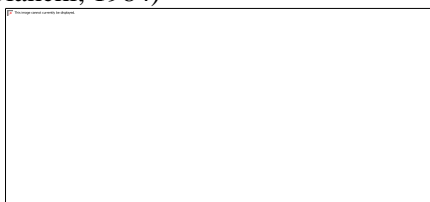
(Photo courtesy Moazzam)

Family Lutjanidae Gill, 1861
 Genus *Lutjanus* Bloch, 1790
Lutjanus argentimaculatus (Forsskal, 1775) Max. TL 150 cm . Back and sides greenish brown to reddish; belly silvery or whitish; frequently overall reddish . Reef-associated, brackish water, freshwater, depth range 10-120 m .
 (Jalil and Khaliluddin, 1972)



(Photo courtesy Moazzam)

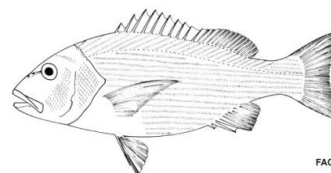
Lutjanus bengalensis (Bloch, 1790) Max. TL 30.0 cm with a series of 4 bright blue stripes; the medial fins yellow, pectoral and pelvic fins whitish
 Depth range 10–30 m. Founf in coral and rocky reefs
 (Bianchi, 1984)



(FAO image)

Lutjanus bohar (Forsskal, 1775) Max.TL 90.0 cm. Dark reddish brown on back, shading to red on sides, scales with a whitish spot, forming a linear pattern; with 2 distinct silvery spots on body

between lateral line and dorsal fin; usually centre of each scale silvery
 Reef-associated, depth range 4–180 m.
 (Bianchi, 1984)



(FAO image)

Lutjanus coeruleolineatus (Ruppell, 1838) Max. TL 40.0 cm . Yellow with 7 or 8 blue longitudinal stripes on sides, the upper 4 slanting posteriorly toward dorsal fin base; a large blackish spot on back below anterior portion of soft dorsal fin; blue spots and broken lines on head; fins yellowish
 Depth range 10–20 m. inhabits clear coastal coral reefs
 (Bianchi, 1984)



(Photo courtesy Osmany)

Lutjanus ehrenbergii (Peters, 1869) Max. TL 35.0 cm Body grey-brown dorsally, edges of the scales darker than centres, shading to silvery grey on sides and ventrally, with four or five narrow yellow stripes on body below lateral line; fins yellow
 Reef-associated, brackish water, freshwater, depth range 5–20 m.
 (Bianchi, 1984)



(Photo courtesy Osmany)



(Image courtesy FishBase)

Lutjanus erythropterus Bloch, 1790
 Max. size 81.6 cm FL. Overall pink or red, including fins
 Depth range 5–100 m. Found over rubble, corals, hard or sandy mud substrates and offshore reefs (Bianchi, 1984)



(Photo courtesy Moazzam)

Lutjanus fulviflamma (Forsskal, 1775)
 Max. TL 35.0 cm . Back and upper sides brown; lower sides whitish or light brown; a series of 6–7 yellow stripes on sides; fins yellowish
 Reef-associated, brackish water, depth range 3–35 m.
 (Jalil and Khaliluddin, 1972)



(Photo courtesy Osmany)

Lutjanus fulvus (Forster, 1801) Max. TL 40.0 cm . Back and sides grey to brown; with a series of narrow yellow or golden-brown stripes; belly and underside of head whitish; caudal fin blackish, dorsal and caudal fins with a narrow white border; pelvic and anal fins yellowish.
 Reef-associated, brackish water, depth range 1–75 m.
 (Qureshi, 1955 as *Lutjanus marginatus*)



(Photo courtesy Moazzam)

Lutjanus gibbus (Forsskal, 1775)
 Max. TL 50.0 cm. Red or grey, darker on back and upper portion of head; fins red or frequently dark brown to blackish
 Reef-associated, depth range 1–150 m.

(Bianchi, 1983; Hoda, 1988 as *Lutjanus coccineus* (Cuvier))



(Online image)

Lutjanus indicus Allen, White and Erdmann, 2013

Back and upper side brownish; lower sides and belly pink to whitish with a silvery sheen; 7 narrow yellow to brown stripes on sides, obliquely rising (except lower 2) dorsally and posteriorly

Inhabits offshore coral reefs and also inshore rock and coral reefs; in brackish mangrove estuaries and lower reaches of freshwater streams

(Psomadakis *et al.*, 2015)



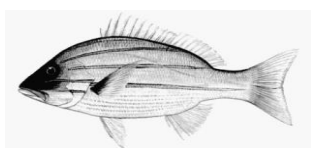
(Photo courtesy Osmany)

Lutjanus johni (Bloch, 1792) Max. TL 97.0 cm Yellow with a bronze to silvery sheen, grading to silvery white on belly and underside of head; centre of each scale on side with a reddish brown spot forming longitudinal rows on side
 Reef-associated, brackish water, depth range 80 m.
 (Jetkins, 1910)



(Photo courtesy Moazzam)

Lutjanus kasmira (Forsskal, 1775) Max. TL 40.0 cm. Yellow with abrupt transition to white on lower one-third; a series of 4 blue stripes on yellow portion of body; several faint greyish stripes on lowermost part of sides; fins yellow
 Reef-associated, found in shallow lagoons and on outer reef slopes depth range 3–265 m.
 (Bianchi, 1984)



(FAO image)

Lutjanus lemniscatus (Valenciennes, 1828)

Max. TL 65.0 cm Back and upper sides greybrown or olive; belly and underside of head whitish; dorsal and caudal fins brownish, remaining fins pink or reddish. Depth range 70–80 m. inhabits offshore reefs and muddy habitats (Fischer and Bianchi, 1984)



(Photo courtesy Osmany)

Lutjanus lunulatus (Park, 1797) Max.TL 35.0 cm Back and upper side brown to reddish pink; rear half of maxilla, lower part of preopercle, breast and abdomen creamy yellow; dorsal fin reddish pink to clear; caudal fin with broad, black crescent; pectoral, anal, and pelvic fins yellow

Reef-associated, depth range 10–30 m. (Day, 1878; Qureshi, 1955)



(Online image)

Lutjanus lutjanus Bloch, 1790 Max. TL 35.0 cm Yellowish or pale brown, with a stronger dark yellow stripe along sides from tip of snout, through eye, to caudal fin; fins pale yellow to whitish

Shallow, down to 90 m depth. Inhabits offshore coral reefs

(Day,1876 as *Lutjanus lineolatus*;Qureshi, 1955)



(Photo courtesy Moazzam)

Lutjanus malabaricus (Bloch and Schneider, 1801) Max. TL 100.0 cm . Back and sides red or redorange, lighter on lower parts; fins reddish Reef-associated, depth range 12–100 m. (Day,1876;Qureshi, 1955)

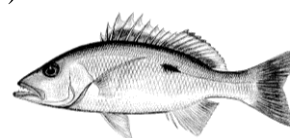


(Photo courtesy Moazzam)

Lutjanus monostigma (Cuvier, 1828) 60cm . silvery white with yellow fins ,a small black side spot just below the dorsal fin

Lives in coral reef areas, usually close to caves and coral formations, at depths ,1 - 60 m.

(Jenkins,1910 as *Lutjanus lioglossus* Bleeker)

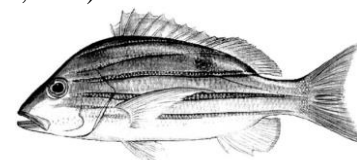


(Photo courtesy FAO)

Lutjanus quinque-lineatus (Bloch, 1790) Max. size 38.0 cm TL. Upper part of head brownish; sides and belly bright yellow; a series of 5 bright blue stripes on sides; fins yellow

Reef-associated, depth range 2-40 m. Inhabits sheltered lagoons and exposed, outer slope coral reefs

(Allen,1985)



(Online image)

Lutjanus rivulatus (Cuvier,1828) Max. size 80.0 cm TL. Brown with a reddish tinge; each scale on side with a pale brown border and 2–3 small bluish white spots in central portion

Depth range 100 m. Found on deep coastal slopes, on shallow algae-reef flats and near freshwater run-offs

(Qureshi, 1955)



(Photo courtesy Moazzam)

Lutjanus russelli (Bleeker, 1849) Max. TL 50.0 cm. Brackish water, depth range 80 m. and offshore coral reefs, inshore rocky and coral reefs, in mangrove estuaries and lower reaches of freshwater streams

(Bianchi, 1984)



(Photo courtesy Moazzam)

Lutjanus sanguineus (Cuvier, 1828) Max. TL 100.0 cm. Red dorsally, the scale centres silver-grey, silvery red on side and ventrally; fins red; roof of mouth bright yellow

Inhabits coral and rocky reefs to depths of at least 100 m.

(Bianchi, 1984)



(Online image)

Lutjanus sebae (Cuvier, 1816) Max. size 116 cm FL. Generally red or pink. Brackish water, depth range 5–180 m. in coral or rocky reefs over adjacent sand flats and gravel patches

(Qureshi, 1955)



(Online image)

Lutjanus vitta (Quoy and Gaimard, 1824) Max. TL 40.0 cm Back and upper sides brown, lower sides and belly whitish or pink; narrow longitudinal brown lines on sides

Reef-associated, brackish water, depth range 10–72 m. also areas with flat bottoms

(Bianchi, 1984)



(Photo courtesy Osmany)

Lutjanus campechanus (Poey, 1860)

Found over rocky bottoms, shallow waters, common over sand or muddy bottoms

(Map, code 44 Key book to world map of Fisheries, 1983. An Atlantic species. May not occur in Pakistan)

Genus *Pinjalo* Bleeker, 1845

Pinjalo pinjalo (Bleeker, 1850) Max. TL 80.0 cm. Body pink to silvery lavender dorsally, shading to pale pink or silvery white ventrally; dorsal and caudal fins reddish, usually suffused with yellow, the outer margin blackish

Reef-associated, depth range 15–60 m. and rocky bottoms

(Bianchi, 1984)



(Photo courtesy Moazzam)

Genus *Macolor* Bleeker, 1860

Macolor niger (Forsskal, 1775) Max. TL 75.0 cm. Mostly brownish black.

Reef-associated, depth range 2–90 m. at steep outer walls of lagoons, channels and seaward slopes (Bianchi, 1984)

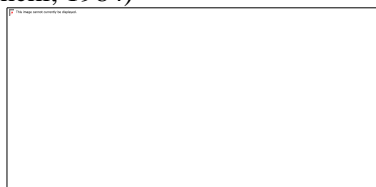


(Online images)

Genus *Lipocheilus* Anderson, Talwar and Johnson, 1977

Lipocheilus carnolabrum (Chan, 1970)
 Max. size 50.0 cm SL. Back and upper part of head brown; yellowish or pinkish on sides; a silvery sheen on ventral portion of body
 Demersal, depth range 90–340 m. Found over rocky bottoms of the continental shelf

(Bianchi, 1984)

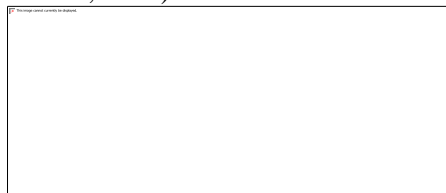


(Online Image)

Genus *Paracaesio* Bleeker, 1875

Paracaesio xanthura Bleeker, 1869
 Max. TL 50.0 cm . Mainly bluish; broad yellow band on upper side beginning near anterior end of dorsal fin, continuing over most of caudal peduncle and out onto both lobes of caudal fin; dorsal fin grey to yellowish, other fins greyish or whitish
 Reef-associated, depth range 5–150 m. Found over rocky bottoms

(Bianchi, 1984)



(Online image)

Genus *Apsilus* Cuvier and Valenciennes, 1830

Apsilus fuscus Valenciennes, 1830 Max. TL 75.0 cm.

Demersal, depth range 15–300 m. Inhabits coralline and rocky bottoms (Hoda, 1988, probably based on misidentification)

Genus *Aprion* Cuvier and Valenciennes, 1828

Aprion virescens Valenciennes, 1830 Max. TL 112 cm Dark green to blue or green; a black area present at base of last 5 interspiny membranes of dorsal fin.

Depth range 0–180 m. Inhabits open waters of deep lagoons, channels, or seaward reefs

(Bianchi, 1984)



(Photo courtesy Moazzam)

Genus *Etelis* Cuvier and Valenciennes, 1828

Etelis carbunculus Cuvier, 1828 Max. TL 127 cm FL. Pink to red, becoming white on lower sides and belly

Reef-associated, depth range 90–400 m. Inhabits rocky bottoms

(Bianchi 1984; Hoda, 1988 as *Etelis marshi* (Jenkins)



(Online image)

Etelis coruscans Valenciennes, 1862 Max. TL 120 cm Back and upper sides deep pink to red; lower sides and belly pink to white; fins pink to red

Reef-associated, depth range 90–400 m. inhabits rocky bottoms

(Allen, 1985)



(FAO image)



Genus *Pristipomoides* Bleeker, 1852

Pristipomoides filamentosus

(Valenciennes, 1830)

Rocky bottoms from 40 m to 360 m.

(Psomadakis *et al.* 2015)

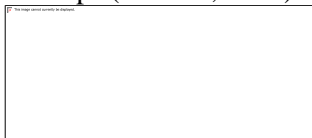


(Photo courtesy Osmany)

Pristipomoides multidens (Day, 1871)

Max. size 90.0 cm TL.

Demersal, depth range 40–245 m. Found in areas of hard, rocky and uneven sea floor and steeps (Bianchi, 1984)



(Online image)

Pristipomoides sieboldii (Bleeker, 1854)
Max.TL 79.0 cm .

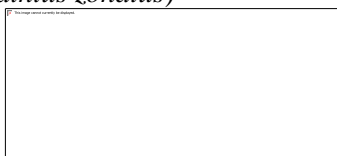
Benthopelagic, depth range 100–360 m. over rocky bottoms (Allen, 1984)



(FAO image)

Pristipomoides zonatus (Valenciennes, 1830) Max. TL 50.0 cm .

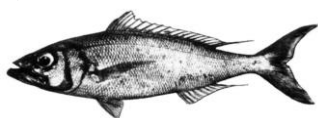
Benthopelagic, depth range 70–300 m. Found over rocky bottoms (Bianchi, 1985; Hoda, 1988 as *Tropidinius zonatus*)



(Online image)

Genus *Aphareus* Cuvier and Valenciennes, 1830

Aphareus furca (Lacepède, 1801) Max. TL 70.0 cm. Silvery purplish brown dorsally, light silvery bluish grey ventrally; lower jaw silvery; vertical edge of opercle and preopercle blackish; median fins yellow to yellowish brown. Inhabits inshore coral and rocky reefs and lagoons. depth range 1–122 m. (Jalil and Khaliluddin, 1972 as *A. furcatus*)



(Online images)

Aphareus rutilans Cuvier, 1830 Max. TL 110 cm Blue-grey or mauve to overall reddish; margin of maxilla black; fins yellowish to reddish except pelvic and anal fins sometimes whitish.

Reef-associated, depth range 100–330 m. (Fischer and Bianchi, 1984)



(online images)

Family Caesionidae Bonaparte, 1831
Genus *Caesio* Lacepede, 1802

Caesio lunaris Cuvier, 1830 Max. TL 40.0 cm .

Reef-associated. Found in coastal areas near coral reefs and in lagoons (Hoda, 1988)



(Photo courtesy Moazzam)

Caesio varilineata Carpenter, 1987
Max.TL 40.0 cm .

Reef-associated, in deep lagoons and seaward reefs (Carpenter, 1988)



(Photo courtesy Osmany)

Genus *Pterocaesio* Bleeker, 1876

Pterocaesio pisang (Bleeker, 1853) Max. size 21.0 cm TL.

Reef-associated, depth range 20–100 m (Fischer and Bianchi, 1984)



Family Lobotidae Gill, 1861

Genus *Lobotes* Cuvier, 1829

Lobotes surinamensis (Bloch, 1790)
Max.TL 110 cm Uniform dark brown or olive to mottled yellowish.

Benthopelagic, found in bays, muddy estuaries and lower reaches of large rivers

(Jalil and Khaliluddin, 1972)



(Photo courtesy Moazzam)

Family Gerreidae Bleeker, 1859
Genus *Gerres* Quoy and Gaimard, 1824
Gerres filamentosus Cuvier, 1829
Max.TL 35.0 cm

Demersal, brackish water, freshwater, depth range 10–50 m over sandy substrates

(Qureshi, 1955)



(Photo courtesy Moazzam)

Gerres infasciatus Iwatsuki and Kimura, 1998

Shallow coastal waters over sandy bottoms near outflows of river

(Psomadakis *et al.*, 2015)



(Photo courtesy Osmany)

Gerres limbatus Cuvier, 1830

Lives in tidal areas of estuaries and very shallow coastal waters

(Jetkins, 1910 as *Gerres lucidus* Cuvier; Psomadakis *et al.*, 2015)



(Photo courtesy Osmany)

Gerres oyena (Forsskal, 1775)Max. TL 30.0 cm .

Depth range 20 m. Found along the coast, saltwater lagoons, and estuaries (Jalil and Khaliluddin, 1972)



(Photo courtesy Osmany)

Gerres phaiya Iwatsuki and Heemstra, 2001

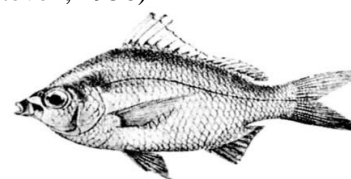
Shallow coastal waters; also in estuaries and over bottoms of muddy sand, in brackish channels, lagoons and estuaries, mangoves

(Qureshi, 1955 as *Gerres poeti*; Psomadakis *et al.*, 2015 as *Gerres longirostris* (Lacepède))



(Online image)

Gerres setifer (Hamilton, 1822) Max. size 15.0 cm SL. Benthopelagic, brackish water, depth range 10 m. Found in shallow coastal waters, or from estuaries basins strongly influenced by freshwater (Kesteven, 1950)



(Online image)

Gerres macracanthus Bleeker, 1854

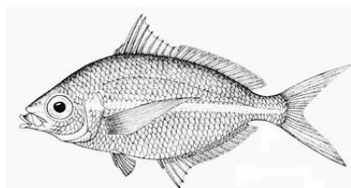
Coastal waters to depths of at least 30 m on sandy bottoms; also in estuaries (FAO; Psomadakis *et al.*, 2015)

Genus *Pentaprion* Bleeker, 1850

Pentaprion longimanus (Cantor, 1849) TL 15.0 cm. Silvery, with a mirror-like stripe from snout to caudal peduncle; fins dusky yellow

Demersal, brackish water, depth range 15–220 m

(Bianchi, 1985)



(Online image)

Family Haemulidae Gill, 1885
 Genus *Anisotremus* Gill, 1861
Anisotremus virginicus (Linnaeus, 1758)
 Reef-associated; depth range 2 - 20 m. (Ahmed and Wazarat, 1993 erroneous record. Ref Moazzam et al, 2021))
 Genus *Diagramma* Oken, 1817
Diagramma pictum (Thunberg, 1792)
 Max. TL 83.0 -100 cm
 Reef-associated, depth range 1–200 m. on open muddy or silty substrates in protected bays or estuaries (Murray, 1880; Jalil and Khaliluddin, 1972 as *Spilotichthys pictus*)



Juvenile and subadult (after Moazzam *et al.*,



(Image courtesy Asadullah Ali Muhammad, 2016)

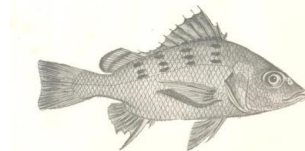
Diagramma punctatum Cuvier, 1830
 Benthopelagic
 (Sorley, 1932)



(Photo courtesy Moazzam)

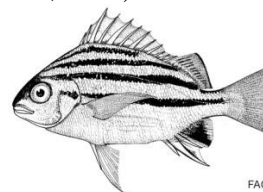
Diagramma affine Gunther, 1859 Max. size 100.0 cm FL.
 Reef-associated, depth range 1-170 m (Murray, 1880, status not certain, Ref. Moazzam *et al.*, 2021)
 Genus *Pomadasys* Lacepede, 1803
Pomadasys argenteus (Forsskal, 1775)
 Max. size 55.0 cm FL.

Demersal, brackish water, freshwater, depth range 15-115 m.
 (Day, 1875 as *Pomadasys hasta* (Bloch); Jetkins, 1910 as *Pristipoma hasta*)



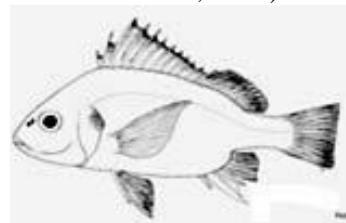
(Online image)

Pomadasys andamanensis McKay and Satapoomin, 1994
 Reef-associated
 (Anonymous, 1999)



(FAO image)

Pomadasys argyreus (Valenciennes, 1833) Max. TL 40.0 cm .Body silvery; gill cover with a large blue black blotch extending onto opercle
 Demersal, inhabits coastal waters. (Jalil and Khaliluddin, 1972)



(FAO image)

Pomadasys commersonii (Lacepede, 1801) Max. TL 80.0 cm .
 Found in coastal waters, estuaries, and tidal fissures
 (Day, 1875; Majid *et al.*, 1992 as *Pristipoma opercularis* (Playfair)



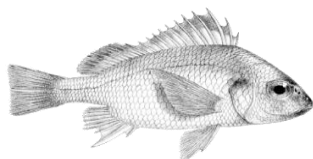
(Photo courtesy Moazzam)

Pomadasys furcatus (Bloch and Schneider, 1801) Max. FL 50.0 cm .
 Reef-associated. Inhabits coastal waters in sandy areas near rocks (Sorley, 1932)



(Photo courtesy Moazzam)

Pomadasys guoraca (Cuveir, 1829)
Benthopelagic; brackish
(Murray, 1880 as *Pristipoma guoraca*)



(Online image)

Pomadasys jubelini (Cuvier, 1830) Max. size 60.0 cm TL.

Demersal, brackish water, freshwater, depth range 100 m. sandy and muddy bottoms of coastal waters and estuaries (Hoda, 1988 may be an erroneous record. An Atlantic species. May not occur in Pakistan.

Pomadasys kaakan (Cuvier, 1930) Max. TL 80.0 cm.

Reef-associated, brackish water, depth range 75 m. Inhabit turbid inshore waters with sandy to muddy bottoms and estuaries (Bianchi, 1985)



(Photo courtesy Moazzam)

Pomadasys maculatus (Bloch, 1793) Max. TL 59.3 cm.

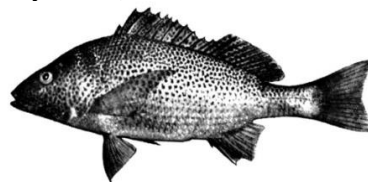
Reef-associated, over sand, brackish water, depth range 20–110 m. (Sorley, 1932)



(Photo courtesy Moazzam)

Pomadasys multimaculatus (Playfair, 1867) Max. TL 76.0 cm

Demersal, brackish water, depth range 20–50 m. in coastal waters and tidal estuaries (McKay, 1984)



(Online image)

Pomadasys olivaceus (Day, 1875) Max. TL 55.0 cm.

Reef-associated, brackish water. Found in coastal waters, tidal estuaries, larger specimens in deeper water (Day, 1875 as *Pristipoma olivaceum*)



(Photo courtesy Osmany)

Pomadasys stridens (Forsskal, 1775) Max. TL 20.0 cm

Reef-associated, depth range 65–68 m. in coastal waters

(Day, 1878 as *Pristipoma stridens* ; LACM Vertebrate Collection 1978 as *Rhonciscus stridens*)



(Photo courtesy Moazzam)

Pomadasys aheneus McKay and Randal, 1995

Coastal area; demersal; depth range ? - 6 m.

(Moazzam *et al.*, 2006)



(Photo courtesy Moazzam)

Pomadasys striatus (Gilchrist and Thompson, 1908)

All fins, except anal, dusky grey; body silvery grey with three dark longitudinal stripes originating from head to caudal fin in middle of body
Benthopelagic; known depth range < 30 m (Shaikh and Panhwar, 2017)



(After Shaikh and Panhwar, 2017)

Genus *Plectorhinchus* Lacepede, 1802
Plectorhinchus flavomaculatus (Cuvier, 1830)
Coastal waters near reefs and weedy areas.
(Psomadakis *et al.*, 2015)



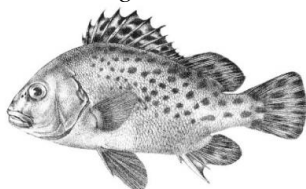
(Photo courtesy Osmany)

Plectorhinchus pictus (Tortonese, 1935)
Max. TL 60.0 cm .
Reef-associated, near rocky and coral areas
(Qureshi, 1952)



(Photo courtesy Moazzam)

Plectorhinchus cinctus (Temminck and Schlegel, 1843)
Inhabits coastal reefs, near rocky and coral areas
(Day, 1876 as *Diagramma cinctum*)



Plectorhinchus gibbosus (Lacepède, 1802) Max.TL 75.0 cm . Uniform dark grey to brownish or blackish; large specimens are sometimes mottled with light brown.

Reef-associated, brackish water, freshwater, depth range 8–20 m.
(Aitken, 1907 as *Diagramma crassipinnis*; Jalil and Khaliluddin, 1972 as *Pseudopristipoma nigra* Cuvier)



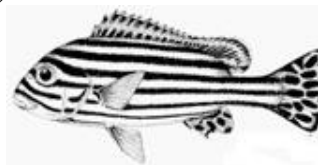
(Photo courtesy Moazzam)

Plectorhinchus lineatus (Linnaeus, 1758) Max.TL 72.0 cm.
Reef-associated, brackish water, depth range 1–35 m. Found in deep inner to outer reef, along coral slopes of clear lagoon and seaward reefs
(Jalil and Khaliluddin, 1972 as *Gaterin lineatus*)



(Online image)

Plectorhinchus vittatus (Linnaeus, 1758)
Max. TL 86.0 cm .
Reef-associated, inhabits seaward reefs depth range 2–25 m .
(Jalil and Khaliluddin, 1972 as *Gaterin orientalis* Bloch)



(FAO image)

Plectorhinchus schotaf (Forsskal, 1775)
Max.TL 80.0 cm .
Brackish water found around rocks and corals from the surf zone to a depth of 80 m
(Day, 1875 as *Diagramma griseum*)



(Photo courtesy Moazzam)

Plectorhinchus gaterinus (Forsk., 1775)

Coastal reefs, usually among coral ledges
(Ali *et al.*, 2017; Moazzam *et al.*, 2006)



(After Moazzam *et al.*, 2006)

Plectorhinchus playfairi (Pellegrin, 1914)
Sandy area
(Moazzam *et al.*, 2006)



(Photo courtesy Osmany)

Plectorhinchus sordidus (Kluninger, 1870)
Rocks and corals, as well as shallow weedy area
(Moazzam *et al.*, 2006)



(Photo courtesy Moazzam)

Family Sparidae Rafinesque, 1818
Genus *Argyrops* Swainson, 1839
Argyrops spinifer (Forsskal, 1775)
Max.TL 70.0 cm .
Demersal, depth range 150 m .
(Day,1876; Qureshi, 1955 as *Pagrus spinifer*)



(Photo courtesy Moazzam)

Argyrops flavops Iwatsuki and Heemstra, 2018
demersal; depth range 30 - 100 m.

(Iwatsuki and Heemstra, 2018)
Genus *Rhabdosargus* Fowler, 1933
Rhabdosargus haffara (Forsskal, 1775)
Max. TL 35.0 cm. Body uniform orangish pink with belly and chin silvery, head with snout mostly yellow or orange, sometimes yellow or orange on cheek; spinous dorsal-fin rays are yellowish or orangish pink, especially on membrane, other fins are somewhat yellowish pink or pale pink; upper jaw and around the eyes often yellowish orange
Reef-associated, depth range 10 m. in shallow waters around coral reefs, and over sandy or mud-sandy bottoms
(Hoda, 1988; Siddiqui *et al.*, 2014)



(Photo courtesy Osmany)

Rhabdosargus sarba (Forsskal, 1775)
Max. TL 80.0 cm .
Reef-associated, brackish water, depth range 60 m. shallow coastal waters, surf-line or in rock pools, mangrove areas
(Jetkins, 1910 as *Chrysophrys sarba*)



(Photo courtesy Moazzam)

Genus *Acanthopagrus* Mc Culloch, 1915
Acanthopagrus berda (Forsskal, 1775)
Max.TL 90.0 cm.
Demersal, brackish water, freshwater, depth range 10–50 m. on muddy and sandy bottoms of coastal waters estuaries and protected bays
(Day, 1876 as *Chrysophrys berda*)



(Photo courtesy Moazzam)

Acanthopagrus arabicus Iwatsuki 2013

Max.TL 50.0 cm .
Pelagic-neritic; brackish water, shallow coastal waters. depth range? - 50 m.
(Iwatsuki, 2013)



(Photo courtesy Moazzam)

Acanthopagrus sheim Iwatsuki, 2013
Demersal in coastal waters
(Iwatsuki, 2013)



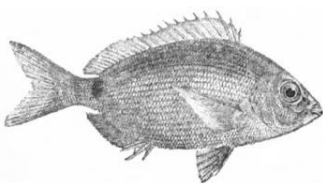
(Photo courtesy Osmany)

Acanthopagrus catenula (Lacepède, 1801) Silvery with two black bars on head; dorsal, caudal and pectoral fins yellow to orange shade
Occurs in shallow coastal waters. Enters estuaries and bays, mainly around coral reefs
(Marshall, 1952 as *Sparus bifasciatus* (Forsskal);
Khan, 2012 as *Acanthopagrus bifasciatus* (Forsskal) *et al.*, 2014)



(Photo courtesy Moazzam)

Genus *Diplodus* Rafinesque, 1810
Diplodus noct (Valenciennes, 1830)
Max. TL 25.0 cm
Above sandy bottoms, around coral reefs and in shallow coastal waters
(Day,1878; Qureshi, 1955 as *Sargus noct*)



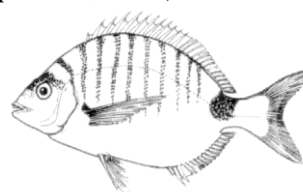
(Online image)

Diplodus kotschy (Steindachner, 1876)
Max. TL 30.0 cm .
Demersal, rocky shallow coastal waters
(Bianchi, 1984 as *Diplodus sargus kotschy*)



(Photo courtesy Moazzam)

Diplodus capensis (Smith, 1844)
Brackish, commonly observed <10 m depth
(Siddiqui *et al.*, 2014)



(FAO image)

Diplodus omanensis Bauchot and Bianchi, 1984
Demersal, found in areas of rocky substrate to depths of 300 m.
(Amir *et al.*, 2013)



(Picture after Feild,2009)

Genus *Crenidens* Cuvier and Valenciennes, 1830
Crenidens crenidens (Forsskal, 1775)
Max. TL 30.0 cm.
Demersal. Found in shallow coastal waters in muddy quiet areas
(Qureshi, 1955 as *Crenidens forskalii*)



(Photo courtesy Moazzam)

Crenidens indicus Day, 1873
Demersal

(Day, 1873)



Genus *Sparidentex* Munro, 1948
Sparidentex hasta (Valenciennes, 1830) Max. TL 50.0 cm.
 Demersal. Found in shallow coastal waters
 (Bianchi, 1984)



(Photo courtesy Moazzam)

Sparidentex jamalensi Amir, Siddiqui and Masroor, 2014 148-224 mm SL.
 Mangrove swamps
 (Amir *et al.*, 2014)



(Photo courtesy Moazzam)

Genus *Cheimerius* Smith, 1938
Cheimerius nufar (Valenciennes, 1830)
 Max. TL 75.0 cm
 Reef-associated. Found on rocky substrates of coastal waters, estuaries.
 depth range 20–300 m
 (Bianchi, 1984)



(Photo courtesy Moazzam)

Genus *Pagellus* Valenciennes, 1830
Pagellus affinis Boulenger, 1888

Demersal; depth range 150 m.
 (Amir *et al.*, 2013)



(Photo courtesy Moazzam)

Family Lethrinidae Bonaparte, 1831
 Genus *Lethrinus* Cuvier, 1829
Lethrinus borbonicus Valenciennes, 1830 Max. TL 40.0 cm. Body greenish grey or yellow-brown; irregular patterns of broken dusky bars on sides.
 Reef-associated, depth range 40 m. in sandy areas near reefs
 (Carpenter and Allen, 1989)



(Fishbase image)

Lethrinus harak (Forsskal, 1775) Max. size 50.0 cm TL. Body greenish grey or yellowbrown; irregular patterns of broken dusky bars on sides.
 Found over shallow sandy, coral rubble, mangroves, lagoons, channel and seagrass areas inshore and adjacent to coral reefs
 (Bianchi, 1984)



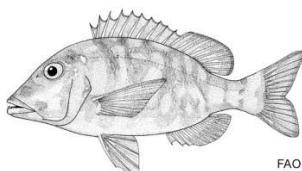
(FAO image)

Lethrinus microdon Valenciennes, 1830
 Max. TL 80.0 cm.
 Depth range 80 m. Found over sandy areas near coral reefs
 (Jalil and Khaliluddin, 1972 as *Lethrinella miniata*)



(Photo courtesy Moazzam)

Lethrinus lentjan (Lacepède, 1802)
 Max. TL 52.0 cm
 Reef-associated. Inhabits sandy bottoms in coastal areas and deep lagoons, depth range 2090 m.
 (Carpenter and Allen, 1989)



(FAO image)

Lethrinus nebulosus (Forsskal, 1775)
 Max. TL 87.0 cm .
 Depth range 10–75 m. Inhabit coral reefs, coralline lagoons, seagrass beds, algae or sponge, mangrove swamps and coastal sand and rock areas
 (Day, 1876; Jalil and Khaliluddin, 1972)



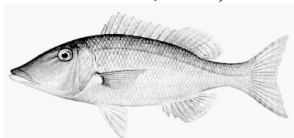
(Photo courtesy Moazzam)

Lethrinus obsoletus (Forsskal, 1775)
 Max. TL 60.0 cm .
 Depth range 30 m. Found over seagrass beds, sand and rubble areas of lagoons and reefs
 (Bianchi, 1984 as *Lethrinus ramak*)



(Online image)

Lethrinus olivaceus Valenciennes, 1830
 Max. TL 100.0 cm .
 Depth range 1-185 m. in sandy coastal areas, lagoons, and reef slopes
 (Carpenter and Allen, 1989)



(FAO images)

Lethrinus ornatus Valenciennes, 1830
 Inhabits sandy and soft bottom inshore bays, seagrass beds, lagoons, and areas adjacent to reefs. Maximum depth 30 m.

