GASTROPOD DIVERSITY ALONG THE INTER-TIDAL COAST OF KAVARATTI ISLAND, LAKSHADWEEP, INDIA

DISSERTATION

Submitted to the University of Kerala

in the partial fulfilment of the requirement for the

BACHELOR OF SCIENCE IN

ZOOLOGY

Department of Zoology

TKM COLLEGE OF ARTS AND SCIENCE, KOLLAM

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Abhijith K.S	**25018142018**
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CERTIFICATE

This is to certify that the project entitled ***"Gastropod Diversity along the inter-tidal coast of Kavaratti Island, Lakshadweep, India"*** is an authentic record of the group work carried out by Febin Manoj (25018142006), Meharunnisa K.M (25018142010), Sooria .S (25018142014), Abhijith K.S (25018142018), Alfiya .N (25018142019), Mohammed Shahan (25018142025), Soumya Mathunny (25018142031), Fathima .A (25018142038), Mahamutha Thazneem.M (25018142040), Department of Zoology, TKM College of Arts & Science, Kollam, as a part of University of Kerala in partial fulfilment of the Degree of Bachelor of Science in Zoology under my supervision and guidance and it has not been submitted anywhere else for any other degree, diploma, or title.

Dr. Jasin Rahman
Head of Department

Dr. Mumthas Y
Supervising Teacher

DECLARATION

We hereby declare that this project entitled ***"Gastropod Diversity along the inter-tidal coast of Kavaratti Island, Lakshadweep, India"*** is an authentic record of original project work carried out by us under the guidance of Dr. Mumthas Y, Department of Zoology, TKM College of Arts and Science, Karicode, Kollam and submitted to the University of Kerala in partial fulfilment of the requirements of the Degree of Bachelor of Science in Zoology.

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Kollam
02/05/2021

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INTRODUCTION

Marine and Coastal environments are among the most ecologically and socio-economically important habitats. Marine and coastal habitats have huge socio-economical value through food production, nutrient cycling, recreation, and gas regulation (Harley et al., 2006). Coastal ecosystems are subjected to a variety of stressors which may interact to produce combined impacts on biodiversity and ecosystem functioning. Fluctuations in the conditions, nature and characteristics of aquatic systems affect benthic community composition, function, diversity, and production. A report issued by the UN Environmental Program (2010) identified many pressures on marine biodiversity and the outlook for habitats, along with some steps being taken to ameliorate the causes.

Benthic fauna act as connecting link between the biotopes of substratum and water column in the aquatic ecosystems and their distribution highly depends on physical nature of the substratum, nutritive content, degree of stability and oxygen content. The low hydro dynamism (Danulate et al., 2002) and generally poor oxygenation of water column (Garcia and Gomez. 2005) lead to a limited diversification of benthic communities (Estacio et al., 1997). Tolerant or opportunistic species tend to dominate stressed assemblages and less tolerant species tend to became increasingly rare or disappear. Therefore, both these species can serve as stress indicators (Belan., 2003). A significant disturbance will however introduce changes in the species composition their abundance and biomass. Such succession changes in the benthic community structure are often predictable and with increased perturbation, the diversity, abundance, and biomass will show a general decline (Pearson and Rosenberg., 1978). The spatio-temporal variation of benthic invertebrates will have impacts on other trophic levels which in turn will determine the fate of energy and nutrient flow in the coastal waters.

Most marine organisms that live benthically as adults have a life cycle that involves a larval stage that is pelagic. The adaptiveness of the life cycle is

debated (Strathmann 1985, 2007). So, the conditions of the pelagic realm affect the benthic biota since they spend a part of their life cycle away from the sea floor. Hence physical and chemical environment has shaped and affected the benthic organisms. Many pelagic larval forms contribute much to plankton communities which in turn is consumed by pelagic fishes. Macrobenthos in marine sediments plays a vital role in ecosystem processes. They perform sediment reworking by feeding, burrowing and construction activities. Benthos comprises the critical link in the marine food web by acting as food for many fishes, birds, and other marine invertebrates. Thus, estimation of benthic production is useful to assess the fishery production of that area. Benthic fauna are key indicators of aquatic environmental pollution and stress and are used in many monitoring programs to assess the overall health of oceans and estuaries.

The coastal waters of the maritime states are under constant threat of pollution from several sources. The relatively long shoreline of India (6000km) is no exception either. More so in the case of Kerala. Kerala is now a developing state and on her way towards being an industrialized one by the year 2020. Most of her industries and urban areas are located on the coastal regions. In addition, the offshore area of the coast is a busy shipping lane. These two phenomena make the intertidal and offshore areas of the coast of Kerala interesting for scientific studies.