(Psomadakis *et al.*, 2015)



(Photo courtesy Moazzam)

Genus *Monotaxis* Bennett, 1830
Monotaxis grandoculis (Forsskal, 1775)
 Max. TL 60.0 cm .
 Depth range 1–100 m. in sand and rubble areas near coral reefs.
 (Day, 1878)



(Photo courtesy Osmany)

Genus *Gymnocranius* Klunzinger, 1870
Gymnocranius grandoculis (Valenciennes, 1830) Max. TL 80.0 cm.
 Depth range 20–170 m. Inhabits offshore reefs of continental shelves and offshore rocky bottoms
 (Carpenter and Allen, 1989)
 Family Nemipteridae Regan, 1913
 Genus *Nemipterus* Swainson, 1839
Nemipterus bipunctatus (Valenciennes, 1830) Max. TL 30.0 cm. Upper part of body pinkish, shading to silvery on the ventral surface; pelvic fins white
 Demersal, depth range 18–100 m. on sand or mud bottoms
 (Bianchi, 1984; Hoda, 1988 as *N. bleekeri* (Day)



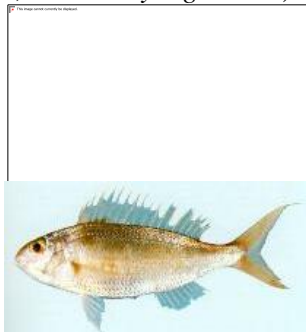
(Photo courtesy Osmany)

Nemipterus japonicus (Bloch, 1791)
 Max. TL 32.0 cm
 Demersal, depth range 5–80 m. in coastal waters on mud or sand bottoms
 (Qureshi, 1955 as *Synagris japonicus*)



(Photo courtesy Moazzam)

Nemipterus peronii (Valenciennes, 1830)
Max. SL 29.0 cm .
Demersal, brackish water, on sand or mud
depth range 17–100 m.
(Qureshi, 1955 as *Synagris tolu*)



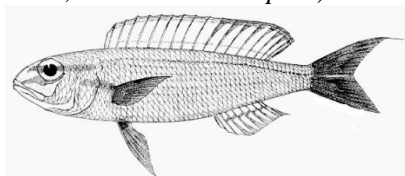
(Online images)

Nemipterus randalli Russell, 1986 Max.
TL 20.0 cm
Demersal, depth range 22–225 m. Found
on sand or mud bottoms
(Russell, 1990)



(Photo courtesy Moazzam)

Nemipterus zysron (Bleeker, 1857)
Max.TL 25.0 cm
Demersal, depth range 10–125m. Found
on sandy bottoms near rocks.
(Bianchi, 1984 as *N. metopias*)



(FAO image)

Genus *Parascalopsis* Boulenger, 1901
Parascalopsis aspinosa (Rao and Rao,
1981) Max. TL 21.0 cm
Demersal, depth range 20–225 m. Found
on sand or mud in offshore waters
(Bianchi, 1984)



(Photo courtesy Moazzam)

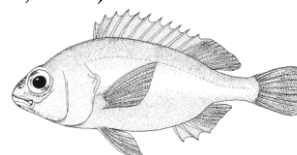
Parascalopsis eriomma (Jordan and
Richardson, 1909) Max. TL 32.0 cm

Demersal, depth range 25–264 m. Found
in offshore waters on sand or mud
(Bianchi, 1984)



(FAO images)

Parascalopsis townsendi Boulenger,
1901 Max.TL 20.0 cm Uniform reddish
with a silvery lateral stripe
Demersal, depth range 100–410 m. Found
on sand or mud bottoms in offshore
waters
(Norman, 1939)



(Online image)

Parascalopsis boesemani (Rao and Rao,
1981)
On soft bottom, demersal; depth range
150 - 300 m.
(Bianchi, 1985)



(Photo courtesy Moazzam)

Genus *Scolopsis* Cuvier, 1815
Scolopsis bimaculata Ruppell, 1828
Max.TL 31.0 cm Reef.reef-associated,
depth range 60 m. in sand or mud bottoms
close to reefs
(Hoda, 1988)



(Photo courtesy Osmany)

Scolopsis frenata (Cuvier 1830) Max. TL
26.0 cm
Reef-associated, depth range 5–20 m.
inhabits sandy bottoms close to coral
reefs
(Day, 1876; Qureshi, 1955 as *S. phaeops*
(Bennett))

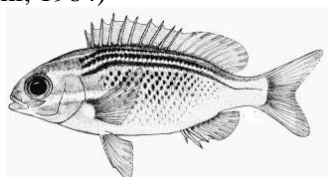


(FAO image)

Scolopsis ghanam (Forsskal, 1775) Max. TL 30.0 cm

Depth range 1–20 m. Found in inshore waters usually on shallow sandy bottoms close to coral reefs

(Bianchi, 1984)

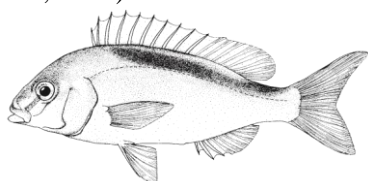


(Online image)

Scolopsis taeniatus (Cuvier, 1830) Max. TL 36.0 cm .

Reef-associated, depth range 20–50 m.

(Bianchi, 1984)



(Online image)

Scolopsis vosmeri (Bloch, 1792) Max. TL 25.0 cm

Depth range 2–25 m. Found in inshore waters, usually on sand or mud bottoms close to reefs also in offshore areas

(Qureshi, 1955; Psomadakis *et al.*, 2015 as *Scolopsis torquata* (Cuvier)



(Photo courtesy Moazzam)



(Photo courtesy Kamran Shaikh)

Family Polynemidae Rafinesque, 1815

Genus *Eleutheronema* Bleeker, 1862

Eleutheronema tetradactylum (Shaw, 1804) Max. TL 200 cm .

Pelagic, brackish water, freshwater, depth range 0–23 m. Found over shallow muddy bottoms in coastal waters

(Jetkins, 1910 as *Polynemus tetradactylus*)



(Photo courtesy Moazzam)

Genus *Leptomelanosoma* Motomura and Iwatsuki, 2001

Leptomelanosoma indicum (Shaw, 1804) Max. TL 142 cm .

Demersal, brackish water, depth range 55–100 m .

(Kesteven, 1950; Qureshi and Burney, 1952 as *Polydactylus indicus*; Qureshi, 1955 as *Polynemus indicus* Shaw)



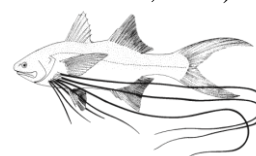
(Photo courtesy Moazzam)

Genus *Polynemus* Linnaeus, 1758

Polynemus paradiseus Linnaeus, 1858 questionable Max. TL 23.0 cm

Demersal, depth range 25 m. Found over sandy bottoms, regularly entering freshwaters during breeding season

(Jalil and Khaliluddin, 1972)



(Online image)

Genus *Polydactylus* Lacepède, 1803

Polydactylus mullani (Hora, 1926) Max. size 15.7 cm SL.

Pelagic, depth range 14–115 m.

(Hora, 1925 as *Polynemus sextarius mullani* Hora; Motomura and Iwatsuki, 2001)



(Photo courtesy Moazzam)

Polydactylus plebeius (Broussonet, 1782) Max. TL size 45.0 cm
Demersal, brackish water, over muddy bottoms (Kesterern, 1950; Qureshi, 1955 as *Polynemus plebeius*)



(Photo courtesy Moazzam)

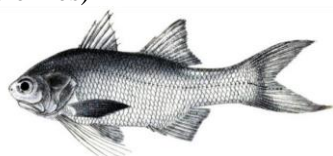
Polydactylus sextarius (Bloch and Schneider, 1801)
Max. TL 30.0 cm. Body golden olive, silvery on sides and below, large black blotch on lateral line. Brackish water, depth range 19–73 m. (Jalil and Khaliluddin, 1972 as *Polynemus sextarius*)



(Online image)

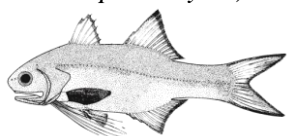
Polydactylus sexfilis (Valenciennes, 1831)

Max. TL 61.0 cm .
Reef-associated, brackish water, freshwater, along sandy and rocky shorelines and over sandy lagoon bottoms
(Qureshi, 1955 as *Polynemus sexfilis* Valenciennes)



(After Day, 1878)

Genus *Filimanus* Myers, 1936
Filimanus heptadactyla (Cuvier, 1829)
Max. size 13.0 cm SL.
Demersal, brackish water over shallow muddy bottoms
(Talwar and Kacker, 1984 as *Polydactylus heptadactylus*; Hoda, 1988 as *Polynemus heptadactylus*)



(Online image)

Filimanus similis Feltes, 1991 Max. size 9.9 cm SL.
Demersal
(Feltes, 1991)



(Photo courtesy Moazzam)

Family Sciaenidae Cuvier, 1829
Genus *Argyrosomus* De la Pylaie, 1835
Argyrosomus japonicus (Temminck and Schlegel, 1843)
Brackish; benthopelagic
(Psomadakis *et al.*, 2015).
Argyrosomus amoyensis (Bleeker, 1863)
demersal; depth range ? - 60 m
(FishBase)



Genus *Otolithes* Oken, 1817
Otolithes cuvieri Trewavas, 1974 Max. TL 39.0 cm .
Benthopelagic. Inhabits inshore and coastal waters (Trewavas, 1974; Fischer and Bianchi, 1984)



(Photo courtesy Moazzam)

Otolithes ruber (Bloch and Schneider, 1801)
Max. TL 90.0 cm.
Benthopelagic, brackish water, depth range 10–40 m. in coastal waters
(Jetkins, 1910 as *Otolithus ruber*; Qureshi, 1955 also as *Otolithus argenteus* Cuvier and Valenciennes)



(Photo courtesy Moazzam)

Genus *Pterotolithes* Fowler, 1933

Pterolithes maculatus (Cuvier, 1830)
 Max.SL 45.0 cm .
 Benthopelagic, brackish water
 (Amanullah and Qureshi, 1967 as
Otolithus maculatus)



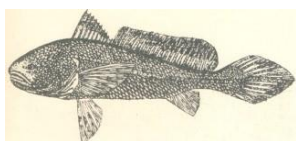
(After Day, 1878)

Genus *Otolithoides* Fowler, 1933
Otolithoides biauritus (Cantor, 1849)
 Max. SL 160 cm .
 Demersal. Found in coastal and inshore
 waters
 (Qureshi, 1955 as *Sciaenoides brunneus*
 (Day)



(Photo courtesy Moazzam)

Otolithoides pama (Hamilton, 1822)
 Freshwater; brackish; benthopelagic
 (Amanullah and Qureshi, 1967 as *Pama*
pama)



(After Amanullah and Qureshi, 1967)

Genus *Atrobucca* Chu, Lo and Wu, 1963
Atrobucca alcocki Talwar, 1980 Max.
 size 21.6 cm SL. Body silvery, whitish
 below; lining of mouth, gill chamber, and
 peritoneum black.
 Deepwater species recorded at depths of
 60–280 m.
 (Talwar, 1980; FishBase, 2006)



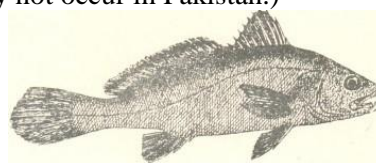
(Photo courtesy Moazzam)

Genus *Pennahia* Fowler, 1926
Pennahia anea (Bloch, 1793) Max. SL
 30.0 cm .
 Demersal, depth range 60 m. in inshore
 waters
 (Jalil and Khaliluddin, 1972 as *Johnius*
aneus; Talwar and Kacker, 1974 as *P.*
macrophthalmus (Bleeker)



(Photo courtesy Moazzam)

Pennahia argentata (Houttuyn, 1782)
 Benthopelagic; depth range 20 - 140 m.
 (Amanullah and Qureshi, 1967 as *Johnius*
argentatus. Known from western Pacific.
 May not occur in Pakistan.)



(After Amanullah and Qureshi, 1967)

Genus *Johnius* Bloch, 1793
Johnius dussumieri (Cuvier, 1830) Max.
 TL 40.0 cm . Back and flanks black or
 dark brown, belly whitish or pale yellow;
 upper part of the rather high spinous part
 of dorsal fin black.
 Demersal, brackish water, depth range 40
 m
 (Day, 1865 ;Qureshi, 1955 as *Sciaena*
sina)



(Photo courtesy Osmany)

Johnius macrorhynchus (Lal Mohan,
 1976)
 Benthopelagic
 (Khan,2003)



(Photo courtesy Moazzam)

Johnius belangerii (Cuvier, 1830) Max.
 TL 30.0 cm
 Demersal, brackish water, coastal waters
 and estuaries depth range 40 m
 (Jetkins,1910 as *Sciaena*
belengeri;Qureshi, 1955 as *Sciaena*
belangerii)



(Photo courtesy Moazzam)

Johnius borneensis (Bleeker, 1851) Max. TL 34.8 cm
Depth 40 m. Benthopelagic, brackish water, freshwater
(Hoda, 1988 as *Johnieops vogleri* (Bleeker))



(Photo courtesy Osmany)

Johnius carouna (Cuvier, 1830) Upper 2/3 of body light grey or with a white sheen, lower 1/3 yellowish; pectoral, pelvic, and anal fins and lower part of caudal fin with yellow tinge
Inhabits shallow coastal waters, entering estuaries and mangrove swamps.
(Psomadakis *et al.*, 2015)



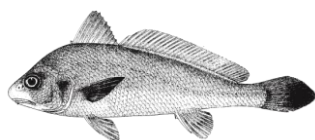
(Photo courtesy Osmany)

Johnius carutta Bloch, 1793 Max. SL 30.0 cm. Demersal, brackish water, freshwater, inshore waters depth range 40 m.
(Amanullah and Qureshi, 1967)



(Photo courtesy Moazzam)

Johnius macropterus (Bleeker, 1853) Max. TL 25.0 cm.
Demersal, in shallow coastal waters
(Hoda, 1988)



(Online image)

Johnius glaucus (Day, 1876)

Coastal waters over muddy bottoms to 30 m. depth
(Bianchi, 1985)



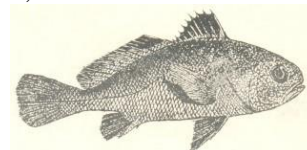
(Online image)

Johnius amblycephalus (Bleeker, 1855) Freshwater; brackish; demersal; depth range 1 - 40 m.
(FishBase)



(Photo courtesy Moazzam)

Genus *Kathala* Mohan, 1969
Kathala axillaris (Cuvier, 1830) Max. TL 27.0 cm
Benthopelagic. In shallow coastal waters
(Qureshi, 1955 as *Sciaena axillaris*)



Genus *Protonibea* Trewavas, 1971
Protonibea diacanthus (Lacepede, 1802) Max. SL 150 cm.
Demersal, brackish water, depth range 60 m. over muddy bottoms, off the sea-bed
(Qureshi, 1955 as *Sciaena diacanthus*)



(Photo courtesy Osmany)

Genus *Paranibea* Trewavas, 1971
Paranibea semiluctuosa (Cuvier, 1830) Max. TL 40.0 cm.
Demersal. Found in coastal waters
(Jalil and Khaliluddin, 1972 as *Johnius semiluctuosus*)



(Photo courtesy Moazzam)

Genus *Nibea* Jordan and Temminck, 1911

Nibea maculata (Bloch and Schneider, 1801) Max. TL 30.0 cm Spinous dorsal fin black, except base pale, soft dorsal fin with black margin and series of dark spots along base.

Demersal, found in coastal waters (Qureshi, 1955 as *Sciaena maculata*)



(Photo courtesy Moazzam)

Nibea soldado (Lacepede, 1802) Max. SL 60.0 cm .

Demersal, brackish water, freshwater, depth range 40 m.

(Jalil and Khaliluddin, 1972 as *Johnius soldado*)



(Online image)

Genus *Daysciaena* Talwar, 1970

Daysciaena albida (Cuvier, 1830) Max. size 90.0 cm SL.

Benthopelagic, brackish water (Hoda, 1988 as *Nibea albida*)



(Photo courtesy Moazzam)

Genus *Umbrina* Cuvier, 1817

Umbrina robinsoni Gilchrist et Thompson, 1908 Max. TL 80.0 cm. Silvery dark gray with irregular short and moderate pale gray vermiculations on head and body; pelvic and median fins blackish.

Demersal, depth range 50–300 m. in mud and sandy bottoms of the shelf and upper slope

(Day, 1878; Qureshi, 1955 as *Umbrina sinuate*; Psomadakis et al., 2015 as *U. canariensis* Valenciennes)



(Photo courtesy Osmany)

Umbrina ronchus Valenciennes, 1843 Max. TL size 100.0 cm.

Demersal, brackish water, freshwater, depth range 20–200 m. Inhabits rocky and sandy bottoms

(Hoda, 1988)



(FAO image)

Genus *Dendrophysa* Trewavas, 1829

Dendrophysa russelii (Cuvier, 1829)

Max. size 25.0 cm SL.

Found in coastal waters to 50 m depth.

(Amanullah and Qureshi, 1967 as *Sciaena russelli*)

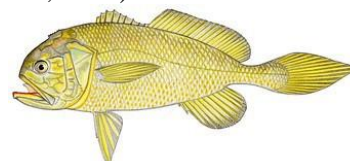


(Online image)

Genus *Collichthys* Gunther, 1860

Collichthys lucidus (Richardson, 1844) Max. size 17.0 cm SL.

Demersal, depth range 90 m. found in estuaries and down to 90 m. depth (Hussain, 1975)



(Online image)

Genus *Macrospinosa* Lal Mohan, 1969

Macrospinosa cuja (Hamilton, 1822)

Freshwater; brackish; benthopelagic (Jenkins 1910 as *Sciaena cuja* Hamilton)

Family Mullidae Rafinesque, 1815

Genus *Mulloidichthys* Whitley, 1929

Mulloidichthys flavolineatus (Lacepede, 1801). Max. TL 43.0 cm

Depth range 5 – 35 m. in shallow sandy areas of lagoon and seaward reefs

(Fischer and Bianchi, 1984 as *Mulloides flavolineatus*)



(FAO image)

Mulloidichthys vanicolensis

(Valenciennes, 1831)

Max.TL 38.0 cm .

Depth range 5–113 m. Found on sandy bottoms of reef flats, lagoons, and seaward reefs

(Fischer and Bianchi, 1984 as *Mulloides vanicolensis*)



(Photo courtesy Osmany)

Genus *Parupeneus* Bleeker, 1863

Parupeneus barberinus (Lacepède, 1801) Max.TL 60.0 cm

In large sand patches as well as sand and rubble areas of reef flats, and lagoon and seaward reefs

(Fischer and Bianchi, 1984)



(FAO image)

Parupeneus trifasciatus (Lacepede,

1801) Max.TL 35.0 cm .

Reef-associated, depth range 1–80 m. in lagoons and seaward reefs

(Fischer and Bianchi, 1984 as *Parupeneus bifasciatus*; questionable Kapoor *et al.*, 2002; FishBase, 2006)



(FAO image)

Parupeneus cyclostomus (Lacepede, 1801) Max. TL 50.0 cm.

Depth range 8–100 m. Found on coral, rocky, or rubble bottoms of reef flats, lagoons, and seaward reefs

(Fischer and Bianchi, 1984)



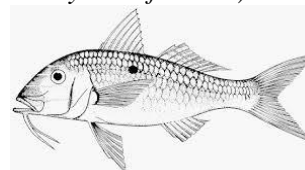
(Online images)

Parupeneus forsskali (Fourmanoir and Guézé, 1976)

Max. TL 28.0 cm

Reef-associated, brackish water

(Jalil and Khaliluddin, 1972 as *Mulloidichthys auriflamma*)



(Online image)

Parupeneus heptacanthus (Lacepède,

1802) Max. TL 36.0 cm .

Brackish water, depth range 12–350 m. Found over muddy, sandy, rubble, or seagrass bottoms of lagoon and seaward reefs (Fischer and Bianchi, 1984 as *Parupeneus cinnabarinus* (Cuvier, 1829)



(Photo courtesy Moazzam)

Parupeneus indicus (Shaw, 1803) Max.

TL 45.0 cm

Reef-associated at inner lagoon reefs, brackish water, depth range 20 m.

(Fischer and Bianchi, 1984)

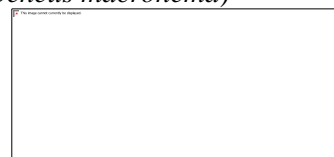


(Photo courtesy Osmany)

Parupeneus macronemus (Lacepede, 1801) Max. TL 40.0 cm

Reef-associated, depth range 3–25 m. Inhabits lagoon and seaward reefs on sandy or weedy bottoms

(Fischer and Bianchi, 1984 as *Parupeneus macronema*)



(Online image)

Parupeneus margaritatus Randall and Guézé, 1984
Reef-associated; depth range 1-55 m.
(Randall, 2004)



(FAO image)

Parupeneus ciliatus (Lacepède, 1802)
Reef-associated; depth range 2 - 91 m.
(Day, 1878 as *Upeneus displurus* Day; Talwar and Kacker, 1984 as *Parupeneus pleurotaenia* (Playfair))



(Online image)

Genus *Upeneus* Cuvier, 1829
Upeneus japonicus (Houttuyn, 1782)
Max. SL 15.7 cm
Reef-associated, depth range 20–200 m.
Found in sandy regions (Hoda, 1988 as *Upeneus bensasi* (Temminck and Schlegel))



(Online image)

Upeneus moluccensis (Bleeker, 1855)
Max. TL 20.0 cm
Reef-associated, brackish water, depth range 10-120 m. Found in coastal waters with a muddy substrate
(Fischer and Bianchi, 1984)



(Photo courtesy Moazzam)

Upeneus sulphureus Cuvier, 1829 Max. TL 22.0 cm
Demersal, brackish water. Inhabits coastal waters down to 100 m.
(Qureshi, 1955 as *Upeneoides sulphureus*)

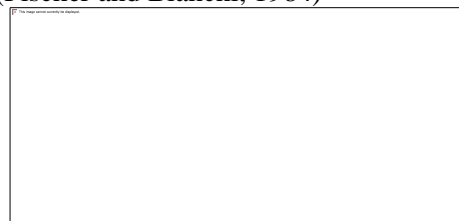


Upeneus taeniopterus Cuvier, 1829
Max. TL 33 cm .
Reef-associated. Inhabits sheltered, often turbid inshore waters over sand or mud substrates
(Fischer and Bianchi, 1984)



(FAO image)

Upeneus tragula Richardson, 1846 Max. TL 30.0 cm .
Brackish water, depth range 40 m. Found over sand and mud bottoms near coral reefs, also enter lower reaches of rivers
(Fischer and Bianchi, 1984)



(Online image)

Upeneus vittatus (Forsskal, 1775) Max. TL 28.0 cm .
Reef-associated, brackish water, depth range 5–100 m., sandy lagoons and sheltered coastal waters, also over muddy bottoms
(Jalil and Khaliluddin, 1972)



(Photo courtesy Moazzam)

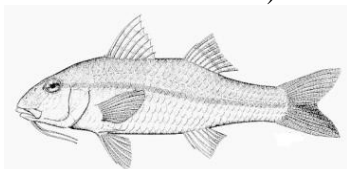
Upeneus supravittatus Uiblein and Heemstra, 2010
Reef-associated; depth range? - 40 m.
(Uiblein and Gouws, 2015)



(Photo courtesy Osmany)

Upeneus sundaicus (Bleeker, 1855)
Bronze green dorsally, shading ventrally to yellowish or whitish, with a yellowish brown stripe from eye to above midbase of caudal fin; barbels orange; dorsal fins yellowish.

Coastal waters, throughout its range
(Kumaran and Randall 1984)



(After Carpenter *et al.*, 1997)

Family Pempheridae Bleeker, 1859
Genus *Pempheris* Cuvier, 1829

Pempheris vanicolensis Cuvier, 1831
Max.TL 20.0 cm .

Reef-associated. Inhabits shallow rocky and coral reefs

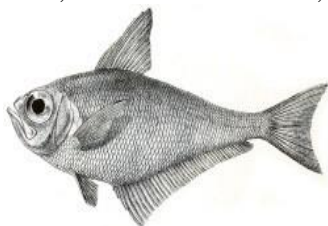
(Hoda, 1988 misidentified, may be *Pempheris flavicycla flavicycla* fide Randall *et al.*, 2015)



(Photo courtesy Moazzam)

Pempheris malabarica Cuvier, 183
Orangish and no dorsal-fin spot Pelagic-neritic

(Day, 1876 as *Pempheris mangula* Cuvier; *P. russellii* Day, 1888; Fanning *et al.*, 2011; Randall and Bineesh, 2014)



(Online image)

Hybrid *Pempheris malabarica* × *P. russellii*

Pelagic

(Randall, and Victor, 2015)

Pempheris molucca Cuvier 1829 Max.

Size 15 cm

Brackish; Reef associated.



(Photo courtesy Moazzam)

Pempheris rhomboidea -species complex

Pelagic

(Randall and Victor, 2015)

Pempheris nesogallica Cuvier, 1831

Pelagic-neritic

(Koeda *et al.*, 2014)

Family Monodactylidae Jordan and Evermann, 1898

Genus *Monodactylus* Lecepede, 1802

Monodactylus argenteus (Linnaeus, 1758) Max. size 25.0 cm TL.

Pelagic, freshwater, in mangrove estuaries, creeks, sometimes in silty coastal reefs.

(Hoda, 1988)



(Photo courtesy Moazzam)

Monodactylus falciformis Lacepede, 1801

Max.TL 31.0 cm.

Reef-associated, brackish water, freshwater

(Hoda, 1988)



(Online image)

Family Drepaneidae Gill, 1872

Genus *Drepane* Cuvier and Valenciennes, 1831

Drepane longimana (Bloch and Schneider, 1801)

Max.TL 50.0 cm .

Depth range 50 m. Found inshore, on sand or mud bottoms, reefs, estuaries and harbour

(Hoda, 1988)



(Photo courtesy Moazzam)

Drepane punctata (Linnaeus, 1758)

Max. TL 50.0 cm.

Depth range 10–49 m. Occurs in inshore sand or mud bottoms, estuaries and harbour, near coral and rock reefs

(Day, 1876; Kesteven, 1950)



(Photo courtesy Moazzam)

Family Chaetodontidae Rafinesque, 1815

Genus *Roa* Jordan, 1923

Roa jayakari (Norman, 1939) Max. TL 16.0 cm

Reef-associated; depth range 33 - 274 m. (Burgess , 1978; Moazzam *et al.*, 1987 as *Chaetodonjayakari* Norman)



(Photo courtesy Moazzam)

Genus *Heniochus* Cuvier, 1817

Heniochus acuminatus (Linnaeus, 1758)

Max. TL 25.0 cm .

Reef-associated, brackish water, depth range 2–75 m. Inhabits deep, protected lagoons and channels, and the deeper parts of outer reef slopes

(Murray, 1880; Qureshi, 1955 as *Heniochus microlepidotus*)



(Photo courtesy Moazzam)

Heniochus monoceros Cuvier, 1831

Max. TL 24.0 cm.

Reef-associated, depth range 2-30 m. Occurs in lagoon and seaward reefs with rich coral growth

(Steene, 1978)



(FAO image)

Genus *Parachaetodon* Bleeker, 1874

Parachaetodon ocellatus (Cuvier, 1831)

Max.TL 18.0 cm .

Reef-associated. Found on flat sand or silty bottoms on coastal reefs, over open muddy substrates in deep water (Murray, 1880)



Genus *Chaetodon* Linnaeus, 1758

Chaetodon auriga Forsskal, 1775

Reef-associated; depth range 1-60 m. (Sorley, 1932)



(Taken from website CAFS (<http://zzy.cafs.ac.cn/>))

Chaetodon gardineri Norman, 1939

Trawl landings
(Asadullah *et al.*, 2017)



(Photo courtesy Osmany)

Chaetodon kleinii Bloch, 1790
In deeper lagoons and channels, and seaward reefs to a depth of 61 m.
(Murray, 1880)



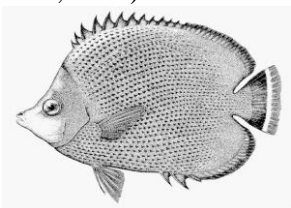
(Online image)

Chaetodon lunula (Lacepede, 1802)
With a pattern of ascending oblique reddish stripes on the flanks and black and white bands over the face and eyes, a black spot on the caudal peduncle and oblique yellow stripes behind the head. Reef-associated and rocky; depth range 0-170 m
Murray, 1880)



(Online image)

Chaetodon nigropunctatus Sauvage, 1880
Reef-associated; depth range 3-15 m.
(Anonymous, 1999)



(FAO image)

Chaetodon octofasciatus Bloch, 1787

Reef-associated; depth range 3-20 m .
(Murray, 1880)



(Online image)

Chaetodon plebeius Cuvier, 1831 15cm.
Thin dark stripes on the body and a patch of blue on the upper sides, a black spot on the caudal peduncle and a blue-edged black bar through the eye Reef-associated; depth range 10 m.
(Sorley, 1932)



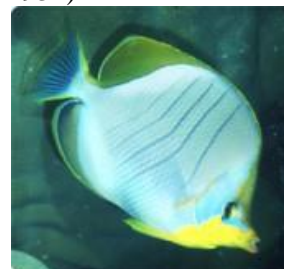
(Online image)

Chaetodon vagabundus Linnaeus, 1758
Reef-associated; depth range 5- 30m.
(Sorley, 1932)



(Photo courtesy Moazzam)

Chaetodon xanthocephalus Bennett, 1833
Reef-associated; depth range 1-30 m.
(Sorley, 1932)



(Online image)

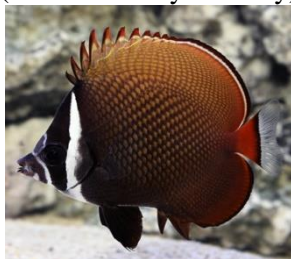
Chaetodon collare Bloch, 1787 Max. TL 18.0 cm. Rich brown to black colour with

light spotted scales throughout. head with two white bands with a black band through the eyes; tail with its wide red band followed by black and white bands. Shallow waters reef-associated, depth range 3–15 m.

(Axelrod and Vorderwinkler ,1961; Jalil and Khaliluddin, 1972 as *Chaetodontops collaris*)



(Photo courtesy Osmany)



Chaetodon trifasciatus Park, 1797
Max.TL 15.0 cm.

Reef-associated, depth range 2–20 m. Occur in coral-rich lagoons and semi-protected seaward reefs

(Jalil and Khaliluddin, 1972 as *Rhabdophorus trifasciatus*)



(Online image)

Chaetodon falcula Bloch, 1795 Reef-associated; depth range 1-15 m .

(Murray, 1880)



(Online image)

Family Pomacanthidae Jordan and Evermann, 1898

Genus *Pomacanthus* Lacepede, 1802

Pomacanthus maculosus (Forsskål, 1775)

Reef-associated; depth range 4 - 50 m. (Zohra *et al.*,2009)



(Photo courtesy Osmany)

Pomacanthus annularis (Bloch, 1787)
Max. TL 45.0 cm .

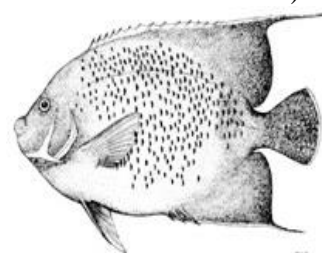
Reef-associated. Inhabits coastal reefs, inside caves, on rock or dead coral substrates (Jalil and Khaliluddin, 1972 as *Pomacanthods annularis*)



(Photo courtesy Moazzam)

Pomacanthus semicirculatus (Cuvier, 1831) Max. size 40.0 cm SL.

Depth range 1–30 m. Found in coastal reefs with heavy coral growth (Jalil and Khaliluddin, 1972 as *Pomacanthodes semicirculatus*)



(FAO image)

Pomacanthus imperator (Bloch, 1787)

At 5 m., under ledges, or in holes of outer lagoon patch reefs or semi-protected areas of exposed channels and outer reef flats

(Ali, 2008)

Genus *Centropyge* Kaup, 1860

Centropyge bicolor (Bloch, 1787) Max. TL 15.0 cm .

Reef-associated, depth range 1-25 m. Inhabits lagoon, channel, or protected seaward reef slopes (Myers, 1991)



(Online image)

Family Kyphosidae Jordan, 1887
 Genus *Kyphosus* Lacepede, 1802
Kyphosus cinerascens (Forsskal, 1775)
 Max. TL 50.0 cm
 Depth range 1–24 m. Found over hard, algal coated bottoms of exposed, surf-swept outer reef flats, lagoon and seaward reefs
 (Qureshi, 1955 as *Pimelepterus cinerascens*)



(Photo courtesy Osmany)

Kyphosus bigibbus Lacepede, 180
 Reef-associated; depth range 2m.
 (IUCN,2015)



(Photo courtesy Osmany)

Kyphosus vaigiensis (Quoy and Gaimard, 1825)
 Reef-associated; depth range 0 - 40 m.
 (IUCN)



(Photo courtesy Moazzam)

Family Terapontidae Richardson, 1842
 Genus *Terapon* Cuvier, 1817
Terapon jarbua (Forsskal, 1775) Max. TL 36.0 cm.
 Demersal, brackish water, freshwater, depth range 20–290 m.

(Jetkins, 1910 *Terapon jarbua*)



(After Moazzam and Osmany, 2022)

Terapon puta Cuvier, 1829 Max. TL 16.0 cm . Benthopelagic, brackish water, freshwater
 (Jetkins, 1910 as *Terapon puta*)



(After Moazzam and Osmany, 2022)

Terapon theraps Cuvier, 1829 Max.SL 30.0 cm.
 Reef-associated, brackish water, freshwater
 (Jalil and Khaliluddin, 1972 as *Terapon theraps*)



(After Moazzam and Osmany, 2022)

Genus *Pelates* Cuvier, 1829
Pelates quadrilineatus (Bloch, 1790)
 Max. TL 30.0 cm . Body silvery grey dorsally, silvery white ventrally; 4–6 narrow, dark brown stripes on body; spiny part of dorsal fin and behind gill opening with blotches; mouth and gill cavity red in life
 Brackish water
 (Jetkins, 1910 as *Terapon quadrilineatus*)



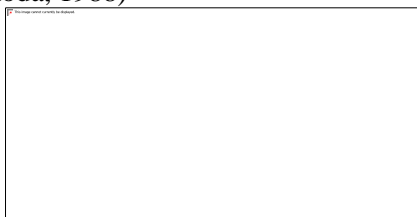
(After Moazzam and Osmany, 2022)

Family Kuhliidae Jordan and Evermann, 1896

Genus *Kuhlia* Gill, 1861

Kuhlia mugil (Forster, 1801) Max. size 40.0 cm SL.

Reef-associated, brackish water along the reef margin of rocky shorelines, depth range 3–18 m. (Hoda, 1988)



(Online image)

Benthopelagic. Occurs in muddy habitats (Moazzam *et al.*, 1987)



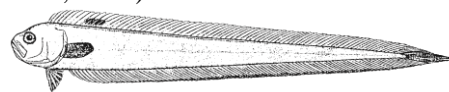
(FAO image)

Acanthocephala limbata (Valenciennes, 1835)

Max. TL 50.0 cm

Demersal, depth range 80–100 m. on deep sand slopes

(Hoda, 1988)



(Online image)

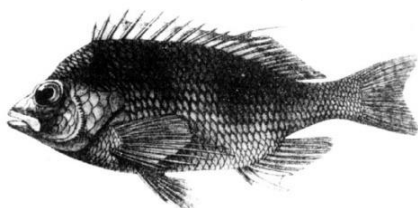
Family Cirrhitidae W. S. Macleay, 1841

Genus *Cirrhitichthys* Bleeker, 1856

Cirrhitichthys aureus (Temminck and Schlegel, 1843) Max. TL 14.0 cm .

Reef-associated. Found on rocky cliffs in deep water, also in muddy substrates in protected bays

(Jalil and Khaliluddin, 1972)



(Online image)

Acanthocephala indica (Day, 1888) Body uniformly orange-red or pink; anterior part of dorsal fin with a black blotch
Found on sandy-muddy bottoms. Benthopelagic usually found in shallow waters in a variety of habitats, including muddy and fine-sandy areas

(ZipcodeZoo; collected Osmany, 2010)



(Photo courtesy Moazzam ,Osmany)

Genus *Paracirrhites* Bleeker, 1875

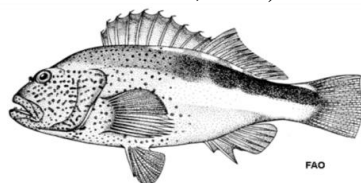
Paracirrhites forsteri (Schneider, 1801)

Max. TL 22.0 cm

Reef-associated, depth range 1–35 m.

Inhabits clear lagoon or seaward reefs, on coral and soft-bottom habitats

(Jalil and Khaliluddin, 1972)



(FAO image)

Family Champsodontidae Jordan and Snyder, 1902

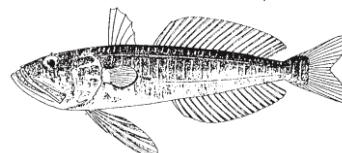
Genus *Champsodon* Gunther, 1867

Champsodon capensis Regan, 1908

Max. TL 14.0 cm

Bathypelagic, depth range 64–552 m.

(Jalil and Khaliluddin, 1972)



(Online images)

Family Cepolidae Rafinesque, 1815

Genus *Acanthocephala* Bleeker 1874

Acanthocephala abbreviata

(Valenciennes, 1835)

Max. TL 30.0 cm .

Champsodon omanensis Regan, 1908

Body silvery, slightly darker brown dorsally; dark blotch at caudal base; pectoral, pelvic, dorsal and anal fins with

melanophores along rays; chin spotted with melanophores
Depth range 135–1 120 m.
(Psomadakis *et al.*, 2015)



(Photo courtesy Moazzam)
Order Orectolobiformes Applegate, 1972

Family Hemiscylliidae Gill, 1862
Genus *Chiloscyllium* Muller and Henle, 1837

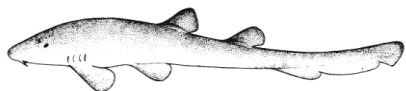
Chiloscyllium arabicum Gubanov, 1980
Max. TL 78.0 cm . Light brown
Demersal, depth range 3–100 m. Found on coral reefs, rocky shores, and mangrove estuaries
(Qureshi, 1953)



(Photo courtesy, after Moazzam and Osmany, 2021a)

Chiloscyllium indicum (Gmelin, 1789)
Max. TL 65.0 cm. Numerous dark brown or blackish spots, dashes and bars on light brown background present
Bottom dweller, bays, inlets rocks and coral reefs, brackish water, freshwater
(Zugmayer, 1913)

Chiloscyllium griseum Müller and Henle, 1838
Reef-associated, brackish water, depth range 5-80 m (Regan, 1908)



(After Compagano, 1984)

Chiloscyllium plagiosum (Bonnelt, 1830) one meter in length. Young and adults with transverse dark bands and numerous white or bluish spots
Reef-associated; inshore, bottom depth range 0 - 50 m
(Murray ,1880; record of Murray (1880) may possibly be misidentification of some other species, its presence in Pakistan may be considered doubtful, cf. Moazzam and Osmany, 2021a)

Chiloscyllium punctatum Muller and Henle, 1838
(Hussain and Khatoon ,1993 as egg case with mature larvae). Identification of this species based on an egg case cannot be done with certainty, its presence in Pakistan thus be considered doubtful cf. Moazzam and Osmany, 2021)

Chiloscyllium sp.A.
(Moazzam and Osmany, 2021a)



(After Moazzam and Osmany, 2021a)

Family Ginglymostomatidae Gill, 1862
Genus *Nebrius* Rüppell, 1837
Nebrius ferrugineus (Lesson, 1831)
Tan above, lighter below; fins slightly dusky
Reef associated; depth range 0 - 70 m .
(Day, 1889)



(After Moazzam and Osmany, 2021)

Family Stegostomatidae Gill, 1862
Genus *Stegostoma* Muller and Henle, 1837

Stegostoma fasciatum (Hermann, 1783)
Max. TL 235 cm, with scattered dark spots on a yellowish background, shading into the whitish ventral surfaces
Reef-associated, brackish water, depth range 0–63 m.
(Day, 1889 as *Stegostoma varius*; Qureshi, 1955 as *Stegostoma tigrinum*)



(After Moazzam and Osmany, 2021)

Family Rhincodontidae (Müller and Henle, 1839)

Genus *Rhincodon* Smith, 1828
Rhincodon typus Smith, 1828 Max. TL 12.7 m . Dark grey, reddish or greenish grey above, with white or yellow spots and transverse stripes; white or yellowish below.

Found offshore but coming close inshore, sometimes entering lagoons or

coral atolls, areas near estuaries and river mouths, depth range 0–700 m (Buist, 1850; Qureshi, 1952 as *R.typicus*)



Juvenile (After Moazzam and Osmany, 2021a)

Order Carcharhiniformes Compagno, 1973

Family Scyliorhinidae Gill, 1862
Genus *Scyliorhinus* Blainville, 1816
Scyliorhinus capensis (Muller and Henle, 1838) Max. TL 122 cm
Demersal, found inshore to offshore, depth range 26–495 m (Gunther, 1861; Day, 1889; Qureshi, 1972 as *Scyllium capense*; Bass *et al.*, 1975 suggest this a different species possibly undescribed)



(Online image)

Genus *Atelomycterus* Garman, 1913
Atelomycterus marmoratus (Bennett, 1830)
Max.TL 70.0 cm . Enlarged black spots merging to form dash and bar marks that bridge not clear saddle areas; large white spots scattered on sides, back and fin margins.
Reef associated (Day, 1889; Qureshi, 1972; Data Deficient)



(After Compagno, 1984)

Genus *Bythaelurus* Compagno, 1988
Bythaelurus alcockii (Garman, 1913)
Max.TL 30.0 cm .
Bathydemersal, depth range 1134–1262 m.
(Alcock, 1896 as *Scyllium canescens*. Validity questioned fide Compagno, 1999)
Bythaelurus tenuicephalus Kaschner, Weigmann and Thiel 2015 (Moazzam and Osmany, 2021)

Family Triakidae Gray, 1851
Genus *Iago* Compagno and Springer, 1971

Iago omanensis (Norman, 1939) Max.TL 37.0 cm Brownish or grayish above and lighter below, with no conspicuous markings; margins of dorsal fins often somewhat darker.

Bathydemersal, depth range 110–2195 m. (Norman, 1939 as *Galeorhinus omanensis*)



(After Moazzam and Osmany, 2021)

Iago sp. A.
Bathydermal (Moazzam and Osmany, 2021a)



(After Moazzam and Osmany, 2021a)

Genus *Mustelus* Linck, 1790
Mustelus manazo Bleeker, 1854 Max. TL 220 cm .

Bathydemersal, in the intertidal zone, on mud and sand bottom (Qureshi, 1952 as *Myrnillo manazo*)

Mustelus mosis Hemprich and Ehrenberg, 1899 Max. TL 150 cm Back and sides plain grey or grey-brown, underside cream-white; no spots on sides
Demersal, depth range 20–250 m. both inshore and offshore (Day, 1878; Compagno, 1984)



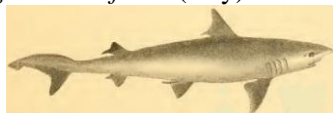
(After Moazzam and Osmany, 2021a)

Family Hemigaleidae Hasse, 1879
Genus *Paragaleus* Budker, 1935
Paragaleus randalli Compagno, Krupp and Carpenter, 1996
Found inshore in shallow water to depths of 18 m. on the continental shelf (IUCN)



(Photo courtesy, after Randall)
Genus *Chaenogaleus* Gill, 1864

Chaenogaleus macrostoma (Bleeker, 1852) Max. TL 100.0 cm Light grey or bronze colour with no prominent markings
Demersal, inshore and offshore
(Day, 1889; Qureshi, 1952 as *Hemigaleus balfouri* (Day))



Genus *Hemipristis* Agassiz, 1843
Hemipristis elongata (Klunzinger, 1871) Max. TL 240 cm Grey or grey-brown above, lighter below, no prominent markings
Demersal, depth range 1–130 m, found inshore and offshore on the continental and insular shelves
(Day, 1878 as *Carcharias ellioti*)



(After Moazzam and Osmany, 2021a)
Family Carcharhinidae Jordan and Everman, 1896
Genus *Carcharhinus* Blainville, 1816
Carcharhinus albimarginatus (Ruppell, 1837) Max. TL 300 cm .
Reef-associated, depth range 0–800 m.
Inshore and offshore
(Hoda, 1988)



(Photo courtesy Moazzam)

Carcharhinus amblyrhynchos (Bleeker, 1856) Max. TL 255 cm.
Reef-associated, depth range 0–1000 m.
(Bianchi, 1984)



(Online image)

Carcharhinus amblyrhynchoides (Whitley, 1934) Grey or grey-brown above, white below; pectoral, dorsal and pelvic fins, and ventral lobe of caudal fin

black or dusky-tipped, sometimes inconspicuously
Inshore, coastal pelagic
(Zugmayer, 1913 as *C.spallanzani*; Fischer and Bianchi, 1984)



(Photo courtesy Moazzam)

Carcharhinus amboinensis (Muller and Henle, 1839) Max. TL 280 cm . Grey above, light below, fin tips dusky, especially in young, but not strikingly marked; an inconspicuous white band on flank.
Reef-associated, brackish water, depth range 0–150 m.
(Day, 1889)



(Photo courtesy Moazzam)

Carcharhinus brevipinna (Müller and Henle, 1839) Max. TL 300 cm . Grey on back, white below; 2nd dorsal, anal, undersides of pectorals and lower caudal fin lobe black or dark grey-tipped
Found abundantly near the edge of continental shelves from close inshore to offshore (Compagno, 1984 as *Aprionodon brevipinna*)



(Photo courtesy Moazzam)

Carcharhinus dussumieri (Muller and Henley, 1839) Max. TL 120 cm. Grey, or grey brown; black or dusky tip present on 2nd dorsal fin only, other fins with pale trailing edges; light stripe on flank not conspicuous
Reef associated, depth range 170 m.
Found on the continental and inshore areas
(Day, 1889 as *Carcharias dussumieri*; Weigmann (2012) as *Carcharhinus sealei* cf. Moazzam and Osmany, 2021)



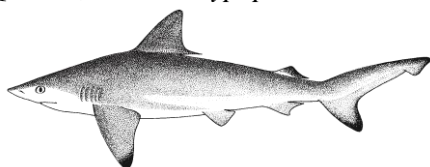
(Photo courtesy Moazzam)

Carcharhinus falciformis (Muller and Henle, 1839) Max. TL 350 cm . Dark grey to grey-brown above with an inconspicuous pale flank band, white below; fin marking inconspicuous; fin tips dusky except for 1st dorsal
Reef-associated, depth range 0–4000 m. (Day, 1889 as *Carcharhinus menisorrhah*)



(Photo courtesy Moazzam)

Carcharhinus hemiodon (Müller and Henle 1839) Max. TL 200 cm . Grey above, white below; fairly conspicuous black tips present on pectorals, 2nd dorsal, and dorsal and ventral caudal lobes
Demersal, brackish water. (Qureshi, 1953 as *Hypoprion hemiodon*)



(After Compagno, 1984)

Carcharhinus leucas (Muller and Henle, 1939) Max. TL 350 cm . Back greyish, belly white; fin tips dusky, but not strikingly marked; an inconspicuous white band on flank
Reef-associated, brackish water, freshwater, depth range 1–152 m . (Jaleel and Khaliluddin, 1972)



(Photo courtesy Moazzam)

Carcharhinus limbatus (Muller and Henle, 1839) Max. TL.275 cm Grey above, white below; black tips usually present on pectorals, 2nd dorsal, and ventral caudal lobe, and sometimes on

pelvic and anal fins and black edges usually present on 1st dorsal apex and dorsal caudal lobe.

Depth range 0–30 m. Inshore and offshore, on or adjacent to continental shelves, often off river mouths and estuaries, muddy bays, mangrove swamps, lagoons, and coral reef (Zugmayer, 1913 as *Carcharias muelleri* Steindachner)



(Photo courtesy Moazzam)

Carcharhinus longimanus (Poey, 1861) Max. TL 396 cm. Back usually dark grey with a bronze tinge or bluish; belly whitish or with a yellow tinge; mottled white fin tips on 1st dorsal, pectoral, and pelvic fins, and at tip of upper and lower caudal fin lobes; 2nd dorsal and anal fins black
Depth range 0–152 m. (Jaleel and Khaliluddin, 1972)



(Picture courtesy Moazzam)

Carcharhinus macloiti (Muller and Henle, 1839) Max. TL 110 cm. Grey or grey-brown above, white below, fins with light edges but not conspicuously marked; light flank marks not conspicuous
Demersal, depth range 170 m. Found in inshore and offshore waters (Day, 1878; Jaleel and Khaliluddin, 1972 as *Hypoprion macloiti*)



(After courtesy Moazzam)

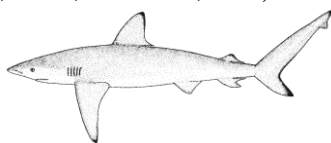
Carcharhinus melanopterus (Quoy and Gaimard, 1824) Max.TL 200 cm . Light brown above, white below; 1st dorsal and

ventral caudal lobe with a conspicuous black apical blotch, brilliantly highlighted proximally with white; other fins, generally with less prominent black fin tips; a conspicuous white band on flank. Inhabits shallow water close inshore on coral reefs and in the intertidal zone, also found in mangrove areas (Day, 1889 as *Carcharias melanopterus*)



(Photo courtesy Moazzam)

Carcharhinus obscurus (Lesueur, 1818) Max. TL 420 cm . Reef-associated, brackish water, depth range 0–400 m (Hoda, 1988; Moazzam, 2012)



(Online image)

Carcharhinus plumbeus (Nardo, 1827) Max. TL 250 cm . Grey-brown above, white below; tips and posterior edges of fins often dusky, but no conspicuous markings; an inconspicuous white band on flank. Reef-associated, brackish water, depth range 1800 m., at bays, river mouths and in harbours (Hoda, 1988)



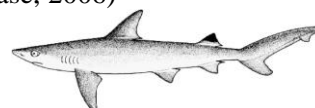
(Photo courtesy Moazzam)

Carcharhinus sorrah (Muller and Henle, 1839) Max. TL 160 Grey above white below; a conspicuous and large black tip on the pectorals, 2nd dorsal, and ventral caudal lobe, but 1st dorsal only with black edge at most; a conspicuous white band on flank Reef-associated, brackish water, depth range 0–140 m. (Day, 1889 as *Carcharias bleekeri*)



(Photo courtesy Moazzam)

Carcharhinus sealei (Pietschmann, 1913) Max. TL 100.0 cm Reef-associated, depth range 40 m. from the surf line and intertidal region to deeper water (ZMH 103117 (ISH 145-1965); FishBase, 2006)



(After Compagno, 1984)

Carcharhinus altimus (Springer, 1950) Max. TL 300 cm. Light grey above, white below, with dusky fin tips (except for pelvics) but no conspicuous markings. Offshore, near the edge of the continental and insular shelves and uppermost slope (Psomadakis *et al.*, 2015)



(Photo courtesy Moazzam)

Genus *Galeocerdo* Muller and Henle, 1837

Galeocerdo cuvier (Peron and Lesueur, 1822) Max. TL 740cm . Back dark-grey or greyish brown with dark brown or black rectangular spots often forming bars on sides of the fins. Reef-associated, brackish water, depth range 0–350 m. (Day, 1889; Qureshi, 1955 as *Galeocerdo rayneri*)



(Photo courtesy Moazzam)

Genus *Glyphis* Agassiz, 1843

Glyphis gangeticus (Müller and Henle, 1839) Max. TL 204 cm . Grey above, white below; no conspicuous markings. Demersal, brackish water, freshwater. (Gunther, 1887 as *Carcharias murrayi* Gunther)



(After Compagno, 1984)

Glyphis cf. gangeticus (Müller and Henle, 1839)

Estuarine, freshwater, demersal
(Psomadakis *et al.*, 2015)

Genus *Lamiopsis* Gill, 1861

Lamiopsis temminckii (Muller and Henle, 1839)

Max. TL 178 cm. Light grey or tan above, light below, with no prominent markings.

Demersal, brackish water, depth range 50 m

(Compagno, 1984)



(After Compagno, 1984)

Genus *Loxodon* Muller and Henle, 1939

Loxodon macrorhinus (Muller and Henle, 1839) Max. TL 95.0 cm Grey above, pale below; fins with edges transparent, caudal and 1st dorsal fin with a narrow dark margin.

Demersal, depth range 7–100 m.

(Compagno, 1984)



(Online image)

Genus *Negaprion* Whitley, 1940

Negaprionacutidens (Ruppell, 1837) Max. TL 380 cm Yellowish brown above, paler below.

Reef-associated, brackish water, shallow sandy lagoons and mangrove swamps depth range 0–92 m.

(Day 1878 as *Carchariasacutidens*)



(Photo courtesy Moazzam)

Genus *Prionace* Cantor, 1849

Prionace glauca (Linnaeus, 1758) Max. TL 400 cm Dark blue on back, bright

blue on sides, white below, tips of pectoral and anal fins dusky
Oceanic found in deep water
(Jaleel and Khaliluddin, 1972 as *Glyphisglaucus*)



(Photo courtesy Moazzam)

Genus *Rhizoprionodon* Whitley, 1929

Rhizoprionodon acutus (Ruppell, 1837) Max. TL 175 cm Grey or greyish brown above, white below; dorsal and anal fins slightly darker than back

Benthopelagic, brackish water, freshwater, depth range 1–200 m. found on sandy beaches (Zugmayer, 1913 as *Carcharius acutus*; Misra, 1961 as *Scoliodon walbeehmi* and *S. palasorra* (Bleeker)



(Photo courtesy Moazzam)

Rhizoprionodonoligolinx Springer, 1964 Max. TL 70 cm. Grey or brownish-grey above, pale below, bronzy when fresh, fins with dusky edges but not conspicuously marked

Reef-associated, depth range 36 m. (Bianchi, 1984)



(Photo courtesy Moazzam)

Genus *Scoliodon* Müller and Henle, 1837
Scoliodonlati caudus Müller and Henle, 1838 Max. TL 100.0 cm . Grey-brown above, light below, sometimes with obscure saddle bands; all fins with light margins

Demersal; brackish water, on rocky substrates of coastal waters. depth range 10–13 m .

(Zugmayer, 1913 as

Carchariuslaticaudus; Zugmayer, 1913 as *Cynocephalus (Scoliodon) macrorhynchus* Bleeker); Qureshi, 1972 as *Scoliodon sorrakowah*)



(Photo courtesy Moazzam)

Genus *Triaenodon* Muller and Henle, 1837

Triaenodon obesus (Ruppell, 1837) Max. size 213 cm TL. Grey-brown above, white below; sometimes with dark spots on sides; 1st dorsal and caudal lobes with brilliant white tips; 2nd dorsal and caudal lobes sometimes white-tipped.

Depth range 1–330 m. Inhabitant of lagoons and seaward reefs

(Day, 1878 as *Triaenodon obtusus* Day, species based on a term fetus of *Carcharhinus amboinensi* fide FAO, 1983)



(After Day, 1878)

Genus *Sphyrna* Rafinesque, 1810

Sphyrna lewini (Griffith and Smith, 1834) Max. TL 430 cm. Greyish brown or olivaceous above, shading to white below; pectoral fins tipped grey or black ventrally

Reef-associated, brackish water, depth range 0–512 m. deep water, often approaching close inshore, bays and estuaries

(Jaleel and Khaliluddin, 1972)



(Photo courtesy Moazzam)

Sphyrna mokarran (Ruppell, 1837) Max. TL 610 cm.

Coastal-pelagic, semi-oceanic, found close inshore and well offshore

(Murray, 1887a as *Zygaena dissimilis* Murray)



(Photo after, Moazzam and Osmany, 2021)

Sphyrna tudes (Valenciennes, 1822)

Max. TL 134 cm

Benthopelagic, coastal and semi oceanic.

(Zugmayer, 1913 as *Zygaena tudes*).

Presence doubtful in Pakistan)



(After Day, 1878)

Sphyrna zygaena (Linnaeus, 1758)

Max. TL 500 cm.

Reef-associated, depth range 0–200 m. inshore and well offshore

(Zugmayer, 1913; Qureshi, 1952 as *Zygaena malleus* Valenciennes)



(After Moazzam and Osmany, 2022)

Genus *Eusphyra* Gill 1862

Eusphyra blochii (Cuvier, 1816) Max. TL 186 cm Grey or grey-brown above, paler below.

Demersal, brackish water

(Kesteren, 1950 as *Zygaena blochi*; Qureshi, 1952 as *Sphyrna blochii*)



(After Moazzam and Osmany, 2022)

Order Lamniformes Berg, 1958

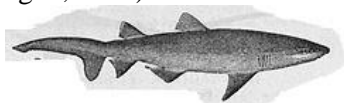
Family Odontaspidae Muller and Henle, 1839

Genus *Carcharias* Rafinesque, 1810

Carcharias taurus Rafinesque, 1810 Max. TL 370 cm. Light brown, often with darker reddish or brownish spots scattered on body, eyes with light green irises.

Demersal. Inshore from the surf zone and in shallow bays to at least 191 m.

(Day, 1878 as *Carcharias tricuspidatus*
Day, regarded as doubtful. Ref
Compagno, 1984)



(After Day, 1878)

Family Pseudocarchariidae Compagno, 1973

Genus *Pseudocarcharias* Cadenat, 1963

Pseudocarcharias kamoharui

(Matsubara, 1936)

Max. TL 110 cm Grey or grey-brown dorsal surface, lighter ventral surface, and light-edged fins

Pelagic, depth range 0–590 m.

(Hoda, 1988)



(Photo courtesy Moazzam)



Male

Family Alopiidae Bonparte, 1838

Genus *Alopias* Rafinesque, 1810

Alopias pelagicus Nakamura, 1835 Max.

TL 347 cm Deep blue or grey above, white below; white colour of abdomen not extending over pectoral fin bases.

Oceanic, epipelagic, caught near shore on narrow shelf.

(Compagno, 1984)



(After Moazzam and Osmany, 2022)

Alopias superciliosus (Lowe, 1841) Max.

TL 488 cm . Body purplish grey or greybrown on upper surface and sides with underside grey to white; light colour of abdomen not extending over pectoral fin bases

Pelagic, depth range 0–500 m. in coastal waters over continental shelves

(Bianchi, 1984)



(After Moazzam and Osmany, 2022)

Alopias vulpinus (Bonnaterre, 1788)

Max. TL 760 cm . Pelagic, depth range 0–550m

(Qureshi, 1972). Presence in Pakistan doubtful



(After Compagno, 1984)

Family Lamnidae Muller and Henle, 1838

Genus *Isurus* Rafinesque, 1810

Isurus oxyrinchus Rafinesque, 1810

Max. TL 400 cm . Dorsolateral coloration brilliant blue or purplish , white below underside of snout and mouth

Reef-associated, depth range 0–740 m

(Murray, 1884 as *Lamna guentheri*; Zugmayer, 1913 as *Lamna spallanzani*)



(Picture after Moazzam and Osmany, 2022)

Isurus paucus Manday, 1966

Dorsolateral colouration dark slaty blue or grey-black , underside white but with underside of snout and mouth dark

Oceanic

(Psomadakis *et al.*, 2015)



(Picture after Moazzam and Osmany, 2022)

Order Squaliformes Compagno, 1973

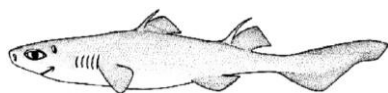
Family Dalatiidae Grey, 1851

Genus *Centroscyllium* Muller and Henle, 1841

Centroscyllium ornatum (Alcock, 1889)

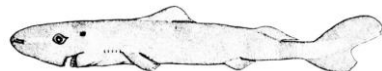
Max. TL 30.0 cm .

Bathydemersal, depth range 521–1262 m. (Alcock, 1889)



(After Compagno, 1984)

Genus *Heteroscymnoides* Fowler, 1934
Heteroscymnoides marleyi Fowler, 1934
 Max. TL 29.0 cm .
 Benthopelagic, depth range 0–502 m
 (Jaleel and Khaliluddin, 1972)



(Online image)

Family Echinorhinidae Gill, 1862
 Genus *Echinorhinus* Blainville, 1816
Echinorhinus brucus (Bonnaterre, 1788)
 Max. TL. 310cm .Grey, brownish or blackish, lighter below; fin edges blackish.
 Bathydemersal; depth range 10 - 900 m.
 (Thangavelu *et al.*, 2009; Psomadakis *et al.*, 2015 as *Echinorhinus cf. brucus* (Bonnaterre))



(Photo courtesy Moazzam)

Family Somniosidae Jordan, 1888
 Genus *Centroscymnus* (Barbosa du Bocage and Capello, 1864)
Centroscymnus crepidater (Barbosa du Bocage and Capello, 1864) Max.TL 130 cm.
 Bathydemersal, depth range 230-1500m.
 (Hoda, 1988)



(Online images)

Family Squalidae Blainville, 1816
 Genus *Squalus* Linnaeus, 1758
Squalus mitsukurii Jordan and Snyder, 1903 Max.TL 110 cm
 Bathydemersal, depth range 0–950 m
 (Hoda, 1988)



(After Compagno,1984)
 Order Pristiophoriformes White 1936

Family Pristiophoridae Bleeker, 1859
 Genus *Pristiophorus* Müller and Henle, 1837

Pristiophorus sp.D.
 Pelagic-oceanic
 (Compagno *et al.*,2005. Records from the Arabian Sea off Pakistan apparently different possibly undescribed species, fide Ebert and Cailliet, 2011)

Pristiophorus nancyae Ebert and Cailliet, 2011
 Pelagic-oceanic depth range 286 - 570 m.
 (Ebert and Cailliet, 2011)



(Online image)

Order Rajiformes Berg, 1940

Family Pristidae Bonaparte, 1838
 Genus *Pristis* Linck, 1790
Pristis pristis (Linnaeus, 1758) Max. size 656 cm TL. Uniformly brownish above, whitish below
 Demersal, brackish water, freshwater, depth range 0–10 m.
 (Sorley, 1932 as *Pristis perrotteti*; Sajid, 1962; Qureshi, 1972 as *Pristis microdon* Latham)



(Photo courtesy Moazzam)

Pristis zijsron Bleeker, 1851 Max. TL 730 cm . Greenish grey above, white below.
 Demersal, brackish water, freshwater, depth range 0–5 m.
 (Day, 1889, Punwani, 1934)



(Rostrum,photo courtesy Moazzam)
Pristis pectinata Latham, 1794

In shallow waters in coastal parts (Misra, 1969; Bianchi, 1985); all records of *P. pectinata* from Pakistan may be considered as *P. pristis*. Presence in Pakistan doubtful. fide Moazzam and Osmany, 2014)

Genus *Anoxypristis* White and Moy-Thomas 1941

Anoxypristis cuspidata (Latham, 1794)
Max. TL 470 cm . Grey above, white or greyish below, fins dusky, pale and with greenish tinge Benthopelagic, brackish water, freshwater, depth range 0–40 m (Murray, 1880; Day, 1889; Qureshi, 1972 as *Pristis cuspidatus*)



(After Compagno, 1984)



(Rostrum, after Moazzam and Osmany, 2014)

Suborder Torpedinoidei Compagno, 1973

Family Torpedinidae Bonaparte, 1838

Genus *Torpedo* Forsskal, 1775

Torpedo adenensis Carvalho, Stehmann and Manilo 2002. Unique dorsal coloration, uniform reddish-, rusty-, or orange-brown and no any distinctive spots, blotches, or reticulations.

Demersal; depth range 125 - 230 mD (Moazzam and Osmany, 2022)



(Photo courtesy

(Photo after Moazzam and Osmany, 2022)

Torpedo fuscomaculata Peters, 1855 Somewhat variable, composed of small clusters of more or less isolated, and sometimes blurry whitish spots (much larger than sensory pore diameter) over the disc, pelvic fins, and tail

Found on mud or sandy bottoms, from shallow water to a depth of 100 m.

(Bianchi, 1985 as *Torpedo panthera* von Olfers)



(After Moazzam and Osmany, 20221)

Torpedo marmorata Risso, 1810
Max.TL 100.0 cm .

Occurs in seagrass areas, rocky reefs, and adjacent soft bottoms brackish water, depth range 2–370 m.

(Englehardt, 1912; Qureshi, 1972; May not be occurring in Pakistan. Records based on wrong identification.)

Torpedo panthera von Olfers, 1831

Pale brownish to reddish brown above, overlain with a complex pattern of irregular, white, diffuse-edged markings; white markings not clustered, smaller than eye. Ventral surface creamy white.



(After Moazzam and Osmany, 2021)

Torpedo sinuspersici Olfers, 1831 Max. TL130 cm Somewhat variable colour, composed of strong cream or whitish and rather thick vermiculations over disc, pelvic fins, and tail; many cream and irregular spots, on anterior and lateral disc regions.

Reef-associated, brackish water, and well offshore from the surf zone down to 200 m.



(After Moazzam and Osmany, 2021)

Torpedo zugmayeri Englehardt, 1912
Above light bright brown dorsally with blackish mottles or a blackish marbled pattern. Ventrally yellowish white with brown-stained disc edges.

Brackish
(Englehardt, 1912)



(After Moazzam and Osmany, 2021)

Family Narcinidae Gill, 1862

Genus *Narcine* Henle, 1834

Narcine atzi Carvalho and Randall, 2003
Pale brown to greyish brown above, covered with small dark brown spots or vermicular markings; snout dusky grey or brownish. Ventrally creamy white, sometimes with dusky disc and pelvic fin margins. Blotches on tail.

Benthic species in shallow coastal waters (presumably to occur Moazzam and Osmany, 2021).

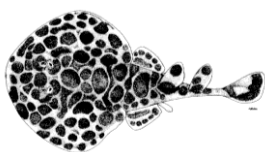
Narcine brunnea Annandale, 1909 Max. TL 22.0 cm Demersal, inshore and offshore (Day, 1889)



(After Moazzam and Osmany, 2021)

Narcine lingula Richardson 1846
Dorsal surface pale brownish, densely covered with large dark brown, oval, circular or crescent-shaped spots of varying shapes and sizes; marking present on body and fins.

Demersal, both inshore and offshore (Bianchi, 1985;Carvalho and Randall (2003)



(Photo courtesy-FAO)

Narcine maculata (Shaw, 1804)
There are many records from Pakistan but possible based on misidentification (Moazzam and Osmany, 2021).



(Photo courtesy-FAO)

Narcine oculifera Carvalho, Compagno and Mee, 2002

Dorsal surface with irregular pale brown to reddish brown reticulate pattern delimited by pale oval, kidney shaped and circular blotches of variable sizes; dorsal and caudal fins white-spotted and with whitish posterior margins.

Inhabits deeperwaters below continental shelves

(Moazzam and Osmany, 2021;Shaikh and Panhwar,2021).



(After Moazzam and Osmany, 2021)

Narcine timlei (Bloch and Schneider, 1801) Max. TL 38.0 cm Uniform purplish-brown, brown, or tan dorsally devoid of any other markings.

Demersal, inshore and offshore

(Day, 1889; Qureshi, 1955 as *Narcine indica* Henle)



(After Moazzam and Osmany, 2021)

Genus *Benthobatis* Alcock, 1898

Benthobatis moresbyi Alcock, 1898
Max. TL 35.1 cm.

Bathydemersal, depth range 787–1071 m

(Hoda, 1988)



(Online image)

Family Narkinae Fowler, 1934

Genus *Narke* Kaup, 1826

Narke dipterygia (Bloch and Schneider, 1801) Max. TL 18.0 cm . Dorsal surface plain brownish to greenish with white bars on sides of tail extending anteriorly to above rear pelvic fin bases; paired large white spots on rear of pectoral disc; ventral surface white.

Demersal, found in continental waters, both inshore and offshore

(Day, 1889 as *Astrape dipterygia*)



(After Moazzam and Osmany, 2021)

Order Rajiformes Berg, 1940

Family Rhinobatidae Müller and Henle, 1837

Genus *Rhina* Bloch and Schneider, 1801

Rhina ancylostoma Bloch and Schneider, 1801 Max. TL 270 cm. Grey above, white below; numerous white spots dorsally on fins, body and tail; black spots on head and shoulders but no eyespots or ocelli.

Reef-associated, depth range 3–90 m on coral reefs, close inshore, on sand and mud bottoms

(Day, 1889 as *R. ancylostomus*)



(After Moazzam and Osmany, 2020)

Genus *Rhynchobatus* Muller and Henle, 1841

Rhynchobatus laevis (Bloch and Schneider, 1801) Olive-green above, white below, a black blotch sometimes on ventral side of snout; large black eyespots on pectoral fin bases; eye-brow like markings on the orbital membranes
Inshore occurrence off river mouths and shallow bays

(McAuley and Compagno, 2003)



(After Moazzam and Osmany, 2020)

Rhynchobatus djiddensis (Forsskal, 1775) Max. TL 310 cm.

Reef-associated, brackish water, depth range 2–50 m inshore and in shallow estuaries

(Qureshi, 1953. Does not occur in Pakistan cf. Moazzam and Osmany, 2020).

Genus *Acroteriobatus* Giltay 1928

Acroteriobatus salalah (Randall and Compagno, 1995)

Spots the size of pupil or a little larger on outer part of disc and on pelvic fins; whitish below Benthopelagic (Khan, 2003)



(After Moazzam and Osmany, 2020)

Genus *Rhinobatos* Linck, 1790

Rhinobatos annandalei Norman, 1926

Max. size 56.0 cm SL. brownish dorsally with small widely scattered white spots usually extending to, or behind 1st dorsal fin; ventral surface dirty white with sparse dusky blotches and dark edges on pectoral and pelvic fins

Demersal, brackish water, depth 55 m. on sandy shores

(Jaleel and Khaliluddin, 1972)



(After Moazzam and Osmany, 2020)

Rhinobatos lionatus (Norman, 1926)

Demersal, brackish water, inhabits river mouths

(USNM LACM, 1978. Presence in Pakistan doubtful cf. Moazzam and Osmany, 2020).

Rhinobatos punctifer Compagno and Randall, 1987

Extremely variable, from plain to richly ornate pattern consisting of wavy lines

and ocelli., dorsal surface brownish grey with widely scattered white spots the size of pupil or smaller not extending behind 1st dorsal fin in Pakistani specimens; ventral surface uniformly white except edges of pectoral and pelvic fins dark. Demersal inshore on the continental shelf (Last *et al.*, 2016)



Ocellated/reticulated morph(After Moazzam and Osmany, 2020).