Consequent upon the rapid growth of human population near the coast, the use of marine environment for different purposes like exploration and exploitation of living and non-living resources, marine transport, dumping of domestic, industrial, and agricultural waste and developmental activities for the settlement recreation and aesthetic purposes have greatly multiplied. Such intensified use of marine biosphere with footprints of man almost everywhere, has brought considerable changes leading to the loss of biodiversity and damage to coastal ecosystem. Therefore, protection of marine biosphere from the

menace of pollution at local, regional, and global scales have been strongly urged upon to ensure the sustainability of marine resource.

Studies on the marine life of the coastal waters and estuaries of Kerala have resulted in considerable knowledge of the fishes and plankton (Easa and Shaji., 2003). However, information about the marine benthic invertebrates of Kerala is limited even though they are critical components of an aquatic system. It is important to establish a baseline for tropical regions and improve our understanding of biodiversity in marine environment. The present study aims at addressing the above problems by filling up the existing lacunae on the diversity of benthic fauna with special reference to gastropods along the inter-tidal coast of Neendakara, Kollam.

Gastropods are among the few groups of animals to have become successful in all three major habitats: the ocean, fresh waters, and land. A few gastropod types (such as conch, abalone, limpets, and whelks) are used as food, and several different species may be used in the preparation of escargot. Very few gastropod species transmit animal diseases; however, the flukes that because human schistosomiasis use gastropods as intermediate hosts. The shells of some species are used as ornaments or in making jewellery. Some gastropods are scavengers, feeding on dead plant or animal matter; others are predators; some are herbivores, feeding on algae or plant material; and a few species are external or internal parasites of other invertebrates.

From earliest times, humans have used many snail species as food. Periwinkles (*Littorina*) in Europe and South Africa, queen conchs (*Strombus gigas*) in the West Indies, abalones (*Haliotis*) in California and Japan, and turban shells (*Turbo*) in the Pacific are the most frequently eaten marine snails. Occasionally limpets and whelks are used for food, but they are more commonly used as fish bait. Freshwater snails rarely are eaten. Land snails of the family Helicidae have been eaten in the Middle East and Europe since prehistoric times. Today many tons of the European edible snails *Helix aspersa* and *H. pomatia* (the most common species used to prepare escargot) are raised

on snail farms or collected wild. Several species of Otalaand Eobania from Morocco and Algeria are exported for food.

In some places, introductions of *Achatina* and *Helix* have resulted in damage to crops and gardens by these rapidly multiplying snails. On the other hand, habitat degradation, the introduction of predatory rats and land snails, and shell collecting by humans have caused the extinction of about 50 per cent of all *Achatinella* species in Hawaii. Eighteen of the remaining 19 native species have been pushed to the brink of extinction.

Shells of certain snails are highly prized by collectors. The operculum of some *Turbo* species is used in making earrings; cameos are cut from the shell of the Red Sea snail *Cassis rufa*. Abalone shells are used in many cultures for decorative purposes; the shell of the golden cowrie (*Cypraea aurantium*) served at one time as a badge of a chief in Fiji. Strings of shells have been used as money.

Serious medical problems are caused by the few freshwater snails (*Pomatiopsis, Bulinus, Biomphalaria*) that serve as intermediate hosts for flatworms that parasitize humans. Schistosomiasis is a disease caused by minute blood flukes (*schistosomes*). Both snails and flukes are most common in areas where fields are irrigated. *Schistosomes* also parasitize birds and mammals. A skin rash called swimmer's itch results from bird schistosomes trying, only partly successfully, to penetrate human skin. They die in the upper skin layers, and their decomposition causes local infection. Other health problems are caused by several snails and slugs (e.g., *Bradybaena, Angustipes, and Veronicella*) that serve as intermediate hosts for the rat lungworm. If an infected land snail or slug is inadvertently chopped up in a salad and eaten, the worm can migrate to the brain and encyst, causing moderate to severe damage.

Most gastropods, however, are useful to humans in that they help decompose dead plants and animals into substances that can be used by plants to manufacture new organic compounds. Kavaratti is a well-known for its pristine white sand beaches and calm lagoons, which makes it a popular tourist destination and Kollam is a coastal hamlet the economy of which mainly resides in the fishery sector- the source of

livelihood for the fishing communities. The coast is unexplored as far as benthos is concerned. The present study explores the gastropod assemblages along the inter-tidal region of the coast. As benthos is key indicators of pollution and stress, the study will pave the way for Environmental Risk Assessment and monitoring of coastal waters of Kollam.