(After Moazzam and Osmany, 2020).
Genus *Glaucostegus* Bonaparte, 1846

Glaucostegus granulatus (Cuvier, 1829)
Max. size 280 cm SL. Grey-brown dorsally, except for large translucent area on snout to each side of rostral cartilages; whitish below.
Demersal, depth range 119 m intertidal to offshore continental shelves
(Qureshi, 1953 as *Rhinobatos granulatus* Cuvier)



(After Moazzam and Osmany, 2020)

Glaucostegus typus (Anonymous [Bennett], 1830) Max. TL 270 cm .
Demersal, brackish water, freshwater, depth range 0–100 m.
(Misra, 1962. Occurrence in Pakistan doubtful cf. Moazzam and Osmany, 2020)

Glaucostegus halavi (Forsskål, 1775)
Max. size 120 cm WD. Uniform tan dorsally, except for large translucent area on snout to each side of rostral cartilages; whitish below.
Benthopelagic, depth range 0–40 m. Found inshore on sandy slopes and seagrass beds
(Bianchi, 1985 as *Rhinobatos halavi* (Forsskål)



(After Moazzam and Osmany, 2020)

Glaucostegus obtusus (Müller and Henle, 1841) Max. TL 93.0 cm Uniform greyish to brownish body
Demersal; depth range ? - 60 m found inshore and offshore
(FishBase, 2006 as *Rhinobatos obtusus*)



(After Moazzam and Osmany, 2020)

Glaucostegus thouin (Anonymous, 1798) Max. TL 275 cm
Benthopelagic. Found on sandy bottoms (Qureshi, 1952 as *Rhinobatos thouiniana*); Presence in Pakistan doubtful cf. Moazzam and Osmany, 2020)

Family Rajidae Blainville, 1816
Genus *Fenestraja* McEachran and Compagno, 1982

Fenestraja mamillidens (Alcock, 1889)
Bathydemersal, depth range 1093 m.
(Hoda, 1988 as *Raja mamillidens*). Presence in Pakistan doubtful cf. Moazzam and Osmany, 2020)

Genus *Amblyraja* Malm, 1877

Amblyraja reversa (Lloyd, 1906) Disc surface white, becoming greyish at disc margins; pelvic fins greyish on upper surface; ventral surface of disc purplish-black. Bathydemersal, depth range 1500m

(Lloyd, 1906 as *Raja reversa*)

Genus *Dipturus* Rafinesque 1810

Dipturus johannisdavisi (Alcock, 1899)
Max. size 23.0 cm WD.

Bathydemersal, depth range 457–549 m found on deeper part of the continental shelves and upper slope

(Hoda, 1988 as *Raja johannisdavisi*)

Genus *Orbiraja* Last, Weigmann and Dumale, 2016

Orbiraja powelli (Alcock, 1898) Max. size 21.0 cm WD.

Demersal, depth range 122– 244 m. (Hoda, 1988 as *Raja powellii*. Presence in Pakistan doubtful cf. Moazzam and Osmany, 2020)

Infraclass Batoidea

Order Myliobatiformes Compagno, 1973

Family Dasyatidae Jordan and Gilbert, 1879

Genus *Maculabatis* Last, Naylor and Manjaji-Matsumoto, 2016

Maculabatis arabica Manjaji-Matsumoto, Mabel and Last, 2016 demersal; depth range 15 - 29 m. (Manjaji-Matsumoto *et al.*, 2016)

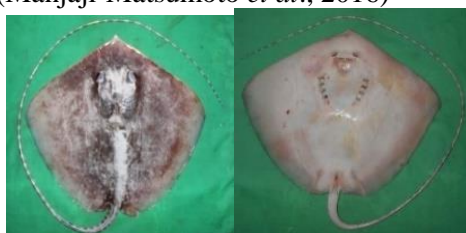


(After Moazzam and Osmany, 2021)

Maculabatis bineeshi Manjaji-Matsumoto, Mabel and Last, 2016 plain dorsal disc colouration, and a dark blackish tail especially in young with weakly mottled banding on its dorsal surface beyond the caudal sting

Demersal; depth range 13 - 22 m.

(Manjaji-Matsumoto *et al.*, 2016)



(After Moazzam and Osmany, 2021)

Maculabatis gerrardi (Gray, 1851) Max.TL 200 cm. Upper surface with diffuse white spots confined to posterior half of disc, sometimes spots very sparse, absent or also extending over anterior disc.

Demersal, brackish water, depth range 58 m. Found on inner continental shelf, over sandy and mud bottoms

(Misra, 1962 as *Dasyatis(H.) gerrardi*)



(After Moazzam and Osmany, 2021)

Maculabatis randalli Last, Manjaji-Matsumoto and Moore 2012 Dorsal surface uniformly coloured; ventral disc uniformly whitish; darker dorsal surface of tail sharply demarcated from paler ventral surface in adults; tail in juveniles dark with conspicuous white saddles, its distal portion usually uniformly dark

Demersal over sandy and mud bottoms from inshore to depths of at least 40 m.

(Psomadakis *et al.*, 2015 as *Himantura cf. randalli* Last, Manjaji-Matsumoto and Moore)

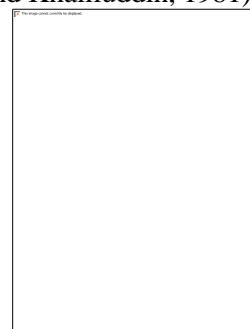


(After Moazzam and Osmany, 2021)

Genus *Taeniura* Muller and Henle, 1841

Taeniura lymma (Forsskal, 1775) Max. size 30.0 cm WD. Golden-brown with blue spots on disc and 2 broad blue bands on tail before sting Reef-associated, depth range 20 m. Found close inshore, shallow sandy patches

(Jaleel and Khaliluddin, 1981)



(Online image)

Taeniura meyeri Müller and Henle, 1841 Dorsal surface mottled, black and white (sometimes brownish); ventral surface of disc uniformly pale; tail uniformly black behind sting.

Sand or rubble bottoms in shallow lagoons or near coral and rocky reefs, and may also enter estuaries

(Bianchi, 1985 as *Taeniura melanospila* Bleeker)



(After Moazzam and Osmany, 2021)

Genus *Megatrygon* Last, Naylor, and Manjaji Matsumoto, 2016

Megatrygon microps (Annandale, 1908)
Max. TL 320 cm.

Demersal, brackish water, inhabits coastal waters and river mouths

(Bianchi, 1984 as *Dasyatis microps*; Osmany *et al.*, 2015)



(After Moazzam and Osmany, 2021)

Genus *Dasyatis* Rafinesque, 1810

Dasyatis pastinaca (Linnaeus, 1758)
Max. size 57.0 cm WD.

Demersal, brackish water, depth range 5–200 m. Inshore, found over sandy and muddy bottoms

(Hoda, 1988)



(After Moazzam and Osmany, 2021)

Genus *Bathytoshia* Whitley, 1933

Bathytoshia lata (Garman, 1880)

Dorsal surface dark grey, ventral surface of disc white with dark edge.

Demersal on insular and continental shelves

(Qureshi, 1972; Psomadakis *et al.*, 2015 as *Dasyatis ushieii*)



(After Moazzam and Osmany, 2021)

Genus *Hemitrygon* Müller and Henle 1838

Hemitrygon bennettii (Müller and Henle, 1841)

Demersal; depth range 1–40 m

(Misra, 1969 as *Dasyatis bennettii*)



(After Moazzam and Osmany, 2021)

Genus *Telatrygon* Last, Naylor and Manjaji-Matsumoto, 2016

Telatrygon crozieri (Blyth, 1860)

Max. size 29.0 cm WD. Disc brownish dorsally, pale with dark edges ventrally

Demersal, brackish water, common in estuaries

(based on photographic records (Moazzam unpubl. data 2020' Moazzam and Osmany, 2021)



(After Moazzam and Osmany, 2021)

Genus *Neotrygon* Castelnau, 1873

Neotrygon indica Pavan-Kumar, Kumar, Pitale, Shen and Borsa, 2018

Max. TL 70.0 cm. Dorsal surface greyish, greenish, or brownish with prominent bluish spots or bluish white dark-edged ocelli; spots and ocelli variable in size and number; ventral surface mostly pale, slightly darker around disc margin.

Reef-associated, depth range 0–90 m. on sandy bottoms near rocky or coral reefs (Moazzam and Osmany, 2021)



(After Moazzam and Osmany, 2021)

Genus *Pateobatis* Last, Naylor and Manjaji-Matsumoto, 2016

Pateobatis bleekeri (Blyth, 1860) Max. size 105 cm WD. Uniform dark brown or yellowish above; greyish brown ventrally, with darker margin of disc and tail; dorsal tip of snout, lower jaw, base of pelvic fins, and some areas of belly usually white.

Benthopelagic,
(Qureshi, 1952 as *Trygon bleekeri*)

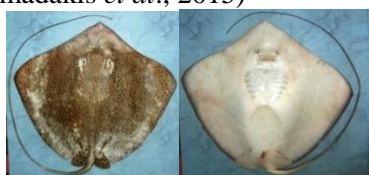


(After Moazzam and Osmany, 2021)



Genus *Himantura* Muller and Henle, 1837

Himantura leoparda Manjaji-Matsumoto and Last, 2008 Dorsal surface covered with leopard-like spots, ventral disc surface uniformly pale; tail of juveniles with a row of dark spots up to sting and with white and black bands beyond sting. Occurs mainly inshore and coastal to depths of at least 70 m. (Psomadakis *et al.*, 2015)



(After Moazzam and Osmany, 2021)

Himantura uarnak (Forsskal, 1775) Max. size 200 cm Disc width. Dorsal surface covered with small black spots or fine reticulations.

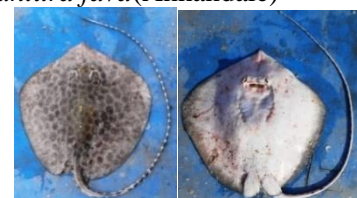
Reef-associated
(Qureshi, 1952 as *Dasyatis*(*H.*) *uarnak*)



(After Moazzam and Osmany, 2021)

Himantura undulata Bleeker, 1852

Found inshore on soft substrates (Jaleel and Khaliluddin, 1972 as *Himantura fava*(Annandale)



(After Moazzam and Osmany, 2021)

Himantura tutul Borsa, Durand, Shen, Alyza, Solihin and Berrebi, 2013 Finely spotted leopard-like patterns Pelagic-neretic

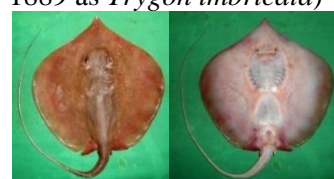


(After Moazzam and Osmany, 2021)

Genus *Brevitrygon* Last, Naylor and Manjaji-Matsumoto, 2016

Brevitrygon imbricata (Bloch and Schneider, 1801) Max. size 25.0 cm WD. Orangish brown, shading to light brown distally on disc, the zone of denticles on back greybrown; pale with darker edges ventrally.

Demersal, brackish water, freshwater, in inshore coastal waters (Day, 1889 as *Trygon imbricata*)



(After Moazzam and Osmany, 2021)

Brevitrygon walga (Müller and Henle, 1841)

Close to the sandy seabed at depths usually less than 50 m.

(Qureshi, 1955 as *Trygon walga*; Misra, 1969)



(Picture after Moazzam and Osmany, 2021)

Genus *Pastinachus* Ruppell, 1829

Pastinachus sephen (Forsskal, 1775)

Max. size 183 cm WD. Upper surface uniform, greyish brown to black; tail fold and tip black; ventral surface mostly white.

Reef-associated, brackish water, freshwater, depth range 60 m .



(After Moazzam and Osmany, 2021)

Pastinachus ater (Macleay, 1883) with very broad rhombic disc, starry based denticles forming wide band on central disc, long thornless tail with well developed ventral tail fold and terminal filament. Anterior margins of disc almost straight, apices angular. Snout short obtuse, with minute lobe at tip.

(Moazzam and Osmany, 2021)



(After Moazzam and Osmany, 2021)

Genus *Urogymnus* Muller and Henle, 1841

Urogymnus asperrimus (Bloch and Schneider, 1801) Max. size 100.0 cm WD.

Disc light grey or whitish above, white below; tail tip blackish.

Reef-associated, brackish water (Day, 1889; Qureshi, 1955)

Urogymnus granulatus (Macleay, 1883)

Found in mangrove areas, also over sand or sand and rubble in lagoons near reefs to depth of 85 m on the continental shelf

(Moazzam and Osmany, 2021)

Genus *Pteroplatytrygon* Fowler, 1910

Pteroplatytrygon voilacea (Bonaparte, 1832) 95 cm long and 45 cm wide. Upper surface uniform dark purple to black; ventral surface almost entirely dark, but usually slightly lighter than dorsal surface, pelagic, oceanic

(Moazzam and Osmany, 2021)



(After Moazzam and Osmany, 2021)

Family Gymnuridae Fowler, 1934

Genus *Gymnura* Van Hasselt, 1823

Gymnura micrura (Bloch and Schneider, 1801) Max. size 137 cm WD.

Demersal, brackish water, depth range 40 m. Found in neritic waters of the continental shelf, usually on sandy bottoms

(Lloyd, 1908; Murray, 1880; Zugmayer, 1913; Anonymous, 1955; Qureshi, 1952, 1957; Ahmad *et al.*, 1973; Sorley, 1928; Qureshi, 1955 as *Pterophlatea micrura*. Reports of previous workers on occurrence in Pakistan seems to be based on misidentification. Ref. Moazzam and Osmany, 2021)

Gymnura poecilura (Shaw, 1804) Max. size 250 cm disc Width. Dorsal surface usually plain, sometimes with faint pale spots; ventral side white to creamy white; tail distinctly cross-banded

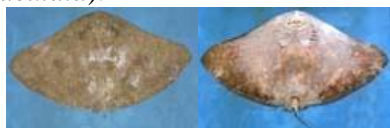
Demersal, found on sandy bottoms of shallow inshore waters and offshore banks

(Qureshi, 1955)



(After Moazzam and Osmany, 2021)

Gymnura tentaculata (Müller and Henle, 1841) Dorsal surface uniformly light to dark brown, frequently covered with numerous small whitish spots or dots. Ventral surface whitish to brownish. Shallow seas, subtidal aquatic beds, estuarine waters, and coastal saline lagoons (Bianchi, 1985 as *Aetoplatea tentaculata*).



(After Moazzam and Osmany, 2021)

Gymnura zonura (Bleeker, 1852) Dorsal fin uniform brown with numerous small round whitish spot. Ventral surface whitish to brownish. Tail banded, with 6-10 bands, pale section often with single dark spot between each black band. Reef-associated; depth range 28 - 37 m (Qureshi, 1977 as *Aetoplatea zonura*; Moazzam and Osmany, 2021).



(After Moazzam and Osmany, 2021)

Family Myliobatidae Bonaparte, 1838
Genus *Aetomylaeus* Garman, 1908

Aetomylaeus maculatus (Gray, 1834)
Max.WD 200 cm .

Reef-associated, brackish water, depth range 18 m. Found inshore, mangrove creeks and protected sandy channels (Qureshi, 1953). Presence in Pakistan doubtful cf.Moazzam and Osmany, 2021).

Aetomylaeus milvus (Muller and Henle, 1841) (ex Valenciensus, 1841) Dorsal surface greenish brown with yellowish transverse bands, breaking down to spots and blotches along posterior margins; white below Benthopelagic (Misra, 1961)



Aetomylaeus nichofii (Bloch and Schneider, 1801) Max. size 65.0 cm WD. Dorsal disc surface yellowish or brownish with 5 pale blue cross bands, inconspicuous or absent in large specimens Demersal, brackish water. Occurs inshore and offshore, from the intertidal to at least 70 m. depth (Day, 1889 as *Myliobatus nichofii*)



(After Moazzam and Osmany, 2021)

Aetomylaeus vespertilio (Bleeker, 1852) Dorsal surface brown to bluish grey with black lines arranged transversely on anterior half of disc and forming an open network on posterior half of disc; head with several black spots and stripes; posterior margin of disc with white spots; tail mostly black. Ventral surface white. Benthopelagic Found in muddy bays and banks and on coral reefs from close inshore to 110 m depth (FishBase map; Moazzam and Osmany, 2021. Seems to be every likelihood of occurrence in Pakistan)

Genus *Aetobatus* Blainville, 1820

Aetobatus narinari (Euphrasen, 1790)
Max. size 300 cm WD.

Reef-associated, brackish water, depth range 1–80 m. inshore and well offshore (Day,1889). Presence in Pakistan doubtful.

Aetobatus ocellatus (Kuhl and van Hasselt, 1823) Dorsal surface dark greenish grey to almost blackish, variably white spotted; white below Benthopelagic. Found in coastal water (Misra, 1962)



(After Moazzam and Osmany, 2021)

Aetobatus flagellum (Bloch and J. G. Schneider, 1801) Dorsal disc surface unspotted; ventral surface white.

Open seas, shallow seas, subtidal aquatic beds, and estuarine waters

(Anonymous, 1955; Moazzam and Nawaz, 2015)



(After Moazzam and Osmany, 2021)

Genus *Myliobatis* Cuvier, 1816

Myliobatis aquila (Linnaeus, 1758)

Max. size 183 cm WD.

Benthopelagic. Found in shallow lagoons, bays and estuaries, also offshore (Ahmad and Niazi, 1975, Hoda, 1988, Hussain, 2003, Jaleel and Khaliluddin, 1972 as *Myliobatis cervus*. All records from Pakistan based on misidentification Presence in Pakistan doubtful. Ref. Moazzam and Osmany, 2021)

Genus *Rhinoptera* Cuvier, 1829

Rhinoptera adpersa Müller and Henle, 1841 Max. TL 99.0 cm .

Benthopelagic

(Day, 1889; Hoda, 1988; FisBase considered as synonym of *Rhinoptera javanica*, but WoRMS accepted it as valid).

Rhinoptera jayakari Boulenger, 1895

Disc uniform dark brown or greyish to bluish grey above, often paler on snout; ventral surface entirely white, usually with narrow black edge Tail base on undersurface white, rest of tail black

Benthopelagic

(Misra, 1947)



(After Moazzam and Osmany, 2021)

Rhinoptera javanica (Muller and Henle, 1841) Max. size 150 cm WD. Disc plain brown above, white below; no conspicuous markings.

Reef-associated, brackish water. Found in bays, and estuaries over sandy and muddy bottoms

(Day, 1889)



(After Moazzam and Osmany, 2021)

Rhinoptera neglecta Ogilby, 1912 Max. size 86.0 cm WD.

Reef-associated

(Ahmad, 1965 as *R. sewelli* Misra). Presence in Pakistan uncertain.

Genus *Mobula* Rafinesque, 1810

Mobula eregoodoo (Cantor, 1849) Max. size 100.0 cm WD. Dorsal surface uniformly greyish brown; tip of dorsal fin may or may not be white; ventral surface white with dark anterior pectoral fin margins; dark dorsal colour extends onto anterior ventral surface of both pectoral fins about midway along the leading edge Pelagic, found in coastal and oceanic waters

(Day, 1878 as *Dicerobatis eregoodoo* Cator)



(After Moazzam and Osmany, 2021)

Mobula kuhli (Muller and Henele, 1841) Max. size 120 cm WD. Grey-brown to blue black above, white below. dorsal fin white-tipped

Pelagic, found in coastal and oceanic waters

(Misra (1969)



(After Moazzam and Osmany, 2021)

Mobula thurstoni (Lloyd, 1908) Dorsal surface dark blue to black, a dark band behind head, ventral surface white down the middle, with silvery-bronzy fin tips; dorsal fin white tipped. Pelagic or epipelagic in shallow, neritic waters of <100 m depth (Lloyd 1908 as *Dicerohatis thurstoni* Lloyd)



(After Moazzam and Osmany, 2021)

Mobula mobular (Bonnaterre, 1788) Max. size 520 cm WD. Dorsal surface bluish black; 2 crescentic white patches on shoulders, most obvious in embryos and juveniles, fading in adults; dorsal fin with a prominent white tip. Ventral surface white, sometimes with dark patches in adults. Pelagic, found over continental shelves and near oceanic islands (Qureshi, 1955 as *Mobula diabolus* (Shaw))



(After Moazzam and Osmany, 2021)

Mobula tarapacana (Philippi, 1892) uniformly olive-brown dorsally, white ventrally with a darker area along the rear margins of disc with a jagged anterior edge; often a dark area extending patchily

from cephalic fins posteriorly along the gill areas
Mostly oceanic, but occasionally in coastal waters
(Moazzam and Nawaz, 2015)



(After Moazzam and Osmany, 2021)

Mobula japonica (Müller and Henle, 1841) Bright blue to black above, white ventrally; dark band edged with lighter areas on posterior of head. Inshore, offshore and possibly oceanic environments (White *et al.*, 2006)

Mobula birostris (Walbaum, 1792) Max. size 800 cm. WD Dorsal surface black to dark brown, with conspicuous white shoulder patches; ventral surface mostly cream to white or black) with dark spots or patches mostly on the abdomen region, but between the gills; posterior gill slits often with black flaring. Pelagic, depth range 0–24 m. found near-shore waters, near coral and rocky reefs (Day, 1878 as *Dicerobatis eregoodoo*; Whitley, 1936 as *Indomanta tombazii*; Moore, 2012)

Genus *Manta* Bancroft, 1829



(After Moazzam and Osmany, 2021)

Manta alfredi (Kreffft, 1868) Dorsal surface black with pale to white markings on shoulders; ventral surface mostly cream to white, occasionally with dark spots or patches between gills and on abdomen. Commonly sighted inshore, but also found around offshore coral reefs, rocky reefs and seamounts

(WWF- Pakistan, 2015. Based on a specimen collected in 1964)

Family Pinguipedidae Günther, 1860
Genus *Parapercis* Bleeker, 1863

Parapercis alboguttata (Günther, 1872)
Snout pale blue with yellow diagonal streaks, fins mostly white; body reddish above, with the margins of the scales being golden brown, and fades to white on the belly; two longitudinal rows of faint pinkish spots along the side of the body and a pair of more distinct reddish spots on the caudal peduncle.

Demersal; in shallow water over sand or shingle bottoms, often near reefs, maximum depth about 70 m.

(Regan, 1905 as *Percis smithii*)

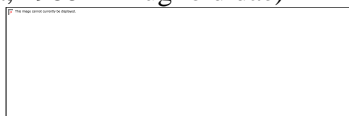


(Photo courtesy Osmany)

Parapercis hexophthalma (Cuvier, 1829)
Max. TL 29.0 cm .

Reef-associated, depth range 2–2 m. Found on sand and rubble bottoms of shallow lagoon and protected seaward reefs

(Hoda, 1988 in Mugiloididae)



(Online image)

Parapercis nebulosa (Quoy and Gaimard, 1825)

Max. TL 25.0 cm .

Demersal, depth range 30 m. Found on silty sand and rubble bottoms in shallow bays

(Hoda, 1988 in Mugiloididae)



(Online image)

Parapercis pulchella (Temminck and Schlegel, 1843) Max. TL 20.0 cm

Demersal

(Qureshi, 1955 as *Percis pulchella*)



(After Day, 1878)

Parapercis clathrata Ogilby 1910

Demersal found in coastal waters (Jaleel and Khaliluddin, 1972) as

Parapercis quadrispinosa (Weber, 1913)



(Online image)

Parapercis robinsoni Fowler, 1929 Max. TL 30.0 cm

Demersal, depth range 6–55 m. Found on sand or rubble bottoms

(Hussain and Kidwai., 1994)



(Photo courtesy Moazzam)

Family Trichonotidae Günther, 1861

Genus *Trichonotus* Bloch and Schneider, 1801

Trichonotus setiger Bloch and Schneider, 1801

Max. TL 22.0 cm.

Reef-associated, brackish water (Jaleel and Khaliluddin, 1972)



(Online image)

Family Percophidae Swainson, 1839

Genus *Bemprops* Steindachner, 1876

Bemprops caudimacula Steindachner, 1876

Max. SL 20.5 cm .

Bathydemersal, depth range 186–500 m (Das and Nelson, 1996)



(Online image)

Family Uranoscopidae Bonaparte, 1831

Genus *Uranoscopus* Gronow, 1783

Uranoscopus archionema Regan, 1921
Max. size 33.0 cm TL.

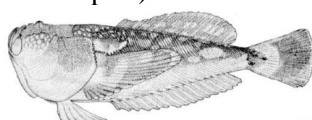
Benthopelagic, depth range 60–300 m.
(Jaleel and Khaliluddin, 1972; Fricke *et al.*, 2013)

Uranoscopus crassiceps Alcock, 1890
Demersal; depth range 179 - 220 m.
(Fricke *et al.*, 2013)

Genus *Ichthyscopus* Swainson, 1839

Ichthyscopus lebeck (Bloch and Schneider, 1801)

Coastal entering estuaries (PARC, 1989 unpublished report)



(FAO image)

Family Cichlidae Bonaparte, 1835

Genus *Oreochromis* Günther, 1889

Oreochromis mossambicus (Peters, 1852)

Brackish

(Talwar and Jhingran, 1992)



(Photo courtesy Osmany)

Family Labridae Cuvier, 1816

Genus *Cheilinus* Lacepede, 1803

Cheilinus lunulatus (Forsskal, 1775)

Max. TL 50.0 cm

Depth range 2–30 m. Inhabits coral reefs and adjacent rubble, sand and seagrass habitats

(Zaidi and Qureshi, 1967)



(FAO image)

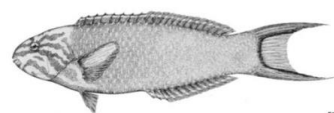
Genus *Thalassoma* Swainson, 1839

Thalassoma lunare (Linnaeus, 1758)

Max. TL 25.0 cm.

Depth range 1–20 m. Occurs in the upper portions of lagoon and coastal reefs, and in protected seaward reefs, enters estuaries

(Zaidi and Qureshi, 1967 as *Thalassoma lunaris*)



(FAO image)

Genus *Bodianus* Bloch, 1790

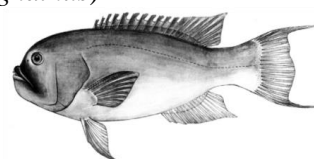
Bodianus macragnathos (Morris, 1974)

Max. TL 62.0 cm

Reef-associated, depth range 25–65 m.

Found in areas with rocky bottoms

(Zaidi and Qureshi, 1967 as *Bodianus macragnathus*)



(Online image)

Bodianus diana (Lacepède, 1801)

At depths of 9–30 m, almost always associated with

living coral reefs

(Manilo and Bogorodsky, 2003)



(FAO images)

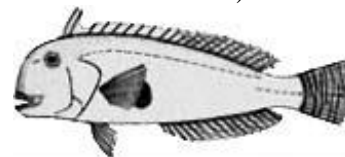
Genus *Iniistius* Gill, 1862

Iniistius bimaculatus (Rüppell, 1829)

Max. TL 10.0 cm.

Reef-associated, depth range 30–60 m. around rubble and sand in steep outer reef slopes

(Jaleel and Khaliluddin, 1972 as *Halichoeres bimaculatus*)



(FAO image)

Genus *Halichoeres* Rüppell, 1835

Halichoeres nigrescens (Bloch and Schneider, 1801)

Subtidal

(Day, 1888 as *PlatyGLOSSUS roseus*; Parenti and Randall, 2000)



(Photo courtesy Osmany)

Halichoeres scapularis (Bennett, 1832)

Reef-associated; depth range 1 - 20 m.

(Ali *et al.*, 2017)

Genus *Labroides* Bleeker, 1851

Labroides dimidiatus (Valenciennes, 1839),

Inhabits coral rich areas of inner lagoons and subtidal reef flats to seaward reefs at depths of over 40 m

(Ali *et al.*, 2017)



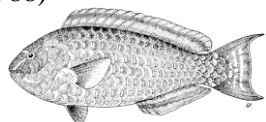
Family Scaridae Rafinesque, 1810

Genus *Calotomus* Gilbert, 1890

Calotomus carolinus (Valenciennes, 1840) Max. TL 54.0 cm .

Reef-associated. Found in coral, rubble, seagrass and weedy areas

(Hoda, 1988)

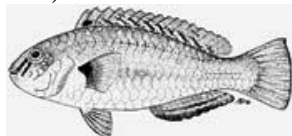


(Photo courtesy FAO)

Calotomus spinidens (Quoy and Gaimard, 1824) Max. TL 30.0 cm .

Reef-associated, depth range 10 m. Found in coastal bays and deep lagoons on seagrass beds or dense beds of algae

(Hoda, 1988)



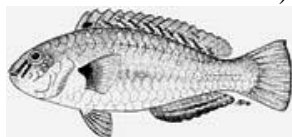
(Photo courtesy FAO)

Genus *Chlorurus* Swainson, 1839

Chlorurus sordidus (Forsskål, 1775)

Reef-associated,

(Hoda, 1988 as *Scarus sordidus*)



(Photo courtesy FAO)

Chlorurus capistratoides (Bleeker, 1847)

Reef-associated; algal habitat depth range 5 - 15 m

(Ali *et al.*, 2017)

Chlorurus bowersi (Snyder, 1909) Males easily recognized by the bright orange patch. Females similar to males but lack orange

Reef-associated; depth range 2 - 20 m.

Inhabits channel and lagoon reef slopes

(Ali *et al.*, 2017)

Genus *Scarus* Forsskal, 1775

Scarus arabicus (Steindachner, 1902)

Max. TL 45.0 cm

Reef-associated. Inhabits coastal reefs, in areas with high coral cover

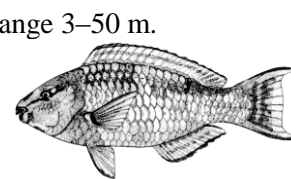
(Hoda, 1988, needs confirmation)



(Photo courtesy Moazzam)

Scarus fuscopurpureus (Klunzinger, 1871) Max. size 38.0 cm

Depth range 3–50 m.



(Photo courtesy FAO)

Scarus ghobban Forsskal, 1775 Max.TL 90.0 cm

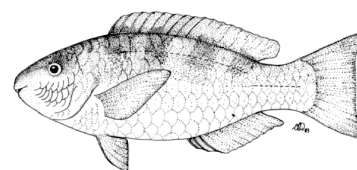
Inhabits lagoon and seaward reefs. Males common in atolls mainly around the inner and outer edges of barrier reefs at depths of about 30 ft; females prefer deeper habitats



(Photo courtesy Moazzam)

Scarus scaber Valenciennes, 1840

Max.TL 37.0 cm .



(Photo courtesy FAO)

Scarus zufar Randall and Hoover, 1995
Demersal; depth range ? - 8 m.
(Khan, 2003)



(Photo courtesy Moazzam)

Family Pomacentridae Bonaparte, 1831
Genus *Neopomacentrus* Allen, 1975
Neopomacentrus cyanomos (Bleeker, 1856)
Inhabits inshore and offshore coral reefs. Also, occurs in harbors and protected outer reef slopes
(Ali *et al.*, 2017)



Neopomacentrus bankieri (Richardson, 1846)
Coral associated, depth range 3 - 12 m
(Ali *et al.*, 2017)
Genus *Chromis* Cuvier, 1814
Chromis westaustralis Allen, 1976 pale brown, with a darker olive brown back, a dark streak on each caudal-fin lobe, a black spot at the pectoral-fin axil, a small white spot below the last dorsal-fin rays, and a narrow blue margin on the dorsal, anal, and caudal fins. Black spot and a tiny white spot at pectoral fin base, wide dark upper and lower tail margins, and light spot under rear base of dorsal fin.
Adults reef-associated; depth range 2 - 75 m.
(Shaikh and Panhwar, 2021)



(After Shaikh and Panhwar, 2021)

Chromis flavaxilla Randall, 1994 Body olive brown, the scale edges darker, shading to gray ventrally. Margin of

spinous portion of dorsal and anal fins and lateral edge of pelvic fins blue. The axil of the pectoral fins bright orange-yellow. Caudal fin light greenish gray with a broad black band in each lobe and a narrow blue upper and lower margin.
Reef-associated; depth range 0 - 18 m
(Ali ,2017)

Genus *Pomacentrus* Lacepède, 1802
Pomacentrus caeruleus Quoy and Gaimard, 1825
Inhabits coral reefs and rubble areas of mainly outer reefs slope
(Ali *et al.*, 2017)

Pomacentrus coelestis Jordan and Starks, 1901
Subtidal
(Ali, 2006)

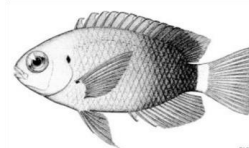
Pomacentrus moluccensis Bleeker, 1853
Subtidal
(Ali, 2006)

Pomacentrus tripunctatus Cuvier, 1830
Brackish; reef-associated; depth range 0-3 m.
(Hoda, 1988)



(Photo courtesy Osmany)

Pomacentrus leptus Allen and Randall, 1980
Reef-associated; depth range 1 - 10 m.
(ZipcodeZoo)



(FAO image)

Genus *Chrysiptera* Swainson, 1839
Chrysiptera annulata (Peters, 1855) Max. TL 8.0 cm.
Reef-associated, depth range 0–2 m. Inhabits lagoon and inshore weed and sand flats
(Hoda, 1988 as *Pomacentrus annulatus*)

Chrysiptera biocellata (Quoy and Gaimard, 1825) Max.TL 12.5 cm.
Reef-associated, depth range 0–5 m. Occurs in protected inner reef flats and shallow lagoons and channels

(Hoda, 1988 as *Abudefduf biocellatus*)



(Online image)

Chrysiptera cyanea (Quoy and Gaimard, 1825)

Max. TL 8.5 cm .

Reef-associated, found amongst rubble and coral of clear sheltered lagoons and subtidal reef flats. depth range 0–10 m. (Jaleel and Khaliluddin, 1972 as *Abudefduf uniocellatus*)



(Online image)

Chrysiptera unimaculata (Cuvier 1830)

Max. TL 10 cm

Reef-associated, found amongst rubble and rock pools. depth range 0–10 m.



(Photo courtesy Moazzam)

Genus *Neopomacentrus* Allen, 1975

Neopomacentrus sindensis (Day, 1873)

Max. size 10.0 cm TL.

Reef-associated, inshore reefs on soft bottoms around coral outcrops, rocks, debris, or wharf pilings depth range 1–10 m.

(Day, 1873 as *Glyphidodon sindensis* Day)



(Photo courtesy Moazzam)

Neopomacentrus taeniurus (Bleeker, 1856) Max. TL 10.0 cm

Demersal, brackish water, freshwater, depth range 0–3 m.

(Jaleel and Khaliluddin, 1972 as *Abudefduf cochinchensis* Cuvier)



(Photo courtesy Osmany)

Neopomacentrus miryae Dor and Allen, 1977

Well above coral reefs

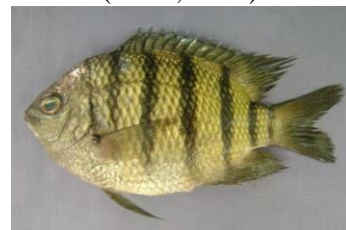
(Ali *et al.*, 2017)

Genus *Abudefduf* Forsskal, 1775

Abudefduf bengalensis (Bloch, 1787)

Max. TL 17.0 cm.

Reef-associated, brackish water, depth range 1–6 m. (Hoda, 1988)



(Photo courtesy Moazzam)

Abudefduf septemfasciatus (Cuvier, 1830) Max. TL 23.0 cm

Rock pools, reef-associated, depth range 0–3 m. Inhabits lagoon and outer reefs in shallow areas

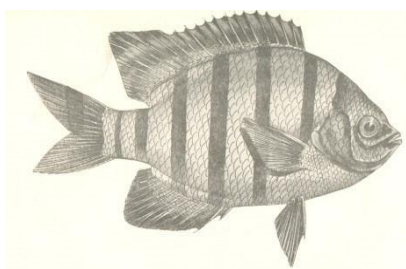
(Hoda, 1988)



(Online image)

Abudefduf sexfasciatus (Lacepede, 1801) Max. TL 16.0 cm

Reef-associated, depth range 1–15 m. Inhabits inshore and offshore coral or rocky reefs (Qureshi, 1955 as *Glyphidodon coelestinus* Cuvier and Valenciennes)



(Online image)

Abudefduf sordidus (Forsskal, 1775)
Max. TL 23.0 cm.

Reef-associated, brackish water, depth range 0–3 m. inhabits rocky lagoons, reef flat shorelines

(Day, 1878 as *Glyphidodon sordidus*)



(Photo courtesy Osmany)

Abudefduf vaigiensis (Quoy and Gaimard, 1825) Max. TL 20.0 cm.

Reef-associated, depth range 1–15 m. upper edge of outer reef slopes and inshore rocky reefs, drifting seaweed

(Hoda, 1988 as *Sexatilis vagiensis*)



(Photo courtesy Osmany)

Genus *Amphiprion* Bloch and Schneider, 1801

Amphiprion percula (Lacepede, 1802)
Max. TL 11.0 cm.

Reef-associated, anemones associated, depth range 1–15 m. in lagoons

(Hoda, 1988)

Amphiprion sebae Bleeker, 1853 Max. TL 16.0 cm .

Reef-associated, Associated with the anemones, depth range 2–25 m. Found in coastal waters and lagoons

(Jaleel and Khaliluddin, 1972)



(Online image)

Amphiprion clarkii (Bennett, 1830)

Lagoons and outer reef slopes.

Commensal with the anemones

(Ali, 2006)

Amphiprion sandaracinos Allen, 1972

Reef-associated; non-migratory; depth range 3 - 20 m

(Ali *et al.*, 2017)

Genus *Dascyllus* Cuvier, 1829

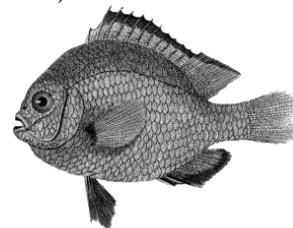
Dascyllus marginatus Ruppell, 1829

Max. TL 6.0 cm

Reef-associated, depth range 1–15 m.

Usually associated with the corals *Stylophora*, *Acropora* and *Porites*

(Hoda, 1988)



(Online image)

Dascyllus trimaculatus (Rüppell, 1829)

Subtidal

(Ali, 2006)



(Photo courtesy Moazzam)

Genus *Dischistodus* Gill, 1863

Dischistodus perspicillatus (Cuvier, 1830)

Brackish; reef-associated; depth range 1 - 10 m

(Hoda, 1988 as *Pomacentrus perspicillatus*)

Family Tripterygiidae Whitley, 1931

Genus *Enneapterygius* Ruppell, 1835
Enneapterygius sindensis Hoda, 1988

Intertidal

(Hoda, 1981 Identification uncertain)

Enneapterygius ventermaculus

Holleman, 1982 Max. TL 4.0 cm.

Overall olive green; anal fins black and white barred. Males head black; first dorsal fin, lower pectoral-fin rays and proximal portion of the pelvic-fin rays yellow in females

Demersal, depth range 0–12 m. rocky shore

(Hoda, 1983 as *Enneapterygius nasimae*

Hoda;

Randall, 1995)



Male, female (After Hoda, 1983)

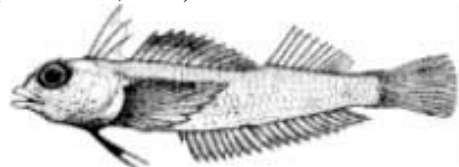


Enneapterygius pusillus Rüppell, 1835

First dorsal fin very tall; body translucent; first dorsal fin yellow; male chest and pelvic fins black, mouth corners red, eye spots deep blue below the eyes; females eye stripe brown below, pectoral-fin base also with brown stripe

Demersal; depth range 3 - 20 m . Known from inshore continental waters. Adults inhabit bays and sheltered lagoons, close to reef base, on a silty sand or mud substrate, often on stones and dead corals of the same colour

(Holleman, 2005)



(After Holleman, 2005)

Genus *Helcogramma* Culloch and Waite, 1918

Helcogramma ellioti (Herre, 1944) Max. size 5.7 cm SL.

Demersal, depth range 2–5 m. Lives on rock surfaces and under ledges. Inhabits rocky boulders

(Hoda, 1983, 1988)



(After Randall, 1999)

Family Blenniidae Rafinesque, 1810

Genus *Istiblennius* Whitley, 1943

Istiblennius dussumieri (Valenciennes, 1836) Max. TL 12.0 cm

Reef-associated, brackish waters. Inhabit sheltered rocky shorelines and mangroves (Hoda, 1988 as *Halmablennius dussumieri* (Cuvier)



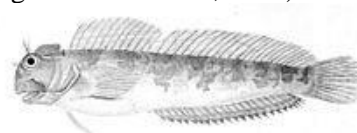
(After Randall, 1997)

Istiblennius edentulus (Forster and Schneider, 1801)

Max. TL 16.0 cm

Reef-associated, depth range 0-5 m.

(Springer and Williams, 1994)



(Online images)

Istiblennius lineatus (Valenciennes, 1836) Max. TL 15.0 cm

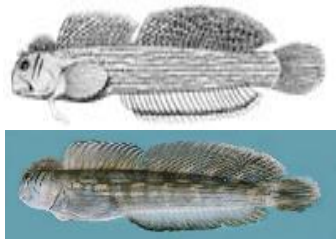
Reef-associated, depth range 0–3 m., intertidal zone of rocky shores, rocky reef flats, including rock pools, harbour and mangrove zones

(Jaleel and Khaliluddin, 1972)



(Online image)

Istiblennius pox Springer and Williams, 1994 Max. TL 13.0 cm .
Demersal. Inshore at night on rocks (Springer and Williams, 1994)



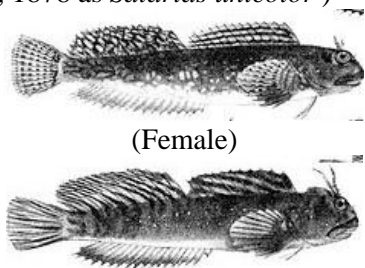
(Online images)

Istiblennius spilotos Springer and Williams, 1994
Max. TL 14.0 cm .

Demersal. Occurs along exposed rocky shores (Springer and Williams, 1994)

Istiblennius unicolor (Rüppell, 1838)
Max. size 10.2 cm SL.

Demersal. on coral reefs (Day, 1878 as *Salarias unicolor*)



(Female)

(Male)

(Online images)

Genus *Antennablennius* Flower, 1931

Antennablennius adenensis Fraser-Brunner, 1951

Max.TL 5.0 cm.

Demersal, depth range 0–2 m. Found on rocky bottoms

(Carpenter *et al.*, 1997)



Antennablennius bifilum (Gunther, 1861)

Max. size 7.5 cm TL.

Demersal, depth range 18–37 m.

((William. *et al.*, 1971)



(FAO image)

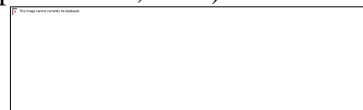
Antennablennius variopunctatus

(Jatzow and Lenz,

1898) Max. TL 7.5 cm .

Demersal, depth range 0–7 m.

(Carpenter *et al.*, 1997)



(Online image)

Antennablennius velifer Smith, 1959

Demersal

(William. *et al.*, 1971)

Genus *Pereulixia* Smith, 1959

Pereulixia kosiensis (Regan, 1908) Max. size 20.0 cm SL.

Demersal found in exposed shallow, rocky shores and tidepools to depths of 2m.

(Springer, 1986; Hoda, 1988 as *Cirripectes kosiensis*)

Genus *Alticus* Lacepède 1800

Alticus kirkii (Günther, 1868) Max.TL

11.0 cm. Demersal. Found in the intertidal zone of exposed rocky shores

(Day,1878 as *Salarias kirkii*;FishBase, 2006)



Genus *Scartella* Jordan, 1886

Scartella emarginata (Gunther, 1861)

Max. size 10.0 cm SL. Light olive, with six indistinct vertical brownish bands, as wide as the ground-colour; the whole body and fins dotted with black;

occasionally some white spots above anal. A large black, white-edged ocellus between first and second dorsal spines.

Some vertical red bands on pectoral and caudal fins. Anal dark, with two rows of light blue spots on the anterior and three on the posterior rays, which have also small black dots and a narrow white edge,

some times all the dots black. Demersal. Found in the tidal zone, on very shallow reefs and in rock pools

(Day, 1873 as *Blennius steindachneri*)

(Day, 1873 as *Blennius steindachneri*)



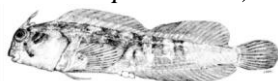
(Photo credit Randall)

Genus *Parablennius* Miranda Ribeiro, 1915

Parablennius opercularis (Murray, 1887)

Max.TL 6.0 cm , olive, with seven or eight short dark bands descending from dorsal fin down first thlird of body. Some dark bands radiate from the eye; a large black blotch below and behind orbit. Two semicircular brown bands across lower surface of jaw. Fins darker than body.

Demersal, depth range 1–12 m. Found in shallow coastal water and tide pool (Day, 1878 as *Salarius neilli*; Murray, 1887 as *Salarias opercularis*)

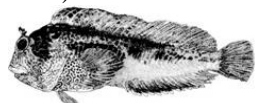


(FAO image)

Parablennius thysanius (Jordan and Seale, 1907)

Max. TL 6.2 cm.

Demersal depth range 1 - 10 m. (Randall, 1995)



(FAO image)

Genus *Atrosalarias* Whitley, 1933

Atrosalarias fuscus (Rüppell, 1838)

Max. TL 10.0 cm

Reef-associated. Inhabits sheltered, shallow reefs

(Lieske and Myers, 1994)



Genus *Ecsenius* McCulloch 1923

Ecsenius pulcher (Murray, 1887)

Max.TL 11.0 cm

Demersal. On rocky shores, hiding in crevices (Murray, 1887 as *Salarias pulcher*; FishBase, 2000)



(FAO image)

Ecsenius bicolor (Day, 1888)

Subtidal

(Ali, 2006)

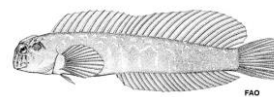
Genus *Omobranchus* Ehrenberg in Cuvier and Valenciennes, 1836

Omobranchus fasciolatus

(Valenciennes, 1836) Max. TL 6.8 cm.

Found in shallow water with rocky bottom, sometimes in tide pools

(Springer and Goman, 1975; Hoda, 1988 as *O.fasciatatus*)



(FAO image)

Omobranchus mekranensis (Regan, 1905) Max. TL 6.0 cm .

Demersal

(Regan, 1905 as *Petroscirtes mekranensis*)

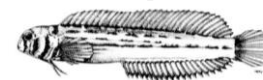


(Online image)

Omobranchus punctatus (Valenciennes, 1836) Max. size 9.5 cm SL. olivaceous, four, wide brown bands On head, the three anterior encircle it; about twelve vertical bands on body, more or less distinct. Dorsal fin with a dark mark along anterior two thirds; anal black-edged, each ray tipped with pure white.

Reef-associated, brackish water in coastal waters among rocks and mangroves

(Day, 1878 as *Salarius sindensis*; Regan, 1905 as *Petroscirtes punctatus*)



(FAO image)

Genus *Xiphasia* Swainson 1839

Xiphasia setifer Swainson, 1839 Max. size 53.0 cm SL.

Demersal, depth range 2–1190 m. Occurs on open soft-bottom and mud habitats from shallow bays to deep water

(Hoda, 1988)



(Photo courtesy Osmany)

Genus *Plagiotremus* Gill 1865

Plagiotremus townsendi (Regan, 1905)

Max. TL 6.0 cm .

Reef-associated, depth range 7–55 m
(Regan, 1905 as *Petroscirtes townsendi*)



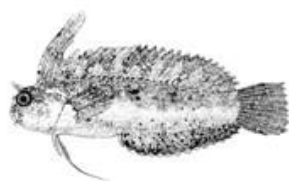
(Photo courtesy R.Feild)

Genus *Petroscirtes* Rüppell, 1830

Petroscirtes mitratus Rüppell, 1830

In coral reefs

(Day, 1878 as *Petroscirtes leinardi*)



(Online image)

Petroscirtes variabilis Cantor, 1849

Subtidal

(Ali, 2006)

Suborder Gobioidi Berge, 1940

Family Eleotridae Bonaparte, 1835

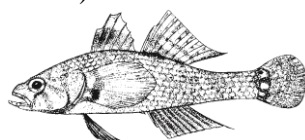
Genus *Butis* Bleeker 1856

Butis koilomatodon (Bleeker, 1849)

Max. TL 10.7 cm .

Demersal. Found in estuaries, mangrove
creeks and rivers

(Hoda, 1984 as *Prionobutis
koelomatodon*)



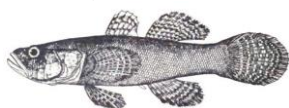
(Online images)

Genus *Eleotris* Bloch and Schneider 1801

Eleotris fusca (Forster, 1801) Max. size

26.0 cm TL. Demersal. Inhabits lagoons,
estuaries and freshwater

(FishBase, 2006)



(Online image)

Family Gobiidae Cuvier, 1816

Genus *Gobius* Linnaeus, 1758

Gobius cobitis Pallas, 1814

Brackish; demersal; depth range 10-35 m

(Kachhi *et al.*, 2020)

Genus *Favonigobius* Whitley, 1930

Favonigobius reichei (Bleeker, 1854)

small spots; sides with 4-5 groups of
black spots, last spot on caudal peduncle
often paired without a vertical bar at
caudal base; median fins spotted

Depths of 0–5 m. found over muddy or
sandy bottoms, often in weedy areas of
the intertidal zone, and also in
mangroves, estuaries, lagoons, and
downstream parts of rivers

(Sadeghi *et al.*, 2017, presumably to
occur in Pakistan)

Genus *Awaous* Valenciennes, 1837

Awaous jayakari (Boulenger, 1888)

Brackish; demersal

(Feulner and Cunningham, 2000)

Genus *Cryptocentrus* Valenciennes,
1837

Cryptocentrus sp

Demersal at 25m.

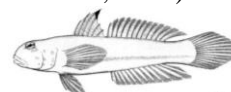
(Hoda, 1980 appears to be *Myersina filifer*
fide Winterbottom, 2002)

Genus *Valenciennesa* Bleeker, 1856

Valenciennesa sexguttata (Valenciennes,
1837) Max. TL 14.0 cm

Reef-associated, depth range 1–10 m.
Inhabits silty or sandy areas of lagoons
and bays

(Hoese and Larson, 1994)



(FAO image)

Genus *Parachaeturichthys* Bleeker, 1874

Parachaeturichthys ocellatus (Day,
1873) with eye-like spots, referring to
yellow ocellus at top of posterior half of
caudal fin

Intertidal, demersal

(Day, 1873; Kesteven, 1930 as *Gobius
ocellatus*; collected AMS I.35907-001,
1(108)1995 AMS Pakistan specimen
lacks barbels, more specimens required to
determine the significance of
this. Ref. Larson *et al.*, 2022;);



(Photo courtesy Moazzam)

Parachaeturichthys polynema (Bleeker
1853) Max. SL 108 mm. Olive, 6 blotches

along sides of body. Dorsal and anal yellowish and spotted. A yellow ocellus with a black centre at the top of caudal fin. Lower lobes of caudal a little dark. Pectoral, ventral yellowish; anal whitish with fin black dots along basal half. Pakistan specimen lacks barbels more specimens required to determine the significance of this.

Demersal, from soft bottom habitats (Hoda,1980)



(Photo courtesy Osmany)

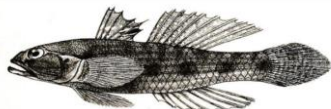
Genus *Psammogobius* Smith, 1935

Psammogobiusbiocellatus

(Valenciennes, 1837)

Max. TL 12.0 cm.

Demersal. Inhabits intertidal areas, estuaries, lagoons and coastal rivers (Day, 1876; Qureshi, 1955 as *Gobiusbiocellatus*)



(After Day,1878)

Genus *Glossogobius* Gill, 1859

Glossogobius giuris (Hamilton, 1822)

Max. size 50.0 cm SL.

Found mainly in freshwater and estuaries, but also enters the sea

(Day, 1876 as *Gobius giuris*; Zugmayer, 1913)



(Photo courtesy Moazzam)

Genus *Bathygobius* Bleeker, 1878

Bathygobius hongkongensis Lam, 1986

Demersal; depth range 0 - ? m.

(Hoda and Goren, 1990)

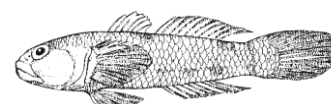
Bathygobius albopunctatus

(Valenciennes, 1837)

Max.TL 12.0 cm .

Demersal

(Hoda, 1984)



Male

Bathygobius cyclopterus (Valenciennes, 1837) Max. TL 7.0 cm

Reef associated, brackish water. Inhabits intertidal seaward reef flats

(Hoda, 1981)

Bathygobius fuscus (Ruppell, 1830)

Max.TL 12.0 cm

Reef associated, brackish water, freshwater

(Hoda, 1988)



(FAO image)

Bathygobius karachiensis Hoda and Goren, 1990

Demersal, depth 1-2 m.

(Hoda and Goren, 1990 as *Monishia karachiensis*)



Bathygobius krefftii (Steindachner, 1866) Max. TL 9.0 cm .

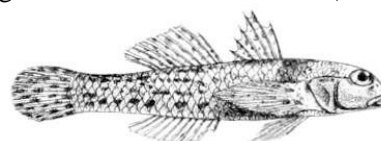
Inhabits shallow seagrass beds, rocky estuaries (Hoda, 1981)

Genus *Istigobius* Whitley, 1932

Istigobius ornatus (Ruppell, 1830) Max. size 11.0 cm TL.

Reef associated, brackish water, depth 0-2 m.

(Regan, 1905 as *Gobius ornatus*)



(Online image)

Genus *Coryogalops* Smith, 1958

Coryogalops adamsoni (Goren, 1985)

Max. TL 6.5 cm .

Demersal, depth range 1–3 m.
(Goren,1985;Hoda, 1988 as *Monishia adamsoni*)



(After Goren,1985)

Coryogalops anomolus Smith, 1958
Max.TL 5.8 cm
Demersal, depth 1-16 m. Found on silty sand, rubble, or seagrass
(Hoda, 1981)

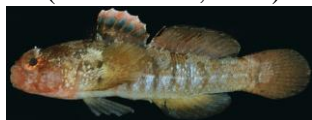


(Online image)

Coryogalops bulejiensis (Hoda, 1983)
Max.TL 4.5 cm
Found in tide pools
(Hoda, 1983 as *Monishia bulejiensis*)



(After Goren, 1985)



(FishBase image)

Coryogalops william (Smith, 1948)
Max. TL 6.0 cm
Found in intertidal areas, estuaries and freshwater
(Hoda, 1981 as *Monishia william*)



(After Goren, 1985)

Coryogalops tessellatus Randall, 1994
Demersal; depth range 0 - 6 m
(FishBase map)
Genus *Heteroleotris* Bleeker, 1874
Heteroleotris vulgaris (Klunzinger, 1871) Max. TL 4.0 cm
Demersal, benthic species typically found in the intertidal zone in rockpools and on rocky substrates. depth range 4-24 m.
(Randall, 1995)



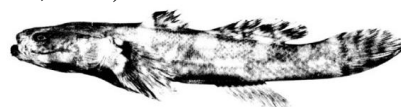
(After Randall,1995)

Heteroleotris zonata (Fowler, 1934)
Max. TL 6.5 cm
Demersal, intertidal rock pools
(Hoda, 1981 as *Heteroleotris zonatus*)



(After Randall, 1999)

Genus *Gobiopsis* Steindachner, 1861
Gobiopsis canalis Lachner and McKinney, 1978 Max. TL 6.3 cm.
Demersal, found on soft bottom, depth 21 m.
(Hoda, 1981)



(Online image)

Gobiopsis macrostoma Steindachner, 1860 Max. size 10.0 cm SL.
Found in coastal waters, estuaries, creeks, tidal rivers and canals
(Hoda, 1981)



(Online image)

Genus *Priolepis* Valenciennes, 1837
Priolepis eugenius (Jordan and Evermann, 1903)
Max. size 5.6 cm SL.
Reef associated, shoreline waters
(Hoda, 1988 as *Quisquilius eugenius*. Questionable) Genus *Drombus* Jordan and Seale, 1905

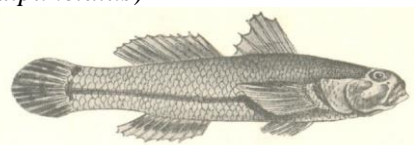
Drombus korangii Hoda, 1981

Creeks area
(Hoda, 1981)

Genus *Acentrogobius* Bleeker, 1874
Acentrogobius dayi Koumans, 1941
Max.TL 11.0 cm
Demersal, found in burrows on mud or silty sand bottoms
(Koumans, 1941; Qureshi, 1955 as *Gobius brevirostris*)

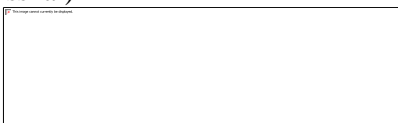


Acentrogobius viridipunctatus
(Valenciennes, 1837)
Max. TL 9.2 cm .
Demersal, brackish water, freshwater
(Day, 1876; Qureshi, 1955 as *Gobius viridipunctatus*)



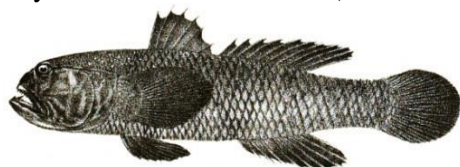
(Online image)

Acentrogobius nebulosus (Forsskål, 1775) Max. size 18.0 cm SL.
Found on muddy bottoms around inner reefs, in mangroves, estuaries and rivers
(Hoda, 1988 as *Yongeichthys nebulosus* (Forsskal))



(Online image)

Acentrogobius masoni (Day, 1873)
Brackish; demersal
(Day, 1873 as *Gobius masoni*)



(Online image)

Acentrogobius moloanus (Herre, 1927)
Freshwater, brackish, demersal.
(Kachhi *et al.*, 2020)

Acentrogobius cyanomos (Bleeker, 1849) 4.5 inches
Found in brackish and salt water, benthopelagic
(Hoda, 1984 as *Favonigobius cyanomes* (Bleeker))

Genus *Yongeichthys* Whitley, 1932
Yongeichthys criniger (Valenciennes, 1837)

Brackish; demersal
(PARC, 1985, annual report as *Ctenogobius criniger*)



Genus *Myersina* Herre, 1934
Myersina pretoriusi (Smith, 1958) Max. TL 7.5 cm . Demersal

(Hoda, 1988 as *Cryptocentrus pretoriusi*)
Genus *Amblyeleotris* Bleeker, 1874
Amblyeleotris guttata (Fowler, 1938)

Reefs in coastal to outer reef sand slopes to 25

meters depth

(Ali, 2006 questionable)

Genus *Ego* Randall, 1994

Ego zebra Randall, 1994

About 21 metres inhabiting open waters near small cracks and holes

(Moazzam and Osmany, 2016)



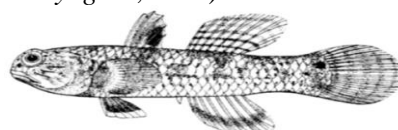
(After Moazzam and Osmany, 2016)

Genus *Mugilogobius* Smith, 1899
Mugilogobius chulae (Smith 1932)

Max. TL 4.0 cm

Found along coastlines, estuaries and tidal reaches of rivers

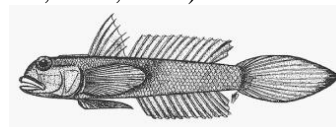
(Hoda, 1988 as *M. valigouva* (Deraniyagala, 1936))



(FAO image)

Genus *Oxyurichthys* Bleeker, 1858
Oxyurichthys microlepis (Bleeker, 1849) Max. TL 13.5 cm
Demersal, brackish water, depth range 75 m.

(Australian Museum I.21217-003, 1978; Hoda, 1980)



(Online image)

Oxyurichthys auchenolepis Bleeker, 1876

At 50 m., possibly to 70 m., recorded from mud and shell bottom (Pezold and Larson, 2015)

Genus *Scartelaos* Swainson, 1839

Scartelaos histophorus (Valenciennes, 1837) Max. size 14.0 cm SL.

Found on sand and mud flats along bay shores, also in estuarine areas, swamps (Hoda, 1988 as *Scartelaos viridis* (Hamilton and Buchanan))



(FAO image)

Scartelaos tenuis (Day, 1876) Max. TL 15.5 cm. Gray along the back, white beneath, black spots on head, bands and blotches on body, end of dorsal and upper edge of caudal with black margins.

Demersal, brackish water, intertidal mudflats and mangroves, fresh water (Day, 1876 as *Bleophthalmus tenuis*)



(Online image)

Genus *Boleophthalmus* Cuvier and Valenciennes, 18

Boleophthalmus dussumieri

Valenciennes, 1837

Max. TL 18.7 cm.

Demersal, brackish water, in mangroves, mudflats, freshwater

(Day, 1876; Zugmayer, 1913 as *Boleophthalmus dentatus* (Cuvier and Valenciennes))



(Photo courtesy Osmany)



Boleophthalmus boddarti (Pallas, 1770)

Freshwater; brackish; demersal (Mirza, 1975)

Genus *Periophthalmus* Bloch and Schneider, 1801

Periophthalmus argentilineatus

Valenciennes, 1837

Max. TL 19.0 cm.

Reef-associated, brackish water, mud flats in mangrove on higher mudflats at low tide, usually at a distance of less than 2 m from the water, not far from mangrove vegetation, and around tide pools in mangrove forests., freshwater; depth range 0–2 m.

(Murdy, 1989)



(Photo courtesy: G. Polgar, 2006)

Periophthalmus barbarus (Linnaeus, 1766) Max. TL 25.0 cm .

Reef-associated, brackish water, freshwater

(Day, 1976; Gadsden, 1900; Jenkins, 1910 as *Periophthalmus koelreuteri* Pallas; cf. Kachhi *et al.*, 2020

An Atlantic Species. May not occur in Pakistan)

Periophthalmus waltoni Kaumans,

1941. Max. TL 15.0 cm

Demersal, brackish water. Found on mud flats

(Koumans, 1941; Qureshi, 1955)



Periophthalmus chrysoplilos Bleeker, 1853

Brackish; demersal

(Ali, 2006 questionable)

Periophthalmus variabilis Eggert, 1935

Brackish; demersal

(Kachhi *et al.*, 2020)

Genus *Taenioides* Lacepede, 1800

Taenioides cirratus (Blyth, 1860) Max. TL 30.0 cm .

Found in coastal waters, estuaries and rivers

(Abdulla el Musseine, 1985)



(Photo courtesy Moazzam)

Genus *Odontamblyopus* Bleeker, 1874
Odontamblyopus tenuis (Day, 1876)
 Max. size 12.8 cm SL.
 Benthopelagic, brackish water,
 freshwater, in mud bottomed coastal and
 estuarine habitats
 (Day, 1876 as *Gobioides tenuis*)



(Online image)

Odontamblyopus rubicundus
 (Hamilton, 1822)
 Brackish; benthopelagic
 (Day, 1876 as *Gibiodes rubicundus*)



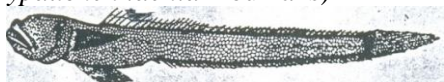
(Online image)

Genus *Trypauchen* Cuvier and
 Valenciennes, 1837
Trypauchen vagina (Bloch and
 Schneider, 1801)
 Max.TL 22.0 cm . Body colour as rosy
 red and the fins as transparent with a
 rosy tinge.
 Demersal, brackish water
 (Jaleel and Khaliluddin, 1972)



(Photo courtesy Moazzam)

Genus *Ctenotrypauchen* Steindachner,
 1867
Ctenotrypauchen chinensis
 Steindachner, 1867 Brackish, fresh water
 (Hussain and Dastagir, 1970 as
Trypauchen taenia Koumans)



(After Hussain and Dastagir, 1971)
 Order Gobiiesociformes Nelson, 1994

Family Gobiiesocidae Bleeker, 1859
 Genus *Lepadichthys* Waite, 1904

Lepadichthys coccinotaenia Regan,
 1921. Max.TL 5.0 cm
 Benthopelagic
 (Hoda, 1988)
Lepadichthys ctenion Briggs and Link,
 1963 Max. size 3.8 cm SL.
 Demersal (Briggs and Link, 1963)

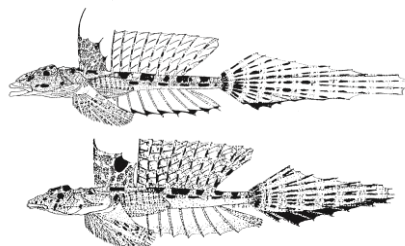
Family Callionymidae Bonaparte, 1831
 Genus *Callionymus* Linnaeus, 1758
Callionymus carebares Alcock, 1890
 135 to 330 metres
 (Fricke and Golani, 2013)



Callionymus hindsii Richardson, 1844
 Demersal; depth range ? - 40 m. on sand
 bottoms
 (Fricke, 2002)



Callionymus japonicus Houttuyn, 1782
 Max. size 20.0 cm SL.
 Demersal, in shallow to deep waters on
 sandy mud bottoms
 (Hoda, 1988)



Male, female (Online image)

Callionymus margaretae Regan, 1905
 Max. TL 16.0 cm.
 Demersal, depth range 22-107 m. on
 sandy and muddy bottoms
 (Regan, 1905)



(Photo courtesy Moazzam)

Callionymus marleyi Regan, 1919
 Max.TL 13.0 cm.

Demersal, depth range 1–20 m. on sandy bottoms
(Jaleel and Khaliluddin, 1972)



(After Randall in FishBase)

Callionymus persicus Regan, 1905
Max. TL 25.8 cm
Demersal, depth range 15–100 m.
(Regan, 1905)



(FAO image)

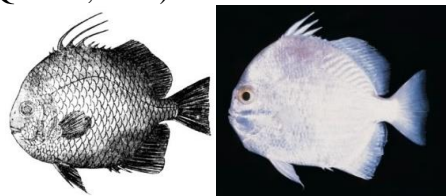
Callionymus sagitta Pallas, 1770 Max. TL 11.0 cm
Demersal, brackish water, in estuaries and the lower courses of rivers
(Qureshi, 1955)



(Online image)

Genus *Spinicapitichthys* Fricke, 1980
Spinicapitichthys spiniceps Regan, 1908
Max. TL 15.2 cm .
Demersal among weeds
(Hoda, 1988; doubtful record as only from the waters around the Seychelles. Ref. FishBase)

Family Ehippidae Bleeker, 1859
Genus *Ehippus* Cuvier, 1817
Ehippus orbis (Bloch, 1787) Max. TL 25.0 cm
Reef-associated, over mud bottoms, depth range 10–0 m .
(Qureshi, 1955)



(Online images)

Genus *Tripterodon* Playfair, 1867
Tripterodon orbis Playfair, 1867
75mm.

Reef-associated
(Zohra *et al.*, 2009, abstract; Psomadakis *et al.*, 2014)



(Photo courtesy Osmany)

Genus *Platax* Cuvier, 1817
Platax orbicularis (Forsskal, 1775)
Max. TL 50.0 cm
Reef-associated, brackish water, depth range 5–30m.
(Fischer and Bianchi, 1984)



(Photo courtesy Osmany)

Platax teira (Forsskal, 1775) Max. size 70.0 cm TL.
Found in lagoons and seaward reefs
(Qureshi, 1955; Jaleel and Khaliluddin, 1972; Marine Life of Pakistan-1, 2009 as *Platax pinnatus* (Linnaeus), misidentification of *P. teira* (Occurrence of *Platax pinnatus* in the Indian Ocean doubtful, cf. Moazzam, unpublished)



(Photo courtesy Moazzam)

Family Scatophagidae Gill, 1883

Genus *Scatophagus* Cuvier and Valenciennes, 1831

Scatophagus argus (Linnaeus, 1766)
Max.TL 38.0 cm.

Reef-associated. Inhabits harbour, natural embayments, brackish water estuaries and the lower reaches of freshwater streams, frequently occurring among mangroves (Jetkins, 1910)



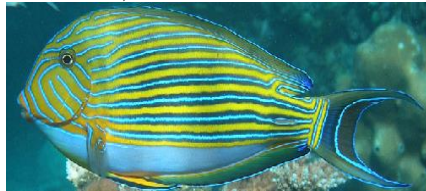
(Photo courtesy Moazzam)

Family Acanthuridae Bonaparte, 1835

Genus *Acanthurus* Forsskal, 1775

Acanthurus lineatus (Linnaeus, 1758)
Max. TL 38.0 cm .

Reef-associated, inshore rocky substrata (Hoda, 1988)



(Online image)

Acanthurus mata (Cuvier, 1829)
Max.TL 50.0 cm .

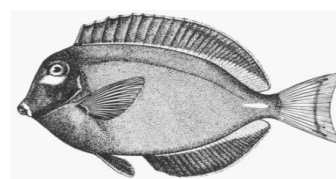
Reef-associated, depth range 5–100 m. (Qureshi, 1969 as *Acanthurus bleekeri* (Gunther, 1861)



(After Moazzam *et al.*, 2017)

Acanthurus nigricans (Linnaeus, 1758)
Max. TL 21.3 cm

Reef-associated, depth range 1–67 m. Inhabits hard substrate areas of clear lagoon and seaward reefs (Hoda,1988)



(FAO image)

Acanthurus monroviae Steindachner, 1876

Brackish; demersal; depth range 5 - 200 m. (Pomadakis *et al.*, 2015)



(After Moazzam *et al.*, 2017)

Acanthurus nigricans (Linnaeus, 1758)
Max. TL 21.3 cm.

Reef-associated, depth range 1–67 m. Inhabits hard substrate areas of clear lagoon and seaward reefs (Hoda, 1988)

Acanthurus nigricauda Duncker and Mohr, 1929 Max.TL 57.0 cm

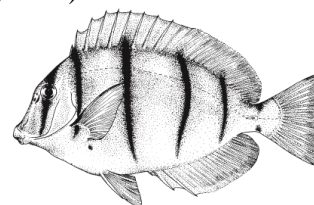
Reef-associated, depth range 0–90 m. (Moazzam *et al.*, 2017)



(Moazzam *et al.*, 2017)

Acanthurus triostegus (Linnaeus, 1758)
Max. TL 27.0 cm .