OBJECTIVES

- To provide basic information on the gastropods diversity along the intertidal region of Kavaratti coast, Lakshadweep, and Kollam.
- To provide information on the gastropod diversity along the intertidal coast of Kavaratti and Kollam.
- To analyse the commercial value/ importance of these gastropods in trade.
- To analyse / identify the ecological indicators.
- To analyse present status of IUCN Red Data List of the identified species
- Create awareness for Environmental Risk Assessment and monitoring of the coastal waters.

SIGNIFICANCE

- Gastropods are well-known animals which have been associated with humans since the dawn of civilization. Their bodies were gathered for food and their shells were used as tools, ornaments, and later as money. Their widespread occurrence is clear evidence of their successful adaptation to different environments.
- Most gastropods, however, are useful to humans in that they help decompose dead plants and animals into substances that can be used by plants to manufacture new organic compounds. In both field and forest, as in ponds, rivers, and oceans, gastropods are an important part of the decomposer community, and some are significant predators.
- Many gastropods, bivalves, and cephalopods are a source of food for many cultures and therefore play an important role in the fishing industries of many countries. In addition to their economic value as food, mollusks are also used to make jewelry the most notable and valuable example of which is pearl jewelry.

REVIEW OF LITERATURE

K.P. Philip (1970) carried out studies of the intertidal fauna of the sandy beaches of Cochin and presented the results of his preliminary observations. Environmental factors such as wave action, grain size, temperature and salinity were studied. He found that salinity varies considerably owing to the heavy rainfall during the southwest monsoon. Major components of the fauna, constituted by the bivalves *Donax spiculum* and *Donax incarnates* and the sand crab *Emerita asiatica* occupy mid-tide and low-tide levels. The pattern of distribution and the seasonal abundance of different intertidal species were studied.

Qualitative and quantitative study of the benthic fauna, sediment characteristics and organic matter content were studied along southwest and southeast coast of India by Sarala Devi *et al.* 1999. It was found that number of species varied with stations and with depths. Population density was very low in the southeast coast as compared to the southwest coast. Polychaetes formed the dominant group. Molluscs were more common along the southeast coast. Five types of substratum were noticed from different stations along southwest coast and organic matter was high in silty clay substratum (3.15%) whereas in sandy substratum this varied between 0.07 and 1.38 percent. Rich benthic fauna in the nearshore region having riverine influence is mainly due to the influx of nutrient rich river water (Parulekr and Dwivedi, 1974).

A study was carried out by Wilber *et al.* (1998) on the effects of dredged material disposal on benthic macroinvertebrates in Galveston Bay, Texas, USA. There was no evidence that dredged material disposal had a detrimental impact on the benthic production. In fact, disposal sites yielded both the highest production estimates and species richness in both the upper and lower bay area two years after disposal. It was found that variation in animal benthic production estimates was 2 or 3 times greater

than the variation in consumption estimates. Macro benthic organisms are not consumed in direct proportion to their abundance or biomass in benthic habitats (Virnstein, 1977).

An attempt has been made to infer the impact of extreme flooding events and anthropogenic stresses on macrobenthic communities Cardoso *et al.* 2007. Interaction between extreme weather events and anthropogenic stressors on the dynamics of the macrobenthic assemblages and the socio-economic implications that follow were explored. The intensification of extreme flooding events had significant effects on the structure and functioning of macrobenthic communities, specifically a decline in total biomass, a decline in species richness and a decline in suspension feeders were observed.

Episodic events such as extreme rain events and flooding can result in the catastrophic deposition of fine segments with profound influences on the structure and function of macrobenthic communities (Norkko *et al*., 2002). Vijayakumar *et al*. (1991) studied the quantitative distribution of macro and meiofauna from Kakinada bay and backwaters. Polychaetes and crustaceans constituted the bulk of macro fauna in the backwaters while Polychaetes and molluscs were found in the nearshore bottom deposits. Nematodes, polychaetes, foraminiferans and turbellarians were the major groups constituting the bulk of meiofauna both in the backwaters and nearshore regions. Macro faunal diversity was higher in the nearshore regions. Impoverishment of fauna in the backwaters was related to lowering in salinity and poor oxygenation. The salinity act as a limiting factor in the distribution of living organism and its variations caused by distribution and evaporation influences the fauna most likely in the intertidal zone (Gypson 1982)

Biodiversity and seasonal variation of macrobenthic infaunal community in the inshore waters of the Parangipettai coast was studied by Sourav, *et al*., 2009. They revealed the

occurrence of 132 species representing 5 diverse groups. Polychaetes were the dominant group (45%), followed by bivalves (31%) and gastropods (16%).