Reef-associated, depth range 0–90 m. (Hoda, 1988)



(Online image)

Acanthurus xanthopterus Valenciennes, 1835 Max. TL 40.0 cm .

Reef-associated, depth range 0–90 m. (Moazzam *et al.*, 2017)



(After Moazzam *et al.*, 2017)

Acanthurus gahhm (Forsskål, 1775)
body black to dark brown, with a white ring around the base of the tail and a yellow stripe around the eyes; pectoral fins tipped with yellow

Lives on reefs and in lagoons and other sandy areas up to 40 meters deep (Jalil and Khalil, 1972 its presence in Pakistan is doubted Ref. Moazzam *et al.*, 2017),)

Genus *Naso* Lacepède, 1801

Naso annulatus (Quoy and Gaimard, 1825). Max. size 100 cm

Reef-associated, depth range 1 - 60 m (Moazzam *et al.*, 2017)



(After Moazzam *et al.*, 2017)

Naso brevirostris (Cuvier, 1829). Max. size 40 cm,

Reef-associated; depth range 2 - 122 m (Moazzam *et al.*, 2017)



(After Moazzam *et al.*, 2017)

Naso brachycentron (Valenciennes, 1835)

Reef-associated; depth range 8 - 30 m. (Moazzam *et al.*, 2017)



(Moazzam *et al.*, 2017)

Naso elegans (Rüppell, 1829)

Reef-associated; depth range 8 - 30 m. (Moazzam *et al.*, 2017)



(After Moazzam *et al.*, 2017)

Naso hexacanthus (Bleeker, 1855)

Reef-associated; depth range 8 - 30 m. (Moazzam *et al.*, 2017)



(Moazzam *et al.*, 2017)

Naso reticulatus Randall, 2001

Reef-associated

(Moazzam *et al.*, 2015)



(Moazzam *et al.*, 2015)

Naso vlamingii Valenciennes, 1835

Reef-associated; depth range 8 - 30 m. (Moazzam *et al.*, 2017)



(Moazzam *et al.*, 2017)

Naso unicornis (Forsskål, 1775)

Inhabits channels, and seaward reefs with strong surge

(Osmany and Moazzam, 2021)



(After Osmany and Moazzam, 2021)

Family Siganidae Richardson, 1837

Genus *Siganus* Forsskal, 1775

Siganus canaliculatus (Park, 1797)

Max. TL 30.0 cm.

Reef-associated, oceanodromous, brackish water, depth range 50 m.

(Jetkins, 1910 as *Siganus oramin* (Bloch and Schneider)



(Photo courtesy Moazzam)

Guttatus (Bloch, 1787)

Inhabits turbid inshore reefs among mangroves; tolerates or even prefers low salinities

(www.farangsgonewild.com)

Siganus javus (Linnaeus, 1766) Max.TL 53.0 cm .

Found in shallow coastal waters, brackish water lagoons and rocky or coral reefs (Qureshi, 1969)



(Photo courtesy Osmany)

Siganus luridus (Rüppell 1829) Max.TL 53.0 cm.

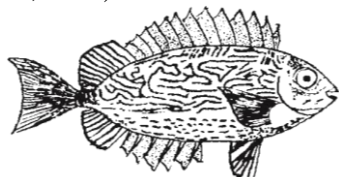
Found in shallow coastal waters, brackish water lagoons and rocky or coral reefs (Osmany, 2014; Ali *et al.*, 2021)



(Photo courtesy Osmany)

Siganus spinus (Linnaeus, 1758) Max. TL 28.0 cm .

Reef-associated, depth range 1–50 m. (Qureshi, 1969)



(Online image)

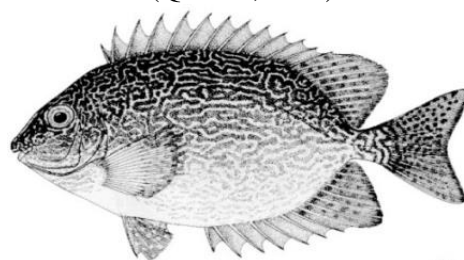
Siganus stellatus (Forsskal, 1775) Max. TL 40.0 cm .

Reef-associated, brackish water, depth range 1 m. (Qureshi, 1969)



(After FAO)

Siganus vermiculatus (Cuvier and Valenciennes, 1835) Max. TL 45.0 cm. Brackish water, found in lagoon and coastal reefs (Qureshi, 1969)



(FAO image)

Siganus sutor (Valenciennes, 1835)

Colour pattern depending on the mood of the fish and the colour of its habitat. Upper body greenish to sandy brown, silver grey below with pale spots evenly spaced on sides Top of head and dorsal fin yellowish. Yellow iris. Often displays dark blotch at origin of lateral line.

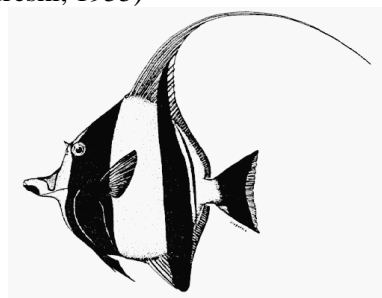
Inhabits seagrass beds and rocky/coral reefs (depth 1-50m, but typically 1-12m (Psomadakis *et al.*, 2015)

Family Zanclidae Bleeker, 1876

Genus *Zanclus* Cuvier and Valenciennes, 1831

Zanclus cornutus (Linnaeus, 1758) Max. TL 23.0 cm

Inhabits turbid inner lagoons, reef flats, and clear seaward rocky and coral reefs (Qureshi, 1955)



(Photo courtesy FAO)

Family Sphyraenidae Rafinesque, 1815
Genus *Sphyraena* Artedi in Rose, 1793
Sphyraena acutipinnis Day, 1876 Max.
TL 80.0 cm
Reef-associated, brackish water. Inhabits lagoon, bays and seaward reefs
(Day, 1876; Qureshi, 1955)



(Photo courtesy Osmany)



Sphyraena arabiansis Abdussamad and Rethesh 2015 Max. TL 200 cm
Reef-associated, brackish water, depth range 0–100 m.
(Fischer and Bianchi, 1984)



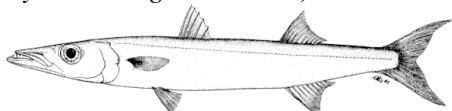
(After Manzoor *et al.*, 2020)

Sphyraena barracuda (Edwards, 1771)
Max. TL 200 cm
Reef-associated, brackish water, depth range 0–100 m.
(Fischer and Bianchi, 1984)



(Photo courtesy Moazzam)

Sphyraena flavicauda Rüppell, 1838
Max. TL 60.0 cm.
Reef-associated. Inhabits lagoon and sheltered seaward reefs, also found in bays
(Jaleel and Khaliluddin, 1972 as *Sphyraena langsar* Bleeker)



(Photo courtesy FAO)

Sphyraena forsteri Cuvier, 1829 Max. TL 75.0 cm
Reef-associated, depth range 300 m.
(Fischer and Bianchi, 1948)



(Online image)

Sphyraena jello Cuvier, 1829 Max. TL 150 cm.
Reef-associated, brackish water, depth range 20–200 m.
(Jenkins, 1910)



(Photo courtesy Osmany)

Sphyraena obtusata Cuvier, 1829 Max. TL 55.0 cm Dark grayish green dorsally, silvery on side and ventrally, with about 15, vertically-elongated, sometimes obscured, blackish spots along lateral line; an indistinct dusky yellowish stripe from upper pectoral-fin base continuing along side of body at level of dorsal edge of pectoral-fin base joining lateral line about halfway between rear end of second dorsal fin and caudal-fin base.
Inhabits bays and estuaries, seagrass beds and rocky reefs, depth range 20–120 m.
(Jaleel and Khaliluddin, 1972)



(Photo courtesy Moazzam)

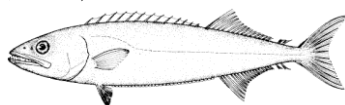
Sphyraena putnamae Jordan and Seale, 1905
Max. TL 90.0 cm . xanthochromism in colour
Reef-associated. Also in bays and inner turbid lagoons, At 3.8 m. and sea grass
(MNH; GBIF; Fischer and Bianchi, 1984; Hoda, 1988 confused with *Sphyraena genie* Klunzinger)



(Photo courtesy Moazzam)

Family Gempylidae Gill, 1862
Genus *Ruvettus* Cocco, 1833
Ruvettus pretiosus Cocco, 1833 Max. TL 200 cm .
Benthopelagic, depth range 100–800 m

(Hoda, 1988)



(Photo courtesy FAO)

Genus *Neoepinnula* Matsubara and Iwai, 1952

Neoepinnula orientalis (Gilchrist and von Bonde, 1924) Max. SL 30.0 cm. Benthopelagic, depth range 200–570 m. (Hoda, 1988)



(Photo courtesy Moazzam)

Genus *Lepidocybium* Gill, 1862

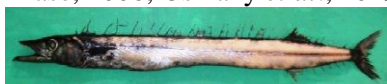
Lepidocybium flavobrunneum (Smith, 1843) Max. SL 200 cm. Bathypelagic, depth 200–885 m. Found mainly over the continental slope (Hoda, 1988)



(After Zohra *et al.*, 2020)

Genus *Gempylus* Cuvier 1829

Gempylus serpens Cuvier, 1829 Max. size 100.0 cm SL. Bathypelagic, depth range 0–600 m. (FishBase, 2006; Osmany *et al.*, 2019)



(Photo courtesy Osmany)

Family Trichiuridae Rafinesque, 1810

Genus *Tentoriceps* Whitley, 1948

Tentoriceps cristatus (Klunzinger, 1884) Benthopelagic; depth range 30 - 110 m. (Anonymous, 2001).



(Photo courtesy Moazzam)

Genus *Lepturacanthus* Fowler, 1905

Lepturacanthus savala (Cuvier, 1829) Max. size 100.0 cm SL.

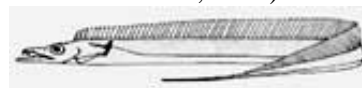
Benthopelagic, brackish water, depth range 100 m. (Murray, 1880; Qureshi, 1955 as *Trichiurus savala*)



(Photo courtesy Moazzam)

Genus *Trichiurus* Linnaeus, 1758

Trichiurus auriga Klunzinger, 1884 Max. TL 35.0 cm Bathydemersal, depth range 250–350 m. (Nakamura and Parin, 1993)



(FAO image)

Trichiurus lepturus Linnaeus, 1758 Max. TL 234 cm

Benthopelagic, brackish water, depth range 0–400 m. over muddy bottoms (Murray, 1880; Qureshi, 1955 as *Trichiurus haumela* (Forsskal))



(Photo courtesy Osmany)

Genus *Eupleurogrammus* Gill, 1862

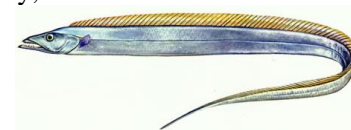
Eupleurogrammus glossodon (Bleeker, 1860) Max. TL 70.0 cm. Benthopelagic, depth range 80 m. Inhabits coastal waters (Nakamura and Parin, 1993)



(FAO image)

Eupleurogrammus muticus (Gray, 1831) Max. TL 70.0 cm.

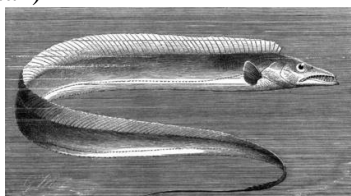
Benthopelagic, coastal, brackish water, depth range 80 m. (Sorley, 1933 as *Trichiurus muticus*)



Genus *Lepidopus* Goüan, 1770

Lepidopus caudatus (Euphrasen, 1788) Benthopelagic; depth range 42 - 620 m.

(Aftab and Ali-Khan, 1992 in larval form
Atlantic species that may not occur in
Pakistan)



(Online image)

Family Scombridae Rafinesque, 1815
Genus *Rastrelliger* Jordan and Starks,
1908

Rastrelliger kanagurta (Cuvier, 1816)
Max. size 35.0 cm FL.

Reef-associated, depth range 20–90 m.
Also found in coastal bays, harbour and
deep lagoons, usually in turbid plankton-
rich waters

(Day, 1876 as *Scomber microlepidotus*;
Murray, 1880 as *Scomber kanagurta*;
Zugmeyer, 1932 as *Scomber
microlepidotus*)



(Photo courtesy Moazzam)

Genus *Scomberomorus* Lacepede, 1800
Scomberomorus commerson (Lacepede,
1800) Max. size 240 cm FL.

Pelagic, depth range 10–70 m. Found
near edge of continental shelf to shallow
coastal waters

(Jenkins, 1910 as *Cybius commersonii*)



(Photo courtesy Moazzam)

Scomberomorus guttatus (Bloch and
Schneider, 1801) Max. size 76.0 cm FL.

Pelagic, brackish water, depth range 15-
200 m

(Day, 1878 as *Cybius guttatum*)



(Photo courtesy Moazzam)

Scomberomorus koreanus (Kishinouye,
1915) Max. size 150 cm FL.

Pelagic and neritic

(Catalog Number: USNM 394592;
Bianchi, 1984)



(Photo courtesy Moazzam)

Scomberomorus lineolatus (Cuvier,
1829) Max. Size 80.0 cm FL.

Coastal waters. Pelagic

(Jaleel and Khaliluddin, 1972 as
Indocybium lineolatum)



(Photo courtesy Osmany)

Genus *Acanthocybium* Gill, 1862

Acanthocybium solandri (Cuvier, 1832)

Max. TL 250 cm

Pelagic, depth range 0–12 m.

(Jaleel and Khaliluddin, 1972)



(Photo courtesy Moazzam)

Genus *Katsuwonus* Kishinouye, 1915

Katsuwonus pelamis (Linnaeus, 1758)

Max. size 108 cm .FL.

Pelagic, depth range 0–260 m.

(Zaidi, 1966)



(Photo courtesy Moazzam)

Genus *Auxis* Cuvier, 1829

Auxis rochei rochei (Risso, 1810) Max.
size 50.0 cm FL.

Pelagic, brackish water, depth range 10
m.

(FishBase, 2006)



(Photo courtesy Moazzam)

Auxis thazard thazard (Lacepède, 1800)
Max. size 65.0 cm FL.
Epipelagic, depth range 50 m. Found in
neritic and oceanic waters
(Zaidi, 1966 as *Auxis thazard*)



(Photo courtesy Moazzam)

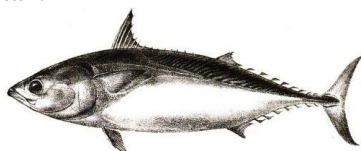
Genus *Euthynnus* Jordan and Gilbert,
1882

Euthynnus affinis (Cantor, 1849) Max.
size 100.0 cm FL.
Pelagic, depth range 0–200 m. Found in
open waters close to the shoreline
(Jaleel and Khaliluddin, 1972)



(Photo courtesy Moazzam)

Euthynnus alletteratus (Rafinesque,
1810)
Brackish; reef-associated
(Qureshi, 1955 as *Thynnus thunnia*). An
Atlantic species. May not occur in
Pakistan.



(Online image)

Genus *Thunnus* South, 1845
Thunnus albacares (Bonnaterre, 1788)
Max. TL 239 cm.
Pelagic, brackish water, depth range 1–
250 m
(Zaidi, 1966 as *Neothunnus*
macropterus; Jaleel and Khaliluddin,
1972 as *Naothunnus albacora* (Lowe)



(Photo courtesy Moazzam)

Thunnus obesus (Lowe, 1839) Max. TL
250 cm .
Pelagic, depth range 0-250 m.
(Map code 25B Key book to world map
of Fisheries, 1983; Fischer and Bianchi,
1985)



(Photo courtesy Moazzam)

Thunnus tonggol (Bleeker, 1851) Max.
size 145 cm FL.
Pelagic, depth range 10 m.
(Rivas, 1961 as *Thynnus argentivittatus*;
Jaleel and Khaliluddin, 1972 as
Kishinoella tonggol)



(Photo courtesy Moazzam)

Thunnus alalunga (Bonnaterre, 1788)
Epi- and mesopelagic
(Map, code 23 scandinavian Fishing year
book, 1982). No authentic record from
Pakistan.

Thunnus maccoyii (Castelnau, 1872)
Oceanic, pelagic
(Map, code 25A Key book to world map
of Fisheries, 1982) No chance of
occurring in Pakistan
Genus *Sarda* Cuvier, 1829

Sarda chiliensis chiliensis (Cuvier,
1832)

Nektonic
(Qureshi, 1955 as *Pelamys chiliensis* no
possibility of occurring in Pakistan)

Sarda orientalis (Temminck and
Schlegel, 1844)
Pelagic-neritic; depth range 1 - 167 m.
(Psomadakis *et al.*, 2015)



(Photo courtesy Moazzam)

Sarda sarda (Bloch, 1793)
Brackish; pelagic-neritic; depth range 80
- 200 m.
(Map, Key book to world map of
Fisheries, 1983 An Atlantic species. No
chance of occurring in Pakistan)

Genus *Scomber* Linnaeus, 1758)
Scomber australasicus Cuvier, 1832
 Neretic, pelagic
 (Moazzam *et al.*, 2005; Zohra *et al.*, 2009 abstract)



(Photo courtesy Moazzam)

Scomber japonicus Houttuyn, 1782
 Nektonic
 (Map, cod 28A Key book to world map of Fisheries, 1983 as *S. colias* No chance of occurring in Pakistan)

Family Xiphiidae Rafinesque, 1815
 Genus *Xiphias* Linnaeus, 1758
Xiphias gladius Linnaeus, 1758 Max. size 455 cm FL. Pelagic, depth range 0–800 m.
 (Jaleel and Khaliluddin, 1972)



(Photo courtesy Moazzam)

Family Istiophoridae Rafinesque, 1815
 Genus *Istiompax* Whitley, 1931
Istiompax indica (Cuvier, 1832) Max. size 465 cm FL.
 Oceanic, epipelagic, usually above the thermocline depth range 0–915 m.
 (Qureshi, 1955 as *Histiophorus brevirostris*)



(Photo courtesy Moazzam)

Genus *Makaira* Lacepede, 1803
Makaira mazara (Jordan and Snyder, 1901)
 Max. TL 500 cm
 Pelagic, depth range 0–200 m.
 (Hoda, 1988 as *Makaira mazra*)



(Photo courtesy FAO)

Makaira nigricans Lacepede, 1802
 Max. TL 500 cm .
 Pelagic, depth range 0–200 m.
 (Jaleel and Khaliluddin, 1972 as *Makaira ampla* (Poye))



(Photo courtesy Moazzam)

Genus *Tetrapturus* Rafinesque, 1810
Tetrapturus angustirostris Tanaka, 1915
 Max. TL 230 cm .
 Pelagic, depth range 0–1830 m.
 (Fischer and Bianchi, 1985)



(Photo courtesy Moazzam)

Genus *Istiophorus* Lacepede, 1802
Istiophorus platypterus (Shaw, 1792)
 Max. size 348 cm FL.
 Pelagic, depth range 0–200 m .
 (Fischer and Bianchi, 1984)



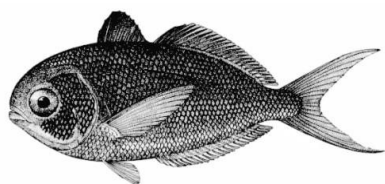
(Photo courtesy Moazzam)

Genus *Kajikia* Hirasaka and Nakamura, 1947
Kajikia audax (Philippi, 1887)
 Max. TL 420 cm.
 Pelagic, depth range 0–200 m.
 (Jaleel and Khaliluddin, 1972 as *Makaira mitsukurii*)



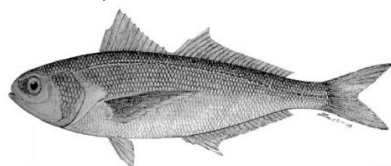
(Photo courtesy Moazzam)

Suborder Stromateoidei Regan 1909
 Family Nomeidae Günther, 1860
 Genus *Psenes* Valenciennes, 1833
Psenes arafurensis Günther, 1889
 Pelagic-oceanic; depth range 0 - 650 m.
 (Hussain and Kidwai, 1994)



(After Last, 2002)

Genus *Cubiceps* Lowe, 1843
Cubiceps capensis (Smith, 1845) Max.
 TL 100.0 cm
 Pelagic, depth range 0–60 m.
 (Hoda, 1988)



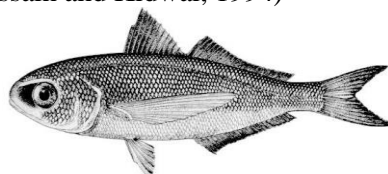
(FAO image)

Cubiceps whiteleggii (Waite, 1894)
 Max. TL 18.6 cm
 Benthopelagic, depth range 250–800 m.
 Found in deep water on the continental
 slope
 (Jaleel and Khaliluddin, 1972 as
Cubiceps natalensis Gilchrist and von
 Bonde; Fischer and Bianchi, 1985 as
Psenes squamiceps (Lloyd)



(Photo courtesy Moazzam)

Cubiceps baxteri McCulloch, 1923
 Pelagic-oceanic; depth range 1 - 100 m.
 (Hussain and Kidwai, 1994)



(Online image)

Family Ariommatidae Haedrich, 1967
 Genus *Ariomma* Jordan and Snyder, 1904
Ariomma indicum (Day, 1871) Max. size
 25.0 cm SL. Benthopelagic, depth range
 20– 300 m. Found on muddy substrates
 on the continental shelf and upper slope
 (Jaleel and Khaliluddin, 1972 as *Psenes*
indicus)



(Photo courtesy Moazzam)

Family Stromateidae Rafinesque, 1810
 Genus *Pampus* Bonaparte, 1837
Pampus argenteus (Euphrasen, 1788)
 Max. SL 60.0 cm.
 Benthopelagic, depth range 5–110 m.
 over muddy bottoms
 (Qureshi, 1955 and as *Stromateus*
cinereus)



(Photo courtesy Moazzam)

Pampus chinensis (Euphrasen, 1788)
 Max. TL 40.0 cm
 Benthopelagic, brackish water, depth
 range 10 m
 (Qureshi, 1955 as *Stromateus sinensis*)



(Photo courtesy Moazzam)

Order Pleuronectiformes

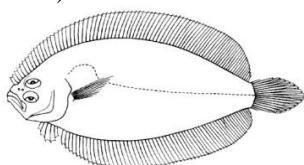
Family Psettodidae Regan, 1910
 Genus *Psettodes* Benneft, 1830
Psettodes erumei (Bloch and Schneider,
 1801)
 Max. TL 64.0 cm.
 Demersal, depth range 1–100 m. on sand
 and mud bottoms
 (Qureshi, 1955)



(Photo courtesy Moazzam)

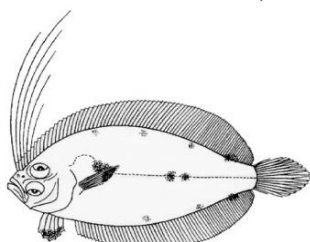
Family Bothidae Smitt, 1892
 Genus *Arnoglossus* Bleeker, 1862
Arnoglossus aspilos (Bleeker, 1851)
 Max. TL 19.0 cm

Demersal, depth range 30–71 m. Inhabits sand and mud bottoms (Hoda, 1988)



(FAO image)

Arnoglossus macrolophus Alcock, 1889
Max. TL 13.0 cm.
Demersal, depth range 18–141 m.
Inhabits sand, mud, and gravel bottoms (Jaleel and Khaliluddin, 1972)



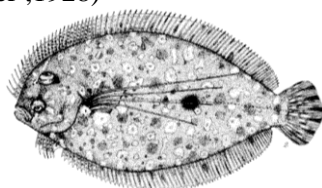
(FAO image)

Genus *Bothus* Rafinesque, 1810
Bothus myriaster (Temminck and Schlegel, 1846) Max. TL 27.0 cm.
Found in sandy and muddy areas of the continental shelf (Fischer and Bianchi, 1984; Hoda, 1988 as *Bothus ovalis* (Regan)



(Photo courtesy Osmany)

Bothus pantherinus (Ruppell, 1830)
Max. TL 39.0 cm .
Inhabits sandy or silty sand, and muddy bottoms of inner reef flats and seaward reefs, frequently found in tide pools (Fowler ,1928)

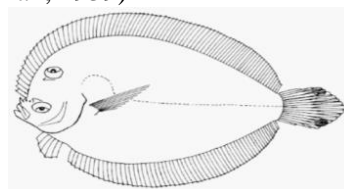


(Photo courtesy FAO)

Genus *Engyprosopon* Gunther, 1862

Engyprosopon grandisquama (Temminck and Schlegel, 1846) Max. TL 15.0 cm

Found on sandy and muddy areas of the continental shelf (Norman, 1939)

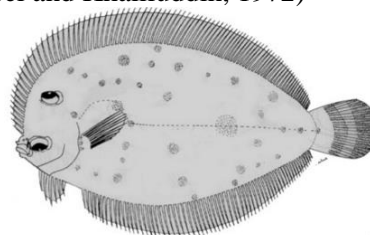


(FAO image)

Genus *Crossorhombus* Regan 1920
Crossorhombus azureus (Alcock, 1889)
Max. TL 18.0 cm .

Demersal, depth range 13–60 m. Lives on mud bottoms

(Jaleel and Khaliluddin, 1972)



(FAO image)

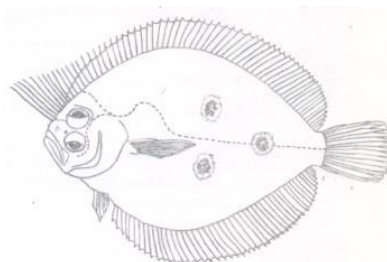
Family Paralichthyidae Regan, 1910

Genus *Paralichthys* Girard, 1858

Paralichthys triocellatus Miranda-Ribeiro, 1903

Max. size 26.2 cm.

Found in shallower muddy and sandy bottoms

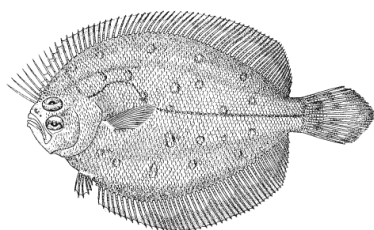


(Online image)

Genus *Pseudorhombus* Bleeker, 1862
Pseudorhombus megalops Fowler, 1934
Bathydemersal; depth range 200 - 270 m. (Kotthaus ,1977)

Pseudorhombus annulatus Norman, 1927 Max. TL 10.5 cm

Demersal, depth range 23–55 m (Qureshi, 1960; Jalali, 1969)



(After Jalali, 1969)

Pseudorhombus arsius (Hamilton, 1822)

Found in shallow waters
(Hussain and Khan, 1981)



(Photo courtesy Moazzam)

Pseudorhombus diplospilus Norman, 1926

Max. SL 40.0 cm .
Demersal, depth range 10–75 m
(Hussain and Khan, 1981)



(Photo courtesy online)

Pseudorhombus elevatus Ogilby, 1912

Max. size 20.0 cm SL.
Found on clay, sand and mud bottoms of the continental shelf
(Hussain and Khan, 1981)



(Photo courtesy Moazzam)

Pseudorhombus javanicus (Bleeker, 1853) Max. size 35.0 cm SL.
Inhabits shallow continental shelves with muddy and sandy substrates
(Kesteven, 1950)



(Photo courtesy Osmany)

Pseudorhombus pentophthalmus

Günther, 1862

Max. size 18.0 cm SL.

Inhabits mud and sand bottoms of the continental shelf

(Hussain and Khan, 1981)

Pseudorhombus russellii (Gray, 1834)

Demersal estuaries, on mud and sand to depths of 200 m.

(ZipcodeZoo).

Genus *Cephalopsetta* Dutt and Rao 1965

Cephalopsetta ventrocellatus Dutt and Rao, 1965

Demersal, bathydermal depth range 200–270m (Kotthaus, 1977)



Pseudorhombus triocellatus (Bloch and Schneider, 1801) Body brownish with three prominent ocelli, one each on either side of lateralline and one on the lateral line just in front of caudal peduncle forming a triangular design. Small indistinct spots seen scattered on body and dorsal, anal and caudal fins on ocular side

Found on the muddy and sandy bottoms of the continental shelf.

(Bianchi, 1985)

Family Samaridae Jordan and Goss, 1889

Genus *Samaris* Gray, 1831

Samaris cristatus Gray, 1831 Max. TL 22.0 cm .

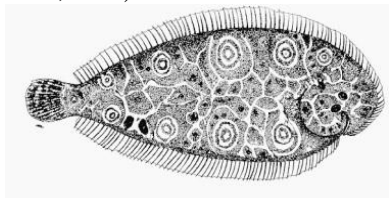
Demersal species, depth range 20–114 m. inhabits sand bottoms

(Jaleel and Khaliluddin, 1972)



(Photo courtesy Moazzam)

Family Soleidae Bonaparte, 1833
 Genus *Heteromycteris* Kaup, 1858
Heteromycteris oculus (Alcock, 1889)
 Demersal
 (Norman, 1939)



(After De Bruin *et al.*, 1995)

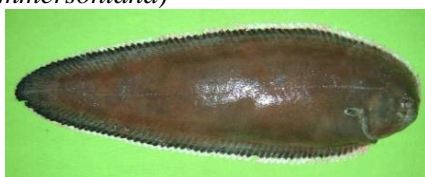
Genus *Brachirus* Swainson, 1839
Brachirus macrolepis (Bleeker, 1858)
 ocular side olive with cloudy brownish markings
 Demersal
 (Hussain and Ai-Khan, 1981)

Brachirus orientalis (Bloch and Schneider, 1801) Max. size 30.0 cm SL.
 Demersal, brackish water, depth range 15-20 m. Inhabits sand and mud bottoms in coastal waters
 (Day, 1889 as *Synaptura orientalis*; Hussain and Ali-Khan, 1981; Steindachner, 1903; Jenkins, 1910 as *Solea sindensis*; Hussain and Ali-Khan, 1981)



(Photo courtesy Osmany)

Genus *Synaptura* Cantor, 1849
Synaptura commersonnii (Lacepede, 1802)
 Max. TL 32.0 cm.
 Demersal, brackish water
 (Norman, 1928 as *Brachirus commersoniana*)



(Photo courtesy Moazzam)

Synaptura albomaculata Kaup, 1858
 Brackish; demersal (Kesteven, 1950)



(Online image)

Genus *Solea* Quensel, 1806
Solea elongata Day, 187 Max. TL 30.0 cm.

Demersal species, depth range 8–28 m. Inhabits sand and mud bottoms in coastal waters

(BMNH, 1911; Abdullah el Husseini, 1965; Jaleel and Khaliluddin, 1972)



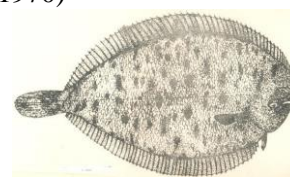
(Photo courtesy Moazzam)

Solea heinii Steindachner, 1903 Ocular side reddish with black with black marks all over body, a black line present along anal and dorsal fins margins, pectoral fin spotted

Demersal, inhabits coastal waters
 (BMNH, 1911)

Solea ovata Richardson, 1846
 Max. size 10.0 cm TL.

Demersal species. Inhabits shallow sand and mud bottoms in coastal waters
 (Jalali, 1970)



(After Jalali, 1970)

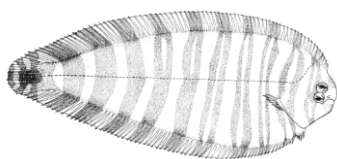
Genus *Zebrias* Jordan and Snyder, 1900

Zebrias regani (Gilchrist, 1906)

Bottom, living in creeks
 (PARC unpublished report, 1989)



Zebrias quagga (Kaup, 1858) Max. size 15.0 cm TL. Demersal. Inhabits shallow coastal waters on sand and mud bottoms
 (Day, 1875 as *Synaptura zebra*)



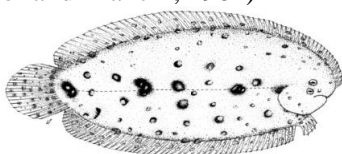
(Online image)

Zebrias synapturoides (Jenkins, 1910)
Max.TL 15.0 cm
Found in shallow sand and mud bottoms of the continental shelf and creeks (Hussain and Ali- Khan, 1981)



(Photo courtesy Moazzam)

Zebrias cochinensis (Rama-Rao, 1967)
47 mm SL.
16-20 m. depth
(USFWS-1965-1966 Acc. 261501, 2 (115.42-134); Manilo and Bogorodsky, 2003 as *Pseudaesopia cochinensis*)
Genus *Pardachirus* Gunther, 1862
Pardachirus marmoratus (Lacepede, 1802) Max.TL 26.0 cm .
Depth 1-15m. Reef-associated, depth range 1–15 m.
(Fischer and Bianchi, 1984)



(FAO image)

Genus *Aesopia* Kaup, 1858
Aesopia cornuta Kaup, 1858 Max.TL 22.0 cm.
Found in coastal waters on sand or mud (Jaleel and Khaliluddin, 1972 as *Aesopia coronuta*)



(Photo courtesy Osmany)

Family Cynoglossidae Jordan, 1888
Genus *Cynoglossus* Hamilton, 1822
Cynoglossus arel (Bloch and Schneider, 1801) Max. TL 40.0 cm

Demersal, brackish water, freshwater, depth range 9–125 m .
(Jaleel and Khaliluddin, 1972)



(Photo courtesy Moazzam)

Cynoglossus bilineatus (Lacepède, 1802)
Max. size 44.0 cm SL.
Demersal, brackish water, depth range 10–400 m.
(Day, 1876 as *Cynoglossus sindensis* Day (partim); Qureshi, 1955)



(Photo courtesy Moazzam)

Cynoglossus carpenteri Alcock, 1889
Max. TL 23.0 cm
Bathodemersal, depth range 27–420 m.
(Fischer and Bianchi, 1984)



(Photo courtesy Moazzam)

Cynoglossus cynoglossus (Hamilton, 1822) Max. TL 20.0 cm .
Demersal, Inhabits muddy and sandy bottoms, often in shallow areas, including river estuaries and brackish waters (Jaleel and Khaliluddin, 1972)



(Photo courtesy Osmany)

Cynoglossus dispar Day, 1877 Max. TL 38.9 cm.
Demersal Inhabits sandy and muddy bottoms of the continental shelf (Day, 1889; Menon, 1977)



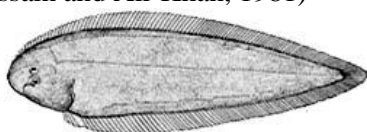
(Online image)

Cynoglossus dubius Day, 1873 Max. TL 50.0 cm.
Demersal, Inhabits sandy and muddy bottoms of continental shelf (Day, 1873)



(Photo courtesy Osmany)

Cynoglossus kopsii (Bleeker, 1851)
Max. size 17.7 cm SL.
Demersal; depth range 24-204 m. (Hussain and Ali-Khan, 1981)



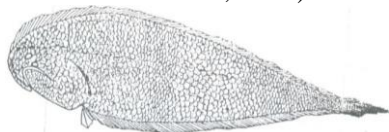
(FAO image)

Cynoglossus lachneri Menon, 1977
Max. TL 46.0 cm.
Inhabits muddy or sandy bottoms of the continental shelf (Fischer and Bianchi, 1984)



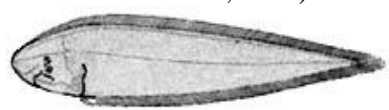
(Photo courtesy Osmany)

Cynoglossus lida (Bleeker, 1851) Max. SL 21.3 cm.
Demersal species, depth range 24-27 m. (Hussain and Ali-Khan, 1981)



(After Hussain and Ali-Khan, 1981)

Cynoglossus lingua Hamilton, 1822
Max. size 45.0 cm.
Demersal, brackish water, freshwater, depth range 961 m. (Jaleel and Khaliluddin, 1972)



(FAO image)

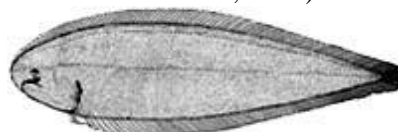
Cynoglossus puncticeps (Richardson, 1846)

Max. TL 18.0 cm.
Demersal, brackish water, freshwater, depth range 1-140 m. (BMNH, 1889; Jenkins, 1910)



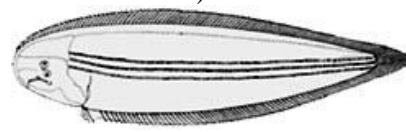
(Photo courtesy Moazzam)

Cynoglossus semifasciatus Day, 1877
Max. size 15.0 cm TL.
Demersal, depth range 12-18 m. (Hussain and Ali Khan, 1981)



(FAO image)

Cynoglossus trulla (Cantor, 1849)
Demersal, brackish water, freshwater (Hussain and Ali-Khan, 1981 as *C. borneensis* Bleeker)



(FAO image)

Genus *Paraplagusia* Bleeker, 1865
Paraplagusia bilineata (Bloch, 1784)
Max. TL 30.0 cm
Demersal; brackish water, depth range 20-50 m. (Hussain and Ali-Khan, 1981)



(Photo courtesy Osmany)

Paraplagusia blochii (Bleeker, 1851)
Max. size 22.0 cm TL.
Demersal, brackish water, depth range 7-80 m (Norman, 1930)



(After Hussain and Ali-Khan, 1981)

Order Tetraodontiformes Berg, 1940

Family Triacanthidae Bleeker, 1859

Genus *Pseudotriacanthus* Fraser-Brunner 1941

Pseudotriacanthus strigilifer (Cantor, 1849) Max.TL 25.0 cm.

Demersal, brackish water, depth range 110 m., on sandy or muddy flats (Zugmayer, 1913)



(Photo courtesy Moazzam)

Genus *Triacanthus* Oken (ex Cuvier), 1817

Triacanthus biaculeatus (Bloch, 1786) Max. TL 30.0 cm.

Demersal, brackish water, depth range 60 m. Inhabits sandy or muddy flat in coastal and estuarine waters

(Qureshi, 1955 as *Triacanthus brevirostris*; Ahmed *et al.*, 1973 as *Triacanthus indicus* (Regan)



(Photo courtesy Moazzam)

Triacanthus nieuhofii Bleeker, 1852 Max.TL 28.0 cm.

Demersal, inhabits sandy and muddy flat in coastal areas

(Moazzam *et al.*, 2005)



(After Osmany)

Family Balistidae Rafinesque, 1810

Genus *Abalistes* Jordan and Seale, 1906

Abalistes filamentosus Matsuura and Yoshino, 2004

Max. TL 40.0 cm.

Demersal. Inhabit coastal areas, found over muddy and sandy bottoms



(After Moazzam and Osmany, 2022)

Abalistes stellatus (Anonymous, 1798) Max. TL 60.0 cm.

Demersal. Inhabit coastal areas, found over muddy and sandy bottoms

(Fischer and Bianchi, 1984)



(After Moazzam and Osmany, 2022)

Genus *Canthidermis* Swainson 1839

Canthidermis macrolepis (Boulenger, 1888)

Reef-associated; pelagic, depth range 1 - 110 m.

(Moazzam *et al.*, 2016)



(After Moazzam and Osmany, 2022)

Canthidermis maculata (Bloch, 1786)

Reef-associated; Pelagic, depth range 1 - 110 m.

(Moazzam *et al.*, 2016)



(After Moazzam and Osmany, 2022)

Genus *Odonus* Gistel, 1848

Odonus niger (Rüppell, 1836)

Reef-associated

(Moazzam and OsmanyKhan, 2008)



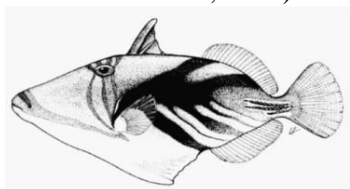
(After Moazzam and Osmany, 2022)

Pseudobalistes fuscus (Bloch and Schneider, 1801).
Max. size 50 cm.
Reef-associated
(Moazzam and Osmany, 2022)



(After Moazzam and Osmany, 2022)

Genus *Rhinecanthus* Swainson, 1839
Rhinecanthus aculeatus (Linnaeus, 1758) Max. TL 30.0 cm.
Found in subtidal reef flats and shallow protected lagoons
(Jaleel and Khaliluddin, 1972)



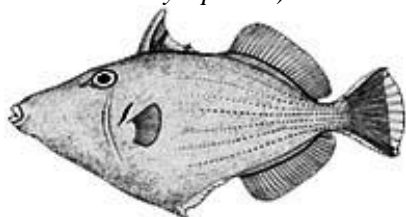
(FAO image)

Rhinecanthus assasi (Forsskål, 1775)
Max. size 50 cm.
Reef-associated
(Moazzam and Osmany, 2022)



(After Moazzam and Osmany, 2022)

Genus *Sufflamen* Jordan, 1916
Sufflamen chrysopterum (Bloch and Schneider, 1801) Max. TL 30.0 cm.
Reef-associated, depth range 1–30 m.
Occur in shallow lagoon and seaward reefs
(Jaleel and Khaliluddin, 1972 as *Hemibalistes chrysopterus*)



(Photo courtesy FAO)

Sufflamen fraenatum (Latreille, 1804)
Max. TL 38.0 cm.
Reef-associated, oceanodromous, depth range 8–186 m. Found over sand and rubble patches of seaward reefs
(Ahmad *et al.*, 1973 as *Sufflamen capistratus* (Shaw))



(After Moazzam and Osmany, 2022)

Family Monacanthidae Nardo 1843
Genus *Acreichthys* Fraser-Brunner, 1941
Acreichthys tomentosus (Linnaeus, 1758)
Max. Size 14 cm
Reef-associated, depth range 0–35 m. non-migratory; inhabits offshore coral reefs usually in surface waters around oceanic islands.
(Moazzam and Osmany, 2016)



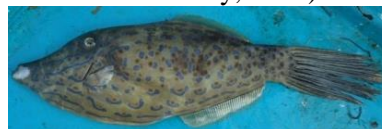
(After Moazzam and Osmany, 2016)

Genus *Aluterus* Cloquet, 1816
Aluterus monoceros (Linnaeus, 1758)
Reef-associated; marine; depth range 1–50 m.
(Hoda, 1988 as *Alutera monoceros*)



(After Moazzam and Osmany, 2016)

Aluterus scriptus (Osbeck, 1765)
At 3-120m., inhabits lagoon and seaward reefs, and individuals occasionally seen under floating objects
(Moazzam and Osmany, 2016)



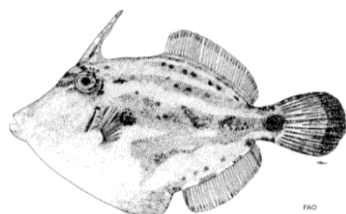
(After Moazzam and Osmany, 2016)

Genus *Cantherhines* Swainson, 1839
Cantherhines dumerilii (Hollard, 1854)
 Reef-associated, depth range 0–35 m.
 Inhabits offshore coral reefs usually in
 surface waters around oceanic islands
 (Hoda, 1988)



(Photo courtesy Osmany)

Cantherhines fronticinctus (Günther, 1867)



(Photo courtesy FAO)

Genus *Lalmohania* Hutchins, 1994
Lalmohania velutina Hutchins, 1994.
 Max Size 7.2 cm
 Demersal; depth range 0 - 5 m
 (Moazzam and Osmany, 2016)



(After Moazzam and Osmany, 2016)

Genus *Paramonacanthus*
 Bleeker, 1865
Paramonacanthus choirocephalus
 (Bleeker, 1852). Max. Size 11 cm
 Demersal; depth range 3 - 25 m
 (Shaikh and Panhwar, 2021)



Paramonacanthus pusillus (Rüppell, 1829). Max. Size 14 cm
 Demersal; depth range 28 - 79 m

Paramonacanthus tricuspis (Hollard, 1854)
 Demersal; inhabits depth range 10–50 m.
 (Shaikh and Panhwar, 2021)



(After Shaikh and Panhwar, 2021)

Genus *Stephanolepis* Gill, 1861
Stephanolepis diaspros Fraser-Brunner, 1940
 Max. size 25.0 cm TL.
 Demersal, depth range 20–50 m. on silty
 bottoms and rocks
 (Hoda, 1988 as *Pervagor tomentosus*)



(After Moazzam and Osmany, 2016)

Stephanolepis setifer (Bennett, 1831)
 Max. size 25.0 cm TL.
 Demersal, depth range 20–50 m. on silty
 bottoms and rocks
 (Zugmeyer, 1913)

Family Ostraciidae Rafinesque, 1810
 Genus *Tetrosomus* Swainson, 1839
Tetrosomus gibbosus (Linnaeus, 1758)
 Max. size 30.0 cm TL.
 Reef-associated, depth range 37–110 m.
 found at coastal sand and rubble flats to
 deep offshore soft bottom
 (Zugmayer, 1913 as *Ostracion turritus*)



(After Moazzam and Osmany, 2014)

Genus *Lactoria* Jordan and Fowler, 1903
Lactoria cornuta (Linnaeus, 1758) Max.
 size 46.0 cm TL.

Reef-associated, brackish water, depth range 18–100 m. found in weedy areas near rocks
(Sorley, 1933 as *Ostracion cornutus*)



(Photo courtesy Osmany)

Genus *Ostracion* Linnaeus, 1758
Ostracion cubicus Linnaeus, 1758 Max. TL 45.0 cm.
Reef-associated, depth range 1–280 m. Inhabits lagoon and semi-sheltered seaward reefs often among *Acropora* corals
(Murray, 1880 as *Ostracion tetragonus*; Bano and Qureshi, 1973 as *Ostracion tuberculatus*)



(After Moazzam and Rahim, 2021)

Ostracion meleagris Shaw, 1796 Max. TL 25.0 cm.
Reef-associated, depth range 1–30 m. and inhabits clear lagoon and seaward reefs
(Day, 1889 as *Ostracion punctatus*)



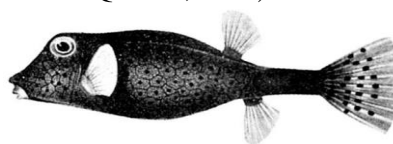
(Online image)

Ostracion rhinorhynchos Bleeker, 1852
Black spots on sides and belly Rock pools in the intertidal areas on rocky shores
(Moazzam and Osmany, 2014)



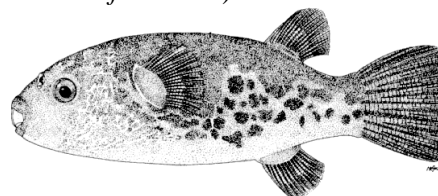
(After Moazzam and Osmany, 2014)
Genus *Rhynchostracion* Fraser-Brunner, 1935

Rhynchostracion nasus (Bloch, 1785)
Max. size 30.0 cm TL.
Reef-associated, depth range 2–80 m. also found around rocky and sandy substrates
(Bano and Qureshi, 1973)



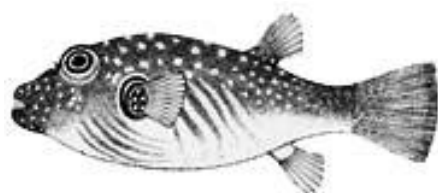
(Online image)

Family Tetraodontidae Bonaparte, 1831
Genus *Dichotomyctere* Duméril, 1855
Dichotomyctere fluviatilis (Hamilton, 1822)
Brackish, fresh water
(BMNH, 1911; Khaliluddin, 1975 as *Chelonodon fluviatilis*; Dekkers, 1975 as *Tetraodon fluviatilis*)



(Photo courtesy FAO)

Genus *Arothron* Muller, 1841
Arothron hispidus (Linnaeus, 1758)
Max. TL 50.0 cm .
Reef-associated, brackish water, depth range 3–50 m. Inhabits outer reef slopes to depths of at least 50 m, inner reef flats and lagoons, plentiful in weedy areas of estuaries
(Jaleel and Khaliluddin, 1972)



(Photo courtesy FAO)

Arothron immaculatus (Bloch and Schneider, 1801)
Max. TL. 30.0 cm .
Reef-associated, brackish water, in weedy areas of estuaries, depth range 1–17 m.
(PARC unpublished report, 1987; Moazzam and Rizvi, 1980)



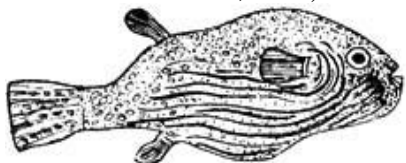
(Photo courtesy FAO)

Arothron reticularis (Bloch and Schneider, 1801)

Max. size 40.0 cm SL. brackish water, depth range

1–25 m. in shallow water reefs near sand or seaweed areas

(Jaleel and Khaliluddin, 1972)



(After Khaliluddin, 1975)

Arothron stellatus ((Anonymous, 1798)

Max. TL 120 cm .

Reef-associated; brackish; depth range 3–58 m.

(Qureshi, 1955 as *Tetrodon stellatus*; Khaliluddin, 1975 as *Arothron aerostaticus*)

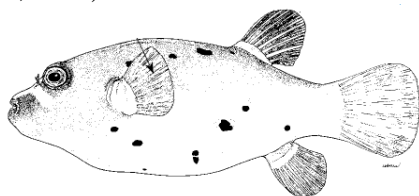


(Photo courtesy Moazzam)

Arothron nigropunctatus (Bloch and Schneider, 1801)

Demersal

(Ali, 2006)



(Photo courtesy FAO)

Arothron leopardus (Day, 1878) 13–17cm,

Demersal, shallow inshore waters in Creeks, estuaries, brackish waters

(Day, 1878; Qureshi, 1955 as *Tetrodon leopardus*)



(After Khaliluddin, 1975)

Genus *Takifugu* Abe, 1949

Takifugu oblongus (Bloch, 1786) Max. TL 40.0 cm

Demersal; brackish water, found in shallow coastal waters

(Jaleel and Khaliluddin, 1972 as *Torquigener oblongus*)



(After Khaliluddin, 1975)

Genus *Lagocephalus* Swainson, 1837

Lagocephalus scleratus (Gmelin, 1789)

Associated with sea grass beds (Khaliluddin, 1975 as *Gastrophysus scleratus*)



(Photo courtesy Osmany)

Lagocephalus inermis (Temminck and Schlegel, 1850) Max. size 90.0 cm SL.

Demersal, found in the shelf edge

(Qureshi, 1955 as *Tetrodon inermis*)



(Photo courtesy Moazzam)

Lagocephalus lunaris (Bloch and Schneider, 1801) Max. SL 45.0 cm.

Demersal, brackish water

(Qureshi, 1955 as *Tetrodon lunaris*)



(Photo courtesy Moazzam)

Genus *Canthigaster* Swainson, 1839

Canthigaster margaritata (Ruppell, 1829) Max. TL 31.2 cm.
In tide pools and over shallow open reef
(Jaleel and Khaliluddin, 1975)



(After Khaliluddin, 1975)

Genus *Chelonodon* Müller, 1841
Chelonodon patoca (Hamilton, 1822)
Freshwater; brackish; reef-associated,
depth range 4 - 60 m.
(Day, 1878 as *Tetradon patoca*)



(Photo courtesy Moazzam)

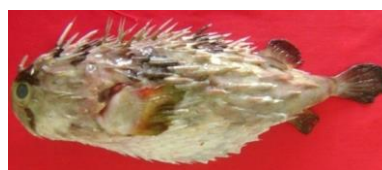
Family Diodontidae Bonaparte, 1835
Genus *Diodon* Linnaeus, 1758
Diodon hystrix Linnaeus, 1758 Max.
size 91.0 cm TL.
Reef-associated, depth range 2–50 m.
Found in lagoon, caves and holes in
shallow reefs
(Zugmayer, 1913)



inflated

(After Moazzam and Osmany, 2014)

Diodon holocanthus Linnaeus, 1758
Max. TL 50.0 cm Dark blotches across
back and spots between the blotches, a
large brown bar above and below each
eye and also a broad transverse brown bar
present on occipital region of head.
Depth range 2–100 m. Inhabits shallow
reefs to open, soft bottoms and also in
areas with rocky substrata
(Zugmayer, 1913; Jaleel and Khaliluddin,
1972 as *Diodon maculifer* Kaup)



(After Moazzam and Osmany, 2014)

Genus *Cyclichthys* (Bloch, 1758)
Cyclichthys orbicularis (Bloch, 1785)
Max. TL 30.0 cm.
Depth range 170 m. Found over sand and
mud bottoms
(Leis, 1984 as *Chilomycterus orbicularis*)



(After Moazzam and Osmany, 2014)

Cyclichthys spilostylus (Leis and
Randall, 1982)

In coastal waters at depth 105 m to the
rock pools in the intertidal areas on rocky
shores
(Moazzam and Osmany, 2014)



(After Moazzam and Osmany, 2014)

Family Molidae Bonaparte, 1835
Genus *Ranzania* Nardo, 1840
Ranzania laevis (Pennant, 1776)
Max. TL 100.0 cm .
Oceanic, epipelagic
(Jaleel and Khaliluddin, 1972)



(After Moazzam and Osmany 2014)

Genus *Mola* Koelreuter, 1770
Mola alexandrini (Ranzani, 1839)
Pelagic-oceanic; depth range 50 - 480 m.
(Moazzam 2021)



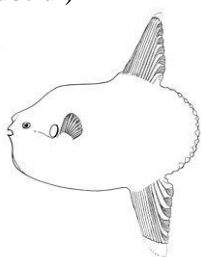
(After Moazzam, 2021)

Mola mola (Linnaeus, 1758) Max. TL 333 cm.
Pelagic-oceanic; depth range 30 - 480 m.
(Day, 1889)



(After Moazzam, 2021)

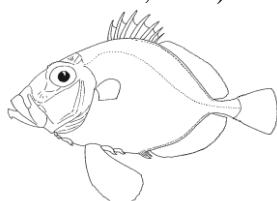
Mola ramsayi (Giglioli, 1883)
Occasionally near the surface
(WWF-Pakistan, 2015. Presence in Pakistan doubtful)



(Photo courtesy FAO)

Infraclass Teleostei Müller, 1845
Order Zeiformes Eschmeyer, Fricke and van der Laan, 2016

Family Zeidae Latreille, 1825
Genus *Cyttopsis* Gill, 1862
Cyttopsis rosea (Lowe, 1843) Max.TL 31.0 cm . Bathypelagic, depth range 150–730 m.
(Fischer and Bianchi, 1985)



(Online images)

Class Reptilia Laurenti, 1768
Order Crocodylia Owen, 1842

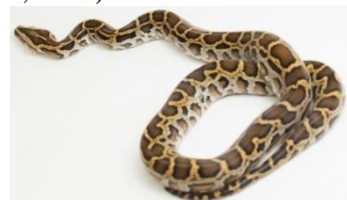
Family Crocodylidae Cuvier, 1807
Genus *Crocodylus* Laurenti, 1768
Crocodylus palustris Lesson, 1831
Although prefers freshwater, but has some tolerance to saltwater therefore occasionally reported from saltwater lagoons
(Marine Life of Pakistan, 2015)



(Online Photo)

Order Squamata Opperl, 1811
Suborder Serpentes Linnaeus, 1758

Family Pythonidae Fitzinger, 1826
Genus *Python* Daudin, 1803
Python molurus (Linnaeus, 1756)
Indus delta
(IUCN, 1993)



(Online Photo)

Family Homalopsidae Bonapart, 1845
Genus *Mintonophis* Murphy and Voris, 2014.
Mintonophis pakistanicus (Mertens, 1959)
Exposed to brackish water on occasion based upon distributions in river deltas and coastal flood plains
(Mertens, 1959 as *Enhydris pakistanica*)

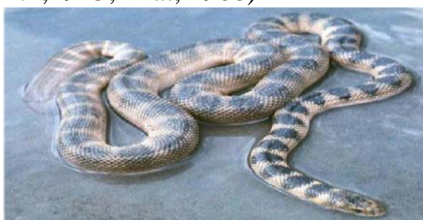


(Online image)

Family Viperidae Opperl, 1811

Genus *Echis* Merrem, 1820
Echis carinatus (Schneider, 1801)
 Sand, rock, soft soil and in scrublands,
 hiding under loose rocks
 (Mertens, 1970 as *Echis carinatus*
astolae; Khan, 2004)

Family Elapidae F. Boie, 1827
 Genus *Hydrophis* Latreille, 1801
Hydrophis cyanocinctus Daudin, 1803
 Dirty white, pale green or yellow, with
 47-70 black cross bands, those at
 midbody widest
 Shallow water, muddy bottom and
 mangroves
 (Murray, 1887 as *Hydrophis phipsoni*;
 Smith, 1943; Iffat, 1988)



(After Khan, 2012)

Hydrophis lapemoides (Gray, 1849)
 With yellowish or whitish dorsum, with
 32-43 dark to light crossbars. Head dark
 with a yellow curved mark Pelagic in
 mangrove swamps
 (Sclater, 1891; Smith, 1943; Khan, 2012)



(After Khan, 2012)

Hydrophis spiralis (Shaw, 1802) Golden
 yellow to yellowish green, scales with
 dark borders, with 35-54 darkstripes
 narrower than interspaces, dark spotted.
 Flanks and ventrum of body pinkish
 white. Head entirely yellow to blackish,
 with a yellow horseshoeshaped
 Offshore, deep sea, pelagic
 (Smith, 1943; Iffat, 1988)



(After Khan, 2012)

Hydrophis ornatus (Gray, 1842)
 Greyish, olivaceous, or white, with dark
 bars or rhomboidal spots. Ventral
 yellowish or whitish. Head olive.
 Coastal areas, mangroves and islands
 (Murray, 1887; Martens, 1969; Khan,
 2012)



(After Khan, 2012)

Hydrophis mamillaris (Daudin, 1803)
 Yellowish or grayish, with 43-57 broad
 crossbars, about twice as broad as their
 interspaces. Head entirely black with a
 yellow streak on temporal region
 Mangroves and sandy and muddy
 beaches
 (Iffat, 1988; Khan, 2012)



(After Khan, 2012)

Hydrophis fasciatus (Schneider, 1799)
 Black to olive, with pale or yellowish
 oval spots on sides
 Neretic
 (Khan, 2012)



(After Khan, 2012)

Genus *Polyodontognathus* Wall, 1921
Polyodontognathus caerulescens Shaw,
 1802 Bluish gray, ventrum yellowish,
 with 39-62 broad dark bands, about twice
 as broad as interspaces
 Muddy creeks with mangrove swamps
 (Minton, 1966; Iffat, 1988 as *Hydrophis*
caerulescens caerulescens (Shaw)



(After Khan, 2012)

Genus *Praescutata* Wall, 1921

Praescutata viperina (Schmidt, 1852)

97cm. Dorsally greenish white, with a median series of 24-34 rhomboidal blotches, fused at midline. Head dark, neck whitish, tail black.

Coastal waters and creeks in deeper waters at 15-30m.

(Murray, 1887 as *Hydrophis plumbea* Murray)



(Online image)

Genus *Astrotia* Fischer, 1856

Astrotia stokesii (Gray, 1846) Yellowish or pale brown, with 32-37 more or less complete broad dark brown rings, or the dorsal pattern may be of bars and ventrum with spots. Head dark olive or yellowish. Coastal areas. 25-45 m.

(Murray, 1887 as *Hydrophis guttata*; Iffat, 1988)



(After Khan, 2012)

Genus *Microcephalophis* Lesson, 1832

Microcephalophis gracilis (Shaw, 1802)

Head region black to dark olive, with white to pale yellow spots or crossbars. Posteriorly pale yellow to greenish white with gray crossbars, to more or less uniformly grey. Ventrally pale

Shallow water with muddy or sandy bottom and mangroves

(Sclater, 1891; Smith, 1943, Iffat, 1988)



(After Khan, 2012)

Microcephalophis cantoris Gunther, 1864

Anterior half of body light olive to yellow above, pale below, with gray to dark dorsal bars, and a black midventral stripe. While posterior half dark olive above, laterally yellowish, with faint lateral bars. Shallow water with muddy or sandy bottoms (Minton, 1962; Iffat, 1988)



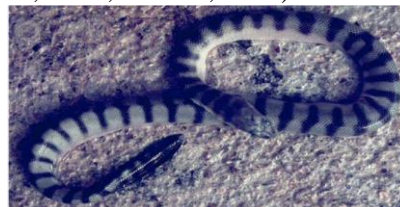
(After Khan, 2012)

Genus *Enhydrina* Gray, 1849

Enhydrina schistosa (Daudin, 1803)

Dirty white to pale greenish gray, with olive to black crossbars. Deep sea to moderately shallow waters, on sandy or rocky bottom, also seen in tidal creeks and other sheltered spots

(Sclater, 1891 as *Enhydrina valakadien*; Smith, 1927; Minton, 1966)



(After Khan 2012)

Genus *Lapemis* Gray, 1832

Lapemis curtus (Shaw, 1802) Pale olive,

becoming white or pale yellow on sides. Black or dark olive crossbars 44-55 forming a median zigzag pattern, fading on sides. Head dark gray or olive; distal half of tail black

Rocky coast

(Smith, 1943; Iffat, 1988)



(After Khan, 2012)

Genus *Pelamis* Daudin, 1803

Pelamis platura (Linnaeus, 1766)
 Dorsally light yellow to cream, ventrally pale, dorsum with 10-19 scale thick brownstripes. Head brownish. Tail with black and white bars or network.
 Pelagic waters, open sea but may come on shores
 (Sclater, 1891; Boulenger, 1897 as *Hydrus platurus*; Smith, 1943, Khan, 2012)



(Online Photo)

Family Acrochordidae Bonaparte, 1831
 Genus *Acrochordus* Hornstedt, 1787
Acrochordus granulatus (Schneider, 1799)
 Coastal rivers, estuaries, mangrove water courses, and in the open shallow seas over mud bottom, and coral reef.
 (Murray, 1884. Does not occur in Pakistan fide Khan, unpublished)



(Online Photo)

Family Colubridae Oppel, 1811
 Genus *Cerberus* Cuvier, 1829
Cerberus rynchops (Schneider, 1799)
 Coastal low-lying areas such as mangrove mudflats
 (Murray, 1884)



(Online image)

Spalerosophis diadema diadema (Schlegel 1837) shimmers iridescently, 4-6 feet long in adulthood
 Coastal plains.
 (Baig *et al.*, 2008)
 Genus *Platyceps* Blyth, 1860
Platyceps rhodorachis (Jan, 1863)
 Coastal plains
 (Schätti and Schimtz, 2006 as *Platyceps ventromaculatus* (Gray); Manzoor *et al.*, 2019)
Platyceps sindhensis Schätti, Tillack and Kucharzewski, 2014
 Coastal plains
 (Baig *et al.*, 2008 as *?Platyceps rhodorachis* [partim].

Order Testudines Linnaeus, 1758
 Superfamily Chelonoidea Bauer, 1893

Family Cheloniidae Oppel, 1811
 Genus *Chelonia* Brongniart, 1800
Chelonia mydas (Linnaeus, 1758)
 Shallow water over continental shelf
 (Butler, 1877; Khan and Mirza, 1976 as *Chelonia mydas japonica*; FAO as *Chelonia mydas agassizii* (Bocourt))



(Photo courtesy Moazzam)

Genus *Eretmochelys* Fitzinger, 1843
Eretmochelys imbricata (Linnaeus, 1766)
 Coastal waters, in rocky areas, coral reefs, lagoons or oceanic islands, and narrow creeks and passes
 (WWF.Pakistan, 2014)



(Photo courtesy Moazzam)

Genus *Caretta* Rafinesque, 1814
Caretta caretta gigas (Linnaeus, 1758)

Coastal waters
(Ghalib *et al.*, 1976; Khan, 2004)



(Photo Moazzam)

Genus *Lepidochelys* Fitzinger, 1843
Lepidochelys olivacea (Eschscholtz, 1829)

Mangrove vegetation along coastal strip
(Ghalib *et al.*, 1976; Khan, 2004)



(Photo courtesy Moazzam)

Family Dermochelyidae Fitzinger, 1843
Genus *Dermochelys* Blainville, 1816
Dermochelys coriacea (Vandelli, 1761)
Coastal areas, primarily in open ocean
(Martens, 1969)



(Photo courtesy Moazzam)

Class Aves Linnaeus, 1758
Order Coraciiformes
Forbes, 1884

Family Coraciiformes
Forbes, 1884

Family Alcedinidae Rafinesque, 1815
Genus *Ceryle*
Ceryle rudis (Linnaeus, 1758)

Creeks

(Khan *et al.*, 2018)

Order Charadriiformes Huxley, 1867
Family Rostratuliidae Mathews, 1911

Genus *Rostratula* Vieillot, 1816

Rostratula benghalensis (Linnaeus,

1758)

Creeks

(Khan *et al.*, 2018)

Order Podicipediformes Fürbringer, 1888

Family Podicipedidae Bonaparte, 1831

Genus *Tachybaptus* Reichenbach, 1853

Tachybaptus ruficollis (Pallas, 1764) 20-29 cm. Dark brown above, dusky below, with rufous throat and foreneck; adult non-breeding: as above but sides of head, neck and breast brownish buff, throat whitish In mangroves appearing on the coast in small bays

(Ali and Ripley, 1983; IUCN report, 1993)



(Online image)

Genus *Podiceps* Latham, 1787

Podiceps nigricollis Brehm, 1831 28-33 cm. ,head, chin, throat fore- and hind-neck, breast and back black, ear-tufts golden, underparts white with rufous band on flank

Coastal estuaries, arms of the sea, and inshore shallows in bays and channels
(Roberts, 1991)



(Online image)

Podiceps cristatus (Linnaeus, 1758)

Lakes, marshes, estuaries, coastal water
(Pandrani *et al.*, 2005)



(Online image)

Order Pelecaniformes Sharpe, 1891

Family Phalacrocoracidae Reichenbach, 1850

Genus *Microcarbo* Bonaparte, 1856

Microcarbo niger (Vieillot, 1817)

Mangrove swamps

(Ali, 1961; Roberts, 1991 as

Phalacrocorax niger)



(Online image)

Microcarbo pygmaeus (Pallas, 1773)

Coastal wetlands

(Wikipedia)



(Online image)

Genus *Phalacrocorax* Brisson, 1760

Phalacrocorax carbo sinensis (Shaw and

Nodder,

1802) Mangroves on the seacoast (Ali

and Ripley, 1983; Roberts, 1991)



(Online image)

Phalacrocorax fuscicollis Stephens, 1826

In estuaries and mangroves but not on open coast

(Ali and Ripley, 1983; Roberts, 1991)



(Online image)

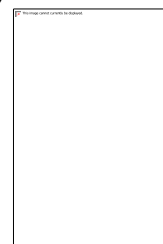
Family Anhingidae Reichenbach, 1849

Genus *Anhinga* Brisson, 1760

Anhinga melanogaster Pennant, 1769

Brackish swamps and sea coast

(Ali and Ripley, 1983; PARC, 1985 unpublished)



(Online image)

Anhinga rufa (Daudin, 1802)

Occasionally foraging in mangrove swamps, estuaries, shallow tidal inlets and coastal lagoons

(PARC, annual report, 1985)



(Online Image)

Family Sulidae Reichenbach, 1884

Genus *Sula* Brisson, 1760

Sula dactylatra (Lesson, 1831) 81-92

cm. adult white with black flight feathers and tail; facial and gular skin blackish to dark blue-grey; bill orange to yellow-green with black at base; legs and feet grey; eye yellow

Pelagic, coastal

(Grimmet *et al.*, 1998)



(Photo Moazzam)

Family Phaethontidae Brandt, 1840
 Genus *Phaethon* Linnaeus, 1758
Phaethon rubricauda Boddaert, 1783
 46-50 cm. white with a pink wash; a black crescent through the eye and black outer webs on the base of the primaries; tail streamers red; bill red or orange; feet and legs red with black webs
 Exclusive economic zone, on oceanic islands
 (Moazzam and Ziaullah, 2001)



(Online image)

Phaethon lepturus Daudin, 1802 white with wing-tip, diagonal bar on the wing coverts, crescent through eye and some flank feathers black; bill yellow; legs yellow, feet black .
 Near islands and at times off shore near mainland, not seen far out at sea
 (Moazzam and Ziaullah, 2001)



(Online image)

Phaethon aethereus indicus Hume, 1876
 50-55 cm. white with uneven black barring on back, rump and inner wing coverts, black crescent through the eye and on crown; flight feathers with outer web of primaries black, inner white, secondaries black with white tips and tertials black; tail and tail streamers white; bill red, legs and feet yellow, webs black
 Offshore waters
 (Hume, 1876)



(Online image)

Family Pelecanidae Rafinesque, 1815
 Genus *Pelecanus* Linnaeus, 1758

Pelecanus onocrotalus Linnaeus, 1758
 Coast, marshes, shallow fresh water and brackish lakes
 (Ali and Ripley, 1983; Roberts, 1991)



(Online image)

Pelecanus philippensis Gmelin, 1789
 Variety of deep and shallow wetlands,, freshwater and saline waters
 (Groombridge, 1983)



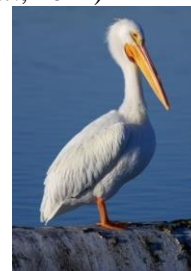
(Online image)

Pelecanus crispus Bruch, 1832
 Huge bird that measures 160 to 183 cm. Dirty white overall with a scruffy, upswept crest and black primaries (prominent only in flight). Adult has a bright orange pouch during the breeding season, yellow in the nonbreeding season. Pelagic, coastal
 (Collar and Andrews, 1988)



(Online image)

Pelecanus erythrorhynchos Gmelin, 1789
 Backwaters
 (Jabeen *et al.*, 2014)



(Online image)

Order Ciconiiformes Bonaparte, 1854

Family Ardeidae Leach, 1820
 Genus *Ardea* Linnaeus, 1758
Ardea cinerea Linnaeus, 1758
 Tidal creeks and mangroves
 (Ali and Ripley, 1999)



Ardea purpurea manilensis (Meyen, 1834)
 Mangroves
 (Ali and Ripley, 1968; Khanum *et al.*, 1980)



(Online image)

Ardea alba alba Linnaeus, 1758
 Mangrove creeks. All kinds of inland and coastal wetlands
 (Butler, 1983 as *Egretta alba* Linnaeus; Ghalib and Hasnain, 1997 as *Egretta alba alba* Linnaeus)



(Online image)

Ardea alba modesta Gray, 1831
 Mudflats, estuaries and brackish lagoons
 (Martínez-Vilalta and Motis 1992)



(Online image)

Genus *Butorides* Blyth, 1852
Butorides striatus javanicus (Horsfield, 1821)
 Along sea coast
 (Khanum *et al.*, 1980)



(Online image)

Genus *Ardeola* Boie, 1822
Ardeola grayii (Sykes, 1832)
 Mangrove creeks and tidal creeks
 (Ali, 1961; Roberts, 1991)



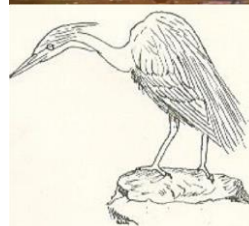
(Photo Moazzam)

Genus *Egretta* Brisson, 1760
Egretta sacra (Gmelin, 1789)
 Mangroves
 (Pandrani *et al.*, 2005)



Light morph and dark morph

Egretta gularis (Bosc, 1792)
 Seacoast, tidal creeks and fresh water swamps
 (Ali, 1961; Roberts, 1991)



(Online image)

Egretta garzetta garzetta (Linnaeus, 1766)

In creeks

(Ali, 1961; Khanum *et al.*, 1980)



(Online images)

Genus *Mesophoyx* Sharpe, 1894

Mesophoyx intermedia (Wagler, 1829)

Mangrove creeks, fresh water swamps and estuaries

(Roberts, 1991 as *Egretta intermedia*; Ghalib and Hasnain, 1997)



(Online image)

Genus *Bubulcus* Bonaparte, 1855

Bubulcus ibis (Linnaeus, 1758)

Frequents grasslands, fields, mangroves, marshes, ponds, and canals

(Durrane *et al.*, 2008)



(Photo courtesy Moazzam)

Genus *Nycticorax* Moehring, 1758

Nycticorax nycticorax (Linnaeus, 1758)

black, grey and white.