Mehrniz *et al.* (2012) under took a study to survey the impacts of bottom trawling on distribution and diversity of gastropods of the Bahrakan Fishing Area (BFA) of the northwestern coast of the Persian Gulf. Biomass and gastropods declined after trawling and no recovery occurred after 3 months. Impacts of trawling were higher in shallow areas than that in deeper areas. The study suggested that gastropod population were removed by passing of trawl and was similar to the result reported by Morton (1996).

Feldstein *et al.* (2003) suggested that due to the economic and ecological importance as well as sedentary life, molluscs have been assumed as an important organism in monitoring contaminants in different ecosystems. Bivalves and gastropod molluscs are among the most useful organism for environmental monitoring (Boening, 1999). Fresh water molluscs especially gastropods are important from the medical and veterinary public health point of view. About 100 species of freshwater gastropods are reported acting as intermediate host in the diagnostic trematode parasites and among prosobranchs members of the family Pilidae and Thiridae were recorded as harbourers of larval trematodes (Subba Rao, 1993)

Udhayanadha and Munsinghe (2009) proposed that none of the physiochemical parameters are responsible for the distribution of molluscs, faunal species. However, it indicates that the contents of the substrate make a favorable contribution on the distribution pattern with a high abundance of faunal species recorded from the substrate with fine sand, silt, and clay.

Shivadas, *et al.*, 2011 studied the ecological aspect and the potential threats to an intertidal gastropod, *Umbonium vestairium.* The study suggested that based on the size frequency, it may be considering that *U. vestairium* like other tropical fauna recruit during monsoon.11 different colour patterns of *U. vestairium* were observed. The

fastidious nature and the sporadic distribution of *U. vestiarium* make them vulnerable to natural and anthropogenic disturbances. Changes in the timing or intensity of monsoon may directly affect the reproduction and associated dispersal of benthic community (Pezrlawski, 2008).

Wei *et al.*, (2016) conducted a study related to macrobenthos in the central Arabian Gulf, characterized by extreme climatic variations in the region. It was found that variability in climates revealed low abundance, biomass and high turnover of species, resulting in insufficient primary production due to global warming.

Seth *et al.*, (2016) assessed the comparison between water masses, macronutrients and phytoplankton in the northern Bering and Chukchi Seas. Their observations revealed that biological ramifications restructured the shelf flows and varying nutrient fluxes; potentially predominant for primary production, secondary production, heat, and pelagic production.

Kenneth *et al.*, (2017) analysed the macrobenthic groups in Deep Bay, northwest Hong Kong and found drastic transformations at three polluted sites namely Victoria harbor, Tolo harbor and Deep Bay. The results also revealed a connection between the macrobenthos and its polluted zone with a reduction in nutrients in the eastern area of Victoria Harbour, which was the main reason for non-recuperation of benthic groups.

Salim *et al*., (2017) carried out a case study based on gastropod landing, utilization, and trade in Kollam, India. Their study revealed that molluscan production in India was comparatively insignificant in earlier times, it increased due to the demand for edible as well as ornamental gastropods from around the globe coupled with their importance in generating additional income as a bycatch. The Sakthikulangara and Neendakara landing centres of the Kollam district of Kerala ranks among the major gastropod landing centres along the west coast of India. Based on the cost and earnings analyzed from the primary data collected from Sakthikulangara and Neendakara area, various productivity ratios are analyzed which indicates that the fishing for gastropods

registered a shift in operations from harvesting as a by-catch resource to targeted fishing. The study reveals the scope of gastropod fishery in Kerala as well as the lack of shell craft industry in the state. Also, the reduced availability of gastropods due to the extensive exploitation is investigated.

Klein *etal*., (2019) carried out a study on Multi-omics investigations within the Phylum Mollusca, Class Gastropoda: from ecological application to breakthrough phylogenomic studies, summarizing the current design of useful data integrating tools and strategies for comparative omics studies in the future. Additionally, they discuss the future of omics applications in aquaculture, natural pharmaceutical biodiscovery and pest management, as well as to monitor the impact of environmental stressors.

A review and a meta-analysis on what can aquatic gastropods tell us about phenotypic plasticity was carried out by Bourdeau *et al*., (2019). They discussed the role of costs and limits of phenotypic plasticity and environmental heterogeneity as important constraints on the evolution of plasticity. They also consider potential publication biases and discuss areas for future research, indicating well-studied areas and important knowledge gaps.

MATERIALS AND METHODS

Study Sites

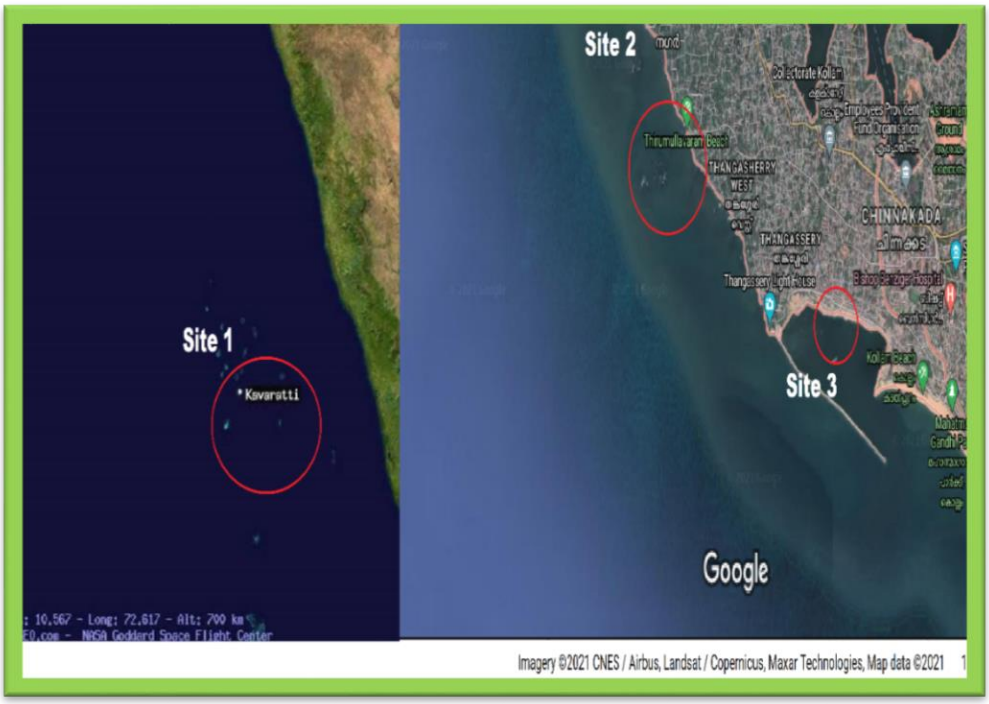

Fig 1 Google earth map showing study sites

Site I: Kavaratti

Lakshadweep is a group of islands in the Arabian sea, 200 to 440 km off the southwestern coast of India. The archipelago is administered as a union territory and district of India. They were also known as the Laccadive Islands, although geographically this is only the name of the central subgroup of the group. Kavaratti serves as the capital of the Union Territory and the region comes under the authority of Kerala High Court. The islands are the northernmost of the Lakshadweep Maldives Chagos group of islands, which are the tops of a vast undersea mountain range, the Chagos-Lakshadweep Ridge (Ashalatha,1991). The Lakshadweep consisted of 36 islands. But currently there are 35 islands, as the Parali island submerged in water due to sea erosion (PTI, 2017).

Fig 2 Site I: Kavaratti

Site II: Thirumullavaram

Site II: Thirumullavaram is a part of Kollam. It is situated 6 km north of the city of Kollam. The beach is very famous for conducting the Karkidaka Vavubali rituals. Thousands of devotees arrive on the beach to perform the Vavubali Tharpanam every year. It is one of the most attractive beaches located in South India. Thirumullavaram beach is one of the 16 best-kept beaches in India, topper from the state of Kerala of India (CMRFRI,2018).

Fig 4 Site II: Thirumullavaram beach

Site III: Kollam Harbour

Kollam Port is one of the historic ports situated 4 kilometres away from downtown Kollam,14km north of Paravur and 24 km north of Varkala Town. It is the second largest port in Kerala by volume of cargo handled and facilities. Located on the south-west coast of India, under the name of Quilon Port it became one of the country's most important trade hubs from the ninth to the seventeenth centuries. Kollam was one the five Indian ports visited by Ibn Battuta (Dunn, 2010; Deccan Chronicle,2017).

Fig 5 Site III: Kollam Port

Duration of the study

Sampling was carried out during the months of January and February, 2021.

Survey and Collection

The study site was covered completely on foot and all the gastropod shells were handpicked from the inter-tidal region. This protocol was repeated twice a month both in the morning and evening (Plate- I).

Laboratory Analysis

a) Sorting:

The handpicked samples from the site were brought to the laboratory in polythene bags, transferred to a large, white-bottomed tray, and the animals were hand sorted. After this preliminary examination, the whole sample was treated with 5% buffered formalin and kept for further analysis (Plate II).

Large samples are then subdivided into sub-samples (live and worn out ones) of roughly equal size that could be sorted more comfortably. The sub samples were placed in different jars with preserving solution and were labelled properly. Fine sorting was performed under a dissection microscope.

b) Analysis of fauna:

Digital images were taken for each of the samples. The preserved fauna was identified to major taxonomic groups using appropriate keys (Fauvel, 1996, Olomukoro 1996; FOA 1998; Shanks 2001; Rao 2000; Modayil 2007; Venkataraman and Sivaperuman, 2014) and standard taxonomic references along with available expertise) (Plate- III).