Fresh and salt-water wetlands

(Durrane *et al.*, 2008)



(Online image)

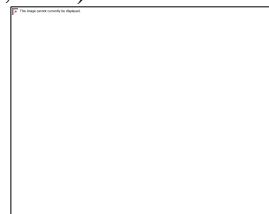
Family Ciconiidae Gray, 1840

Genus *Mycteria* Linnaeus, 1758

Mycteria leucocephala (Pennant, 1769)

Lagoons and swamps, deltaic region

(Roberts, 1991)



(Online image)

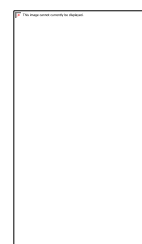
Genus *Ephippiorhynchus* Bonaparte, 1855

Ephippiorhynchus asiaticus (Latham, 1790)

bright red legs, white body, extensive black in the wings and tail and a glossy iridescent black head and neck with big black bill

Mangroves swamps

(Roberts, 1991; Ghalib and Hasnain, 1997)



(Online image)

Genus *Ciconia* Brisson, 1760

Ciconia episcopus (Boddaert, 1783)

Coastal, tidal mudflats and estuaries

(Roberts, 1991)



(photo by Sumeet Moghe)

Ciconia nigra (Linnaeus, 1758)

Estuaries

(Ticehurst, 1923)



(Photo source Wikimedia)

Family Phoenicopteridae Bonaparte, 1831
 Genus *Phoenicopterus* Linnaeus, 1758
Phoenicopterus ruber Linnaeus, 1758
 Shallow brackish lakes or coastal mud flats
 (Ali, 1961; Roberts, 1991)



(Online image)

Phoenicopterus roseus Pallas, 1811
 Creeks
 (Khan *et al.*, 2018)
 Genus *Phoeniconaias* Gray, 1869
Phoeniconaias minor (Geoffroy Saint-Hilaire, 1798)
 Brackish lakes, salt pans or coastal lagoons, usually far out from the shore
 (Roberts, 1991 as *Phoenicopterus minor*)



(Online image)

Family Threskiornithidae Richmond, 1917
 Genus *Platalea* Linnaeus, 1758
Platalea leucorodia Linnaeus, 1758
 Coastal area, wetlands and mangroves
 (Ali, 1961; Roberts, 1991)
Platalea leucorodia infrasp. *major*
 Temminck and Schlegel 1849
 Mangrove swamps
 (Ghalib *et al.*, 1997)



(Online image)

Genus *Threskiornis* Gray, 1842
Threskiornis melanocephalus (Latham, 1790)
 In mangroves, deltaic region
 (Roberts, 1991)



(Online image)

Genus *Plegadis* Kaup, 1829
Plegadis falcinellus (Linnaeus, 1766)
 Estuaries, swampy areas
 (Roberts, 1991)



(Online image)

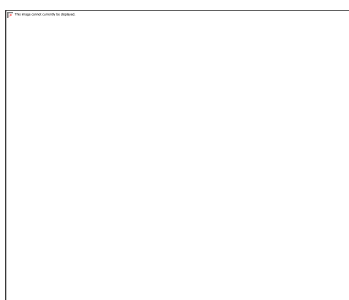
Order Charadriiformes Huxley, 1867

Family Recurvirostridae Bonaparte, 1854
 Genus *Himantopus* Brisson, 1760
Himantopus himantopus (Linnaeus, 1758)
 Open exposed areas of marsh, muddy creeks and backwaters
 (Ali, 1961; Roberts, 1991) (Online image)



(Online image)

Order Phoenicopteriformes Fürbringer, 1888
 Genus *Recurvirostra* Linnaeus, 1758
Recurvirostra avisetta Linnaeus, 1758
 Black and white, bluish-gray legs
 Fresh water lakes, brackish pools and along the seacoast
 (Ali, 1961; Roberts, 1991)



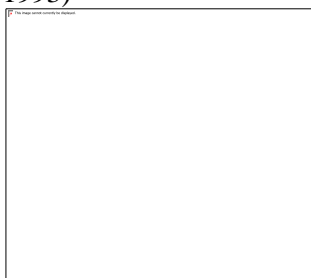
(Online image)

Family Burhinidae Mathews, 1912
 Genus *Esacus* Lesson, 1831
Esacus recurvirostris (Cuvier, 1829)
 Mangroves
 (Roberts, 1991)



(Photo Moazzam)

Esacus magnirostris (Vieillot, 1818)
 Along river bank and the shore of lakes and lagoons on the coast shallow brackish water or on mud flats (Roberts, 1991; IUCN, 1993)



(Online image)

Family Dromadidae Gray, 1840
 Genus *Dromas* Paykull, 1805
Dromas ardeola Paykull, 1805
 Intertidal zone (Roberts, 1991)



(Online image)

Family Charadriidae Vigors, 1825
 Genus *Haematopus* Linnaeus, 1758
Haematopus ostralegus Linnaeus, 1758

Backwaters, seacoast, estuaries and fresh water swamps
 (Roberts, 1991)



(Online image)

Genus *Charadrius* Linnaeus, 1758
Charadrius leschenaultii Lesson, 1826
 During the non-breeding season in littoral habitats with mixed sand and mud substrata; found on sheltered sandy, shelly or muddy beaches, large intertidal mudflats, sandbanks, salt-marshes, estuaries, coral reefs, rocky islands, tidal lagoons and dunes near the coast, although sometimes in coastal grasslands (Roberts, 1991)



(Online image)

Charadrius alexandrinus Linnaeus, 1758
 Along coastal mudflats, rivers, salt pans and sandy



(Online image)

Charadrius hiaticula Linnaeus, 1758
 Margins of larger lakes Seashore and estuarine area
 (PARC, 1985, unpublished, Pandrani *et al.*, 2005; Ghalib *et al.*, 2009)



(Online image)

Charadrius dubius jerdoni (Legge, 1880)

Mangrove swamps
(McKean and Thompson, 1983)



(Online image)

Charadrius mongolus atrifrons Wagler, 1829

Backwaters, coastal mudflats
(PARC, 1985, unpublished; Jabeen *et al.*, 2014)



(Online image)

Charadrius dubius Scopoli, 1786
Along the tidal creeks, mangroves and inter-tidal zone
(Siddiqui *et al.*, 2001)



(Online image)

Genus *Pluvialis* Brisson, 1760
Pluvialis squatarola (Linnaeus, 1758)
Creeks
(Khan *et al.*, 2018)



(Online image)

Pluvialis dominica (Muller, 1776)
Fresh water and mangroves
(Roberts, 1991 as *Hoplopterus malabaricus*)
(Ali, 1961; Roberts, 1991)



(Online image)

Pluvialis apricaria (Linnaeus, 1758)
Mudflat and around the mangroves
(wikipedia)



(Online image)

Family Scolopacidae Rafinesque, 1815
Genus *Arenaria* Brisson 1760

Arenaria interpres (Linnaeus 1758)
Creeks and seacoast
(Khan *et al.*, 2018)

Genus *Calidris* Merrem, 1804
Calidris canutus (Linnaeus, 1758)
Tidal mudflats or sandflats, sandy beaches of sheltered coasts, rocky shelves, bays, lagoons and harbours, occasionally also oceanic beaches and saltmarshes
(Grimmett and Roberts, 2008)



(Online photo)

Calidris alba (Pallas, 1764)
Along seacoast
(Roberts, 1991) (PARC, 1985, unpublished)



(Online image)

Calidris minuta (Leister, 1812)
Along sea coast, inland waters and creeks
(Roberts, 1991)

Calidris alpina (Linnaeus, 1758)
Along the seacoast and rivers
(Roberts, 1991)



(Online image)

Calidris tenuirostris (Horsfield, 1821)
Along seacoast
(Roberts, 1991)



(Online image)

Calidris ferruginea (Pontoppidan, 1763)
Found on along the seacoast
(Roberts, 1991)



(Online image)

Calidris temminckii (Leisler, 1812)
Inland lakes and brackish tidal creeks of delta
(Roberts, 1991)



(Online image)

Calidris canutus (Linnaeus, 1758)
Outside of the breeding season strictly coastal, frequenting tidal mudflats or sandflats, sandy beaches of sheltered coasts, rocky shelves, bays, lagoons and harbours, occasionally also oceanic beaches and saltmarshes
(Grimmett *et al.*, 2008)



(Online image)

Calidaris pugnax (Linnaeus, 1758)
Creeks
(Khan *et al.*, 2018)
Genus *Vanellus* Brisson, 1760
Vanellus gregarius (Pallas, 1771)
Marshy area
(Ghalib *et al.*, 2009)



(Online image)

Vanellus malabaricus (Boddert, 1783)
Dull grey brown with a black, yellow legs and a triangular wattle at the base of the beak.
Mangroves
(Khan *et al.*, 2018)



(Online image)

Vanellus indicus (Boddaert, 1783)

Along coast

(Siddiqui *et al.*, 2001)



(Online image)



(Online image)

Numenius phaeopus (Linnaeus, 1758)

Backwaters, along seacoast

(PARC, 1985, unpublished; Roberts, 1991)

Genus *Limicola* Koch, 1816

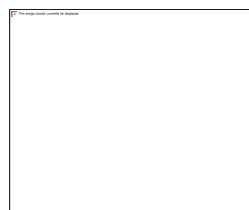
Limicola falcinellus (Pontoppidan, 1763)

Along the seacoast

(Roberts, 1991)



(Online image)



(Online image)

Genus *Tringa* Linnaeus, 1758

Tringa totanus (Linnaeus, 1758)

Backwaters, creeks, coast.

(Khanum and Ahmed, 1988)

Genus *Limosa* Brisson, 1760

Limosa limosa (Linnaeus, 1758)

Sea coast and rivers

(Ali, 1961; Roberts, 1991)



(Online image)



(Online image)

Tringa stagnatilis (Bechstein, 1803)

Fresh water creeks, coast and swamps

(Khanum and Ahmed, 1988; Roberts, 1991)

Limosa lapponica (Linnaeus, 1758)

Backwaters, seacoast

(Roberts, 1991)



Female and male (Online images)



(Online image)

Tringa nebularia (Gunnerus, 1767)

Lakes, coast, delta

(Khanum and Ahmed, 1988)

Genus *Numenius* Moehring, 1758

Numenius arquata (Linnaeus, 1758)

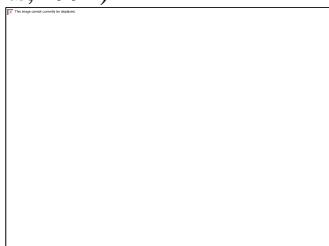
Fresh water lakes, river, majority along the seacoast

(Ali, 1961; Roberts, 1991)



(Online image)

Tringa glareola Linnaeus, 1758
Large lakes and along seacoast
(Roberts, 1991)



Tringa erythropus (Pallas, 1764)
Backwaters (Grimmett et al., 2008)
(Roberts, 1991)



(Online image)

Tringa ochropus Linnaeus, 1758
Backwaters, along seacoast, offshore
(Roberts, 1991)



(Photo Moazzam)

Genus *Phalaropus* Brisson, 1760



Phalaropus lobatus (Linnaeus, 1758)
Genus *Xenus* Kaup, 1829
Xenus cinereus (Guldenstadt, 1775)



(Photo courtesy Moazzam)

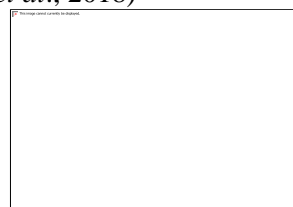
Genus *Gallinago* Leach, 1816
Along seacoast, preferring mangrove
creeks and delta

Gallinago gallinago (Linnaeus, 1758)
Creeks Inhabits fresh and brackish
marshlands with a (Roberts, 1991)
combination of grassy cover and rich,
moist soils, often at the edges of lakes,
rivers and swamps (Roberts, 1991)

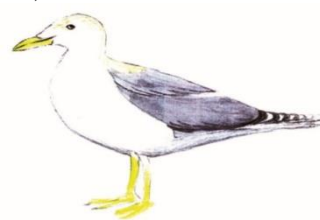


(Online image)

Genus *Actitis* Iliiger, 1811
Actitis hypoleucos Linnaeus, 1758
Coastal area
(Khan et al., 2018)



Family Laridae Vigors, 1825 Inland fresh
water and sea coast , creeks, delta Genus
Larus Linnaeus, 1758 (Roberts, 1991)
Genus *Arenaria* Brisson, 1760
Arenaria interpres (Linnaeus, 1758)
Creeks and seacoast
Larus fuscus heuglini Bree, 1876 Along
the coast
(Roberts, 1991 as *Larus argentatus*
heuglini)



Larus fuscus fuscus Linnaeus, 1758
Along the seacoast Purely coastal and
neritic ,



(Online image)

Larus genei Breme, 1839

Along the seacoast Purely coastal and neritic, occurring in the lagoons, estuaries and delta
(Roberts, 1991 as *Larus fuscus*)



(Online image)

Larus ichthyaetus Pallas, 1773



(Online image)

Larus hemprichii Bruch, 1853 Fresh water beaches and along the seacoast Along seacoast and island (Barnes, 1891; Holmes and Wright, 1969) (Roberts, 1991)



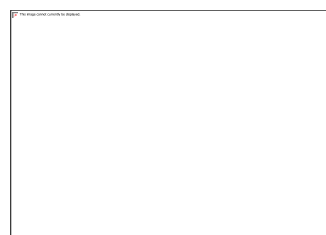
(Online image)

Larus brunnicephalus Jerdon, 1840 (Online image) Along the seacoast, mangrove creeks, lagoons and



(Online image)

Larus cachinnans Pallas, 1811 fresh water Sandy beaches, spits, sand-dunes, and salt-pans, in (Ali, 1961; Roberts, 1991) Intertidal zones (Klein and Buchheim, 1997)



(Online image)

Larus ridibundus Linnaeus, 1766 Larger inland lakes and around the seacoast (Roberts, 1991)



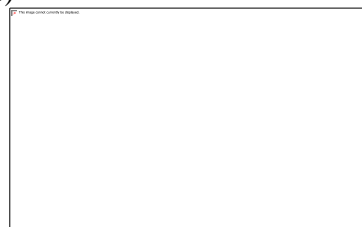
(Online image)

Larus argentatus Pontoppidan, 1763 Backwaters, coast (Pandrani *et al.*, 2005)



(Online image)

Genus *Hydroprogne* Kaup, 1829 *Hydroprogne caspia* (Pallas, 1770) Along seacoast (Butler, 1877; Khanum and Ahmed, 1988)



(Online image)

Family Stercorariidae Gray, 1871 Genus *Stercorarius* Brisson, 1760 *Stercorarius parasiticus* (Linnaeus, 1758) Predominately coastal (Roberts, 1991)



(After Andreas Trepte, www.photonatur.net)

Stercorarius pomarinus (Temminck, 1815)

Non breeders remaining somewhat coastal, especially in upwelling regions (Grimmett *et al.*, 2008)



(After Brian Sullivan)

Family Sternidae Bonaparte, 1838

Genus *Anous* Stephens, 1826

Anous stolidus (Linnaeus, 1758)

Occurs around isolated, bare or vegetated, inshore or oceanic islands or coral reefs with rocky cliffs or offshore stacks or sand beach

(del Hoyo *et al.*, 2014)



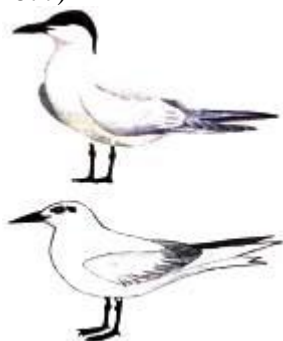
(After Joseph C. Boone, 2013)

Genus *Gelochelidon* Brehm, 1830

Gelochelidon nilotica (Gmelin, 1789)

Open sea, coast, estuaries

(Butler, 1877)



(Online images)

Genus *Sterna* Linnaeus, 1758

Sterna hirundo Linnaeus, 1758

Along the seacoast and river

(Roberts, 1991)



(Online image)

Sterna repressa Hartert, 1916

Coasts and inshore waters

(Ali and Ripley, 1983; Hasnain, 1996, unpublished thesis)

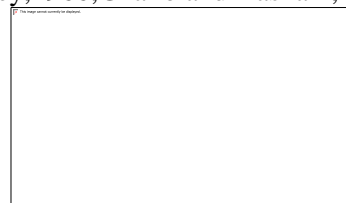


(Online image)

Sterna bergii velox Cretzschmar, 1827

Estuaries, bays, harbours and inlets, along sandy, rocky, coral or muddy shores, in mangrove swamps, on rocky outcrops in open sea and also far out to sea on open water

(Bailey, 1966; Ghalib and Hasnain, 1997)



(Online image)

Sterna bengalensis Lesson, 1831

Along sea coast

(Holmes and Wright, 1969)



(Online image)

Sterna sandvicensis Latham, 1787

Along seacoast

(Roberts, 1991)

Sterna media Horsfield, 1821

(Barnes,1891)
 Genus *Onychoprion* Wagler, 1832
Onychoprion anaethetus (Scopoli, 1786)
 Coast areas and open sea
 (Ali,1969 as *Sterna anaethetus*)



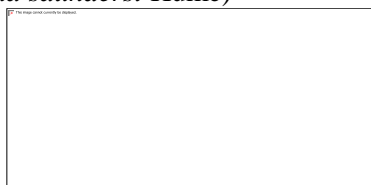
(Online image)

Genus *Sternula* Boie, 1822
Sternula albifrons (Pallas, 1764)
 Occurring open seacoast and mangrove
 creeks
 (Barnes, 1891;Roberts, 1991 as *Sterna
 albifrons* Pallas)



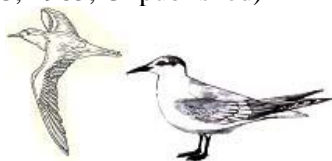
(Online image)

Sternula saundersi (Hume, 1877)
 Coastal areas
 (Hume, 1877; Hasnain, 1996,
 unpublished thesis as
Sterna saundersi Hume)



(Online image)

Genus *Chlidonias* Rafinesque, 1822
Chlidonias hybrida indicus (Stephens,
 1826)
 Along the sea coast
 (PARC, 1985, Unpublished)



Chlidonias leucopterus (Temminck,
 1815)

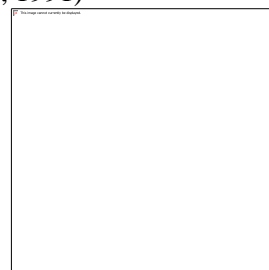
Rocky coast, lagoons and mangrove
 swamps
 (IUCN)



(Online image)

Order Coraciiformes Forbes, 1884

Family Alcedinidae Rafinesque, 1815
 Genus *Alcedo* Linnaeus, 1758
Alcedo atthis (Linnaeus, 1758)
 Occurs in river, smaller swamps and
 along the seacoast
 (Roberts, 1991)



(Online image)

Order Anseriformes Wagler, 1831

Family Anatidae Vigors, 1825
 Genus *Tadorna* Boie, 1822
Tadorna tadorna (Linnaeus, 1758)
 Creeks
 (Khan *et al.*, 2018)
 Genus *Anas* Linnaeus, 1758
Anas platyrhynchos Linnaeus, 1758
 Marshes, lakes, swamps, creeks, rivers,
 streams and ponds.
 (Khan *et al.*, 2018)
Anas acuta Linnaeus, 1758
 In marine environments outside of
 breeding season
 (Ahmad and Ghalib, 1986)



(Online image)

Anas streoera Linnaeus 1758

Creeks
 (Khan *et al.*, 2018)

Anas querquedula Linnaeus, 1758

In marine environments outside of breeding season
(Ahmad and Ghalib, 1986)



(Online image)

Anas crecca Linnaeus, 1758

Creeks

(Khan *et al.*, 2018)

Genus *Mareca* Stephen, 1924

Mareca penelope Linnaeus, 1758

Open wetlands, lakes, wet grassland or marshes with dense fringing vegetation

(Gabol *et al.*, 2018 as *Anas penelope*)



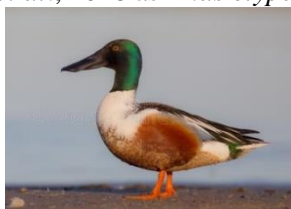
(Online image)

Genus *Spatula* Boie, 1822

Spatula clypeata Linnaeus, 1758

shallow water with muddy bottoms

(Gabol *et al.*, 2018 as *Anas clypeata*)



(Online image)

Genus *Aythya* Boie, 1822

Aythya marila (Linnaeus, 1761)

Primarily along the seacoast and on large bodies of water

(Ahmad and Ghalib, 1986)



(Online image)

Aythya ferina (Linnaeus, 1758)

Saline, brackish and soda lakes and occasionally in sheltered coastal bays

(Gabol *et al.*, 2018)



(Online image)

Genus *Mergus* Linnaeus, 1758

Mergus merganser Linnaeus, 1758

Salt water and fresh water

(Ahmad and Ghalib, 1986)



(Online image)

Mergus serrator Linnaeus, 1758

Along the wooded shorelines

(Ahmed and Ghalib, 1986)



(Online image)

Genus *Clangula* Leach, 1819

Clangula hyemalis (Linnaeus, 1758)

Winters at sea, generally far offshore in waters 10-35 m. deep, as well as in saline, brackish or fresh estuarine waters, brackish lagoons

(Ahmed and Ghalib, 1986)



(Online image)

Order Gaviiformes Wetmore and Miller, 1926

Family Gaviidae Coues, 1903

Genus *Gavia* Forster, 1788

Gavia stellata (Pontoppidan, 1763)

On rich marine Fishing grounds

(Roberts, 1991)



(Online image)

Order Procellariiformes Fürbringer, 1888

Family Hydrobatidae Mathews, 1913
 Genus *Oceanites* Keyserling and Blasius, 1840
Oceanites oceanicus Kuhl, 1820
 Strictly pelagic
 (IUCN)



(Online image)

Family Procellariidae Leach, 1820
 Genus *Puffinus* Brisson, 1760
Puffinus tenuirostris (Temminck, 1835)
 Coastal and offshore
 (Jouanin, 1957 as *Ardenna tenuirostris*)



(Online image)

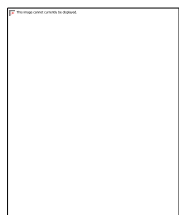
Genus *Bulweria* Bonaparte, 1843
Bulweria fallax Jouanin, 1955
 Open sea all-year-round, only approaching land during the breeding season
 (Sinclair, 1979; Porter *et al.*, 1996, uncertain)



(Online image)

Order Gruiformes Bonaparte, 1854

Family Gruidae Vigors, 1825
 Genus *Antigone* Reichenbach, 1853
Antigone antigone (Linnaeus, 1758)
 Coastal wetlands
 (IUCN)



(Online image)

Grus virgo Linnaeus 1758
 Coastal wetlands; migratory



(Online image)

Grus grus (Linnaeus, 1758)
 Coastal wetlands



(Online image)

Family Rallidae Rafinesque 1815,
 Genus *Fulica* Linnaeus, 1758
Fulica atra Linnaeus, 1758
 In marshy area
 (Gabol *et al.*, 2019)



(Online image)

Class Mammalia Linnaeus, 1758
 Order Sirenia Illiger, 1811

Family Dugongidae Gray, 1821
 Genus *Dugong* Lacépède, 1799
Dugong dugon (Müller, 1776)
 Coastal, also in bays and channels
 (Habitat not suitable here but individual may stray, de Silva 1987; Thornback and Jerkins, 1982)



(Online image)

Order Artioasactyla Owen, 1848
 Infra Order Cetacea Brisson, 1762

Sub order Odontoceti Flower, 1869
Superfamily Delphinoidea Grey, 1821

Family Phocoenidae Grey, 1825
Genus *Neophocaena* Palmer, 1899
Neophocaena asiaeorientalis (Pilleri and Gühr, 1972)

Coastal waters and estuaries, Before monsoon move offshore in winter and Summer monsoon months at river mouth, brackish, fresh

(Murray, 1884 as *Neomeris kurrachiensis*; Pilleri, 1974 as *Neophocaena phocaenoides* (as host); IUCN 1993)

Coastal and riverine areas, inhabit shallow coastal waters
(Gore *et al.*, 2012)



(Online image)

Family Delphinidae Grey, 1821
Genus *Orcinus* Fitzinger, 1860
Orcinus orca (Linnaeus, 1758)
Oceanic

(WWF-Pakistan; Moazzam, 2022)



(Photo courtesy Moazzam)

Genus *Pseudorca* Reinhardt, 1862
Pseudorca crassidens (Owen, 1846)

Deep, offshore waters
(Taylor *et al.*, 2008)



Genus *Tursiops* Gervais, 1855
Tursiops aduncus (Ehrenberg, 1833)

Coastal waters, creeks
(Pilleri and Gühr, 1972)



(Online image)

Tursiops truncatus (Montagu, 1821)
Primarily coastal, also be found in pelagic waters
(Ahmad, 1994)

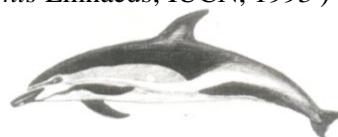


(Online image)

Genus *Delphinus* Linnaeus, 1758
Delphinus capensis tropicalis (Van Bree, 1971)

Coastal areas

(Ahmad *et al.*, 1987 as *Delphinus delphis* Linnaeus; IUCN, 1993)



(Online image)

Genus *Lagenodelphis* Fraser, 1956
Lagenodelphis hosei Fraser, 1956

Deep waters

(Hammond *et al.*, 2008)



(Online image)

Genus *Stenella* Gray, 1866
Stenella longirostris (Gray, 1828)

Inshore waters, islands or banks

(Niazi, 1990; IUCN, 2001)



Stenella coeruleoalba (Meyen, 1833)

Occupies both offshore and inshore
(Meyen, 1833; Niazi, 1990; Kiani *et al.*, 2013)



(After CMS)

Stenella attenuata (Gray, 1846)

Shallow waters
(Kiani *et al.*, 2011)



(After CMS)

Genus *Sousa* Gray, 1866
Sousa chinensis (Osbeck, 1765)
Marine, brackish, also in rivers, estuaries
and mangroves
(Groombridge, 1983)



(Online image)

Sousa plumbea (Cuvier, 1829)
In the mangrove-lined creek system
(Pilleri and Pilleri 1979; Kiani and Van
Waerebeek, 2015)

Genus *Steno* Gray, 1846
Steno bredanensis (Cuvier in Lesson,
1828)

Deep waters, close to the coastline
(Hammond *et al.*, 2008; Kiani *et al.*,
2013)



(Online image)

Genus *Grampus* Gray, 1828
Grampus griseus (Cuvier, 1812)
Usually in deep waters rather than close
to land
(IUCN, 2001)



(Online image)

Genus *Peponocephala* Nishiwaki and
Norris, 1966
Peponocephala electra (Gray, 1846)
Lives far from shore
(Ahmed and Rizvi, 1985)



(Online image)

Genus *Feresa* Gray, 1875
Feresa attenuata Gray, 187
Purely oceanic
(IUCN, 2001)



(Online image)

Family *Physeteroidae* Gray 1868
Genus *Physeter* Linnaeus, 1758
Physeter macrocephalus Linnaeus, 1758
Pelagic; depth range 0 - 3200 m.
(Gore *et al.*, 2007)



(Online image)

Family *Kogiidae* Gill, 1871
Genus *Kogia* Gray, 1846
Kogia breviceps (Blainville, 1838)
Believed to prefer off-shore waters
(IUCN, 2001)



(Online image)

Kogia sima (Owen, 1866)
Appears to be just off the continental
shelf
(Roberts, 1997)



(Online image)

Family *Ziphiidae* Gray, 1850
Genus *Indopacetus* Moore, 1968
Indopacetus pacificus (Longman, 1926)
Offshore waters
(Moazzam, 2015)



(Online image)

Genus *Ziphius* Cuvier, 1823
Ziphius carvirostris Cuvier, 1823
 Offshore waters
 (Ghalib et al,2007;Gore et al,2007)



(Online image)

Genus *Mesoplodon* Gervais, 1850
Mesoplodon densirostris (Blainville, 1817)
 On continental slopes,oceanic waters
 (IUCN, 2001)



(Online image)

Mesoplodon ginkgodens Nishiwaki and Kamiya, 1958
 Pelagic
 (IUCN, 2001)
 (Online image)



Suborder Mysticeti Flower, 1864
 Family Balaenopteridae Gray, 1864
 Genus *Balaenoptera* Lacepede, 1804
Balaenoptera musculus musculus (Linnaeus, 1758)
 Along edge of continental shelves
 (Siddiqi, 1968)



(Online image)

Balaenoptera physalus (Linnaeus, 1758)
 Offshore
 (Groombridge, 1983)



(Online image)

Balaenoptera edeni Anderson, 1878
 Largely coastal rather than pelagic
 (IUCN, 2001)



(Online image)

Genus *Megaptera* Gray, 1846
Megaptera novaengliae (Borowski, 1781)
 (Beneden ,1887)
 Migratory
 (IUCN, 1999)



unidentified



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Addendum

While this book was in press, many important old papers were noticed and new published addressing new records on the marine fauna of the Pakistan coast came across are now being added in the proof:

Phylum Cnidaria

Family Dendrophylliidae Gray, 1847

Heteropsammia cochlea (Spengler, 1781) Pale grey, orange-brown or greenish

Solitary, Sipunculan-associated, Almost always found on soft horizontal substrates at depths of 20 metres or more. (CITES)



Pavona duerdeni Vaughan, 1907

Forms large colonies on horizontal shallow substrates.

(CITES)

Phylum Bryozoa

Phylum Nematoda

Family Philometridae Baylis and Daubney, 1926

Philometra bleekeri Rizwana and Zulfiqar, 2022

Parasitic. Host *Epinephelus bleekeri* (fish) (Rizwana and Zulfiqar, 2022)

Family Catenicellidae Busk, 1852

Catenicella contei (Audouin, 1826) 1.5 cm

Cryptic on artificial substrates like ship hulls and

On algae at a depth of 1 up to 5 meters (Javed, 1990 unpublished thesis)



Phylum Mollusca

Family Terebridae Mörch, 1852

Partecosta nassoides (Hinds,

1844)

In intertidal and shallow subtidal areas (Bibi *et al.*, 2021)

Family Muricidae Rafinesque, 1815

Taurasia striata (Blainville, 1832)

Intertidal

(<http://collections.nmnh.si.edu/search> as *Purpura buccinea* Deshayes)



Family Cardiidae Lamarck, 1809

Tridacna squamosina Sturany,

1899 (presumably to occur in Pakistan)

Shallow reef areas, usually 0–5 m below the surface.

(Killam, 2020)

Phylum Arthropoda

Family Dytiscidae Leach, 1815

Hydroglyphus gujaratensis (Vazirani, 1973)

Shallow brackish pool near sea shore

(Hajek and Wewalka, 2009, unconfirmed but likely to occur in Pakistan)

Family Pandalidae Haworth, 1825

Plesionika adensameri (Balss, 1914)



Phylum Chordata

Family Pempheridae Bleeker, 1859

Pempheris mangula Cuvier, 1829

usually only the tip of dorsal fin blackish

In caves or under overhangs in coral reefs (Cuvier, 1829)



(Picture courtesy Creative common attribution)

(Moazzam and Rizvi, 1980; Niazi, 2001)

Family Apogonidae Günther, 1859

Apogonichthyoides nigripinnis (Cuvier, 1828)

Size: up to 3.94" (10 cm), dark vertical bar present below each dorsal fin and on caudal base; a fourth bar may be present between the 2nd dorsal and the caudal base, normally large yellow edged black ocellus above pectoral fins clearly larger than pupil, pelvic fins. Pectoral fins light and other fins dusky to dark in colour. An oblique dark brown line present between lower edge of eye to corner of preopercular, characterized by having a large dark ocellus above the pectoral fin and a pale distal edge of the second dorsal fin

1 - 50 Meter

(Murray, 1880)

Yarica hyalosoma (Bleeker, 1852)

Demersal

(Moazzam and Rizvi, 1980, record from Pakistan seems based on misidentification)

Lepidamia multitaeniata (Cuvier, 1828)

body generally red, with darker brownish red narrow stripes; body above lateral line and across entire caudal-fin base blackish; 1st dorsal fin black, all other fins mostly red; base of dorsal and anal fins pale; pale pink stripe on distal third of pelvic fin

(Hoda (1985)

Lepidamia kalosoma (Bleeker 1852)

Found in caves and ledges on coastal reefs in 3-15 m

(Regan, 1919 as *Apogon polylepis*,

Apogon noordzieki Bleeker)

Ostorhinchus holotaenia (Regan, 1905)

bluish silver with seven coppery stripes. Lower most stripe poorly developed, the bluish silver stripe above, replaced with a series of bluish silvery spots and the mid lateral stripe becoming dark brown on caudal peduncle and continuing to the end of caudal fin

Reef-associated; depth range 15 - 35 m

(Moazzam and Osmany, 2023)

Nectamia bandanensis (Bleeker, 1854)

Reef-associated; depth range 1 - 34 m

(Zugmayer, 1913)

Fibramia thermalis Cuvier, 1829

Reef-associated; depth range 0 - 20 m

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