RESULTS

A total of 62 species of Gastropods were obtained from the study sites (Table 1 and Plates I - XV). Numerical abundance was recorded maximum at site I (67%) followed by site II (19%) and site III (14%).

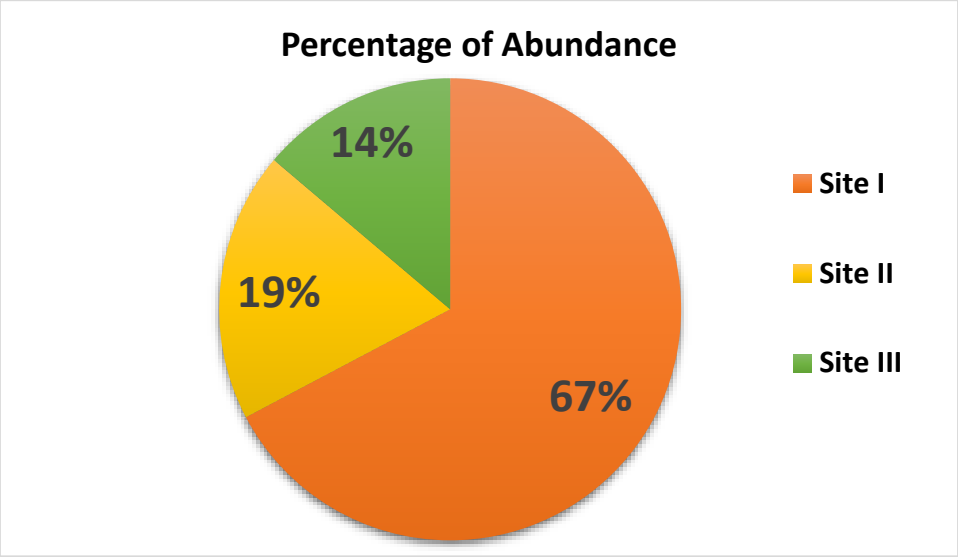

Fig 6: Percentage of Numerical abundance of Gastropods along study sites

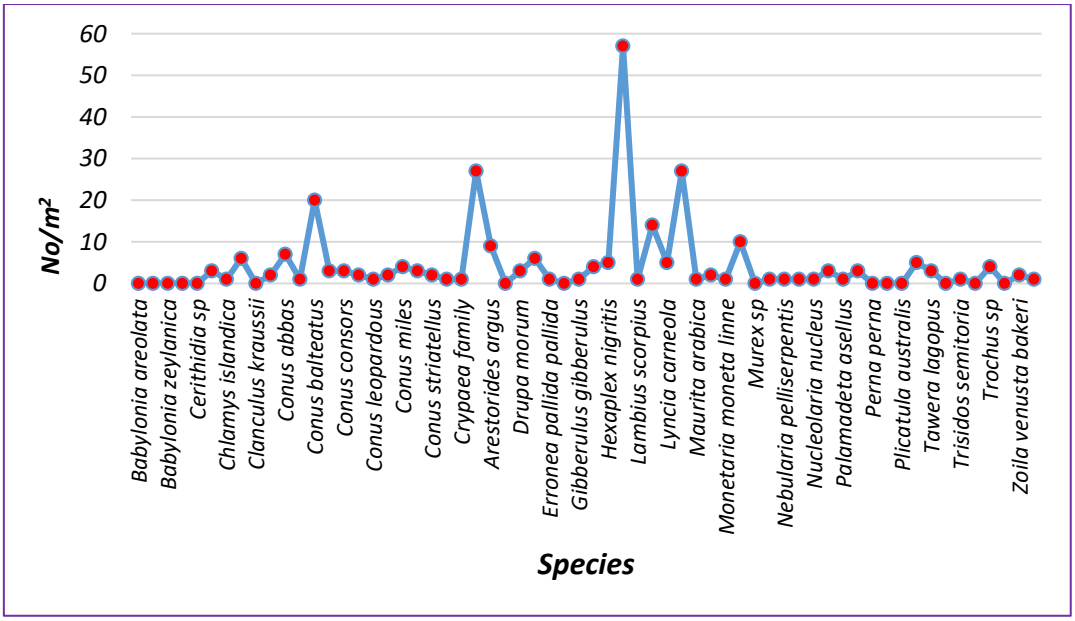

Fig 7 Gastropod diversity along Site 1

Among Gastropods, *Inquisitor isabella* belonging to the family Pseudomelatomidae is one of the common predatory sea snails, was numerically abundant at site I whereas the least abundant species were *Chlamys islandica, Conus aulicus, C.leopardous, Conus tessulatus, Crypaea family, Donacilla cornea, Gibberulus gibberulus, Lambius Scorpius, Nebularia chrysostomia N. pelliserpentis, Nerita albicilla, Palamadeta asellus, Trisidos semitoria Nucleolaria nucleusErronea pallida pallida, Zoila venusta venusta* and *Maurita arabica etc.,*

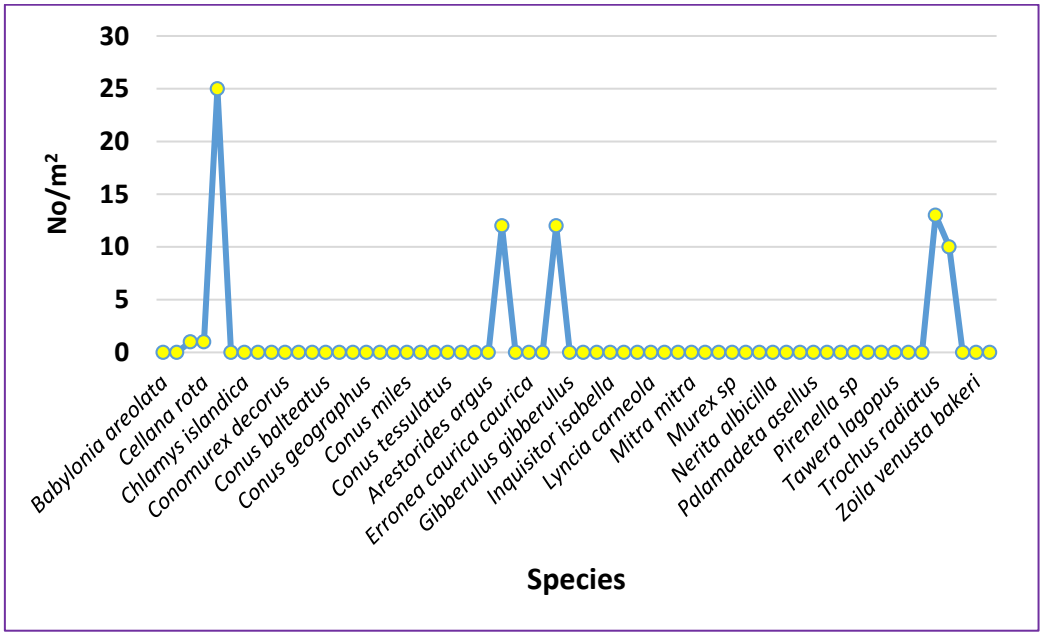

Fig 8 Gastropod diversity along Site 2

At site II, the dominant species were *cerithidia* sp and the least abundant species were *Babylonia spirata, Bufonaria sp, Cellana rota, Donax sp, Pirenella sp* and *Polinices mammilla.*

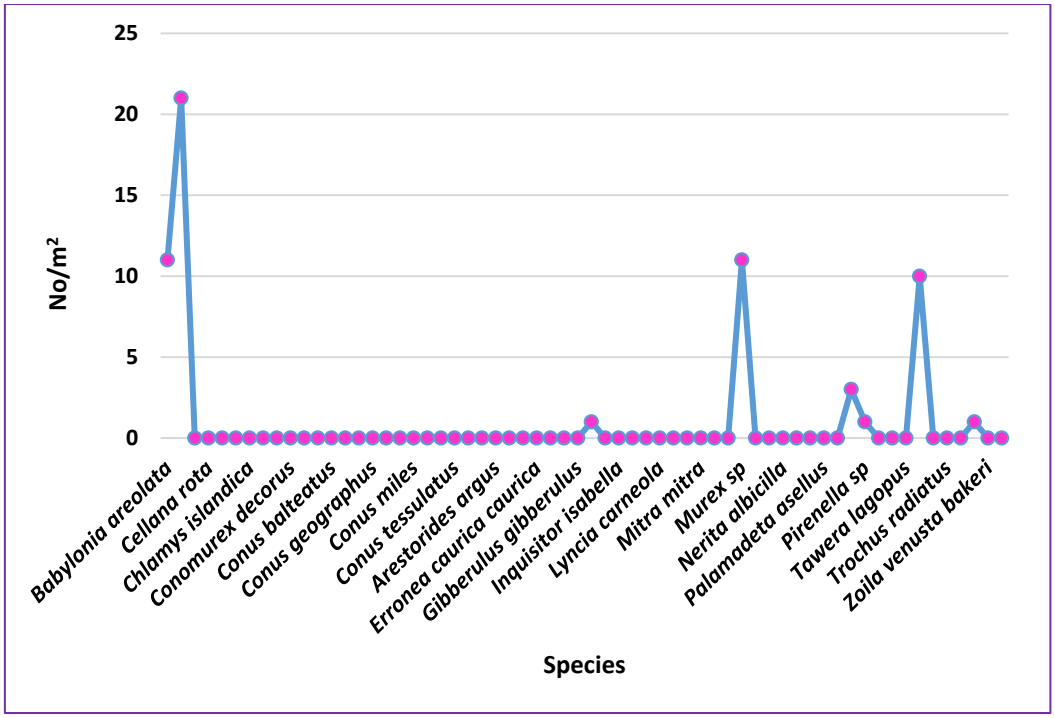

Fig 9 Gastropod diversity along Site 3

At site III, the numerically abundant species were *Babylonia japonica* whereas the least abundant species are *Gibbula* sp, *Pirenella* sp, and *Turritella communis.*

The systematic positon and their habitat, ecology and distribution are recorded in the following.

1. *Babylonia areolata (Link, 1807)*

Systematic Position

Kingdom: Animalia
Phylum: Mollusca
Class: Gastropoda
Family: Buccinidae
Genus: Babylonia

Diagnostic characters: Shell rather thin but solid, elongate- ovate in shape, with a high spire. Whorls convex, distinctly shouldered below the sutures. Outer surface smooth and polished, under the prominent, velvety periostracum. Aperture large and ovate, somewhat pointed at posterior end, with a broadly open and short siphonal canal anteriorly. Outer lip rather thin, inner lip more or less thickened and calloused. Umbilicus deeply perforated, surrounded by a well- marked siphonal ridge. Operculum large and thick, with its nucleus near the anterior end.

Colour: Outside of shell white, with 3 spiral rows of large, squarish brown spots on body whorl, one row of such spots on spire whorls. Periostracum brownish. Inner side of the aperture purplish white, with the outer colour pattern showing through.
Size: Maximum shell length 6.5cm, commonly to 5cm.

Habitat, biology, and fisheries: On sand and mud bottoms. Sub littoral, mainly between depths of 10 and 20m. An economically important species in Thailand.

Distribution: Eastern part of the Indian Ocean, from the Andaman Sea to Indonesia; north to Taiwan province of China and south to southern Indonesia.

2. *Babylonia japonica*

Systematic Position

Kingdom : Animalia
Phylum : Mollusca
Class : Gastropoda
Family : Babyloniidae
Genus : Babylonia
Species : B. japonica

Description:- Babylonia japonica, common name the Japanese Babylon, is a species of sea snail, a marine gastropod mollusk in the family Babyloniidae (WORMS,2015). This marine species occurs off Korea, Japan and Taiwan. The length of the shell varies between 40 mm and 85 mm.

3. *Babylonia zeylanica*

Systematic Position

Kingdom : Animalia
Phylum : Mollusca
Class : Gastropoda
Family : Babyloniidae
Genus : Babylonia
Species : B. zeylanica

Description:- Shell large upto 70mm in height, fusiform, less solid and with less inflated whorls, body whorl narrower than in Babylonia spirata, sutures not canaliculated, spire high ending in dark purple apex. Aperture dark, outer lip sharp and smooth, but not flexed at top, columella smooth with heavy broad callus posteriorly but narrow anteriorly, a strong parietal ridge almost close to the outer lip, umbilicus broadly open with a row of teeth on the outer margin, fasciole with aridge on the inner edge, anterior canal broad and deep, posterior canal not distinctsurface smooth, colour white with large brown blotches.

Threats:- Not reported

Remark:- The species is caught as a bycatch in shrimp trawlers at Shakthikulangara and Neendakara area. The meat and operculum of the species is commercially important. The species has been reported from coast of Kerala by Kurian (1953); Babu Philip and Appukuttan (1995); Rao (2003); Bijukumar (2012); and Franklin and Laladhas (2014).

Habitat:- Sandy, coastal

4. *Cellana rota*

Systematic Position

Kingdom : Animalia
Phylum : Mollusca
Class : Gastropoda
Family : Nacellidae
Genus : Cellana
Species : C. rota

Cellana rota is a species of true limpet, a marine gastropod mollusc in the family Nacellidae, one of the families of true limpets

Diagnostic characters: Shell semi-translucent, rather thin, moderately elevated, with a variable shape. Outline rounded to elongate-ovate, sometimes broadly undulated. Apex subcentral or slightly anterior. External sculpture of numerous and generally unequal radial riblets, often underlain by distinct, broad
radial folds. Interior smooth. Colour: shell coloration highly variable. Exterior basically cream or yellowish, with radial patterns of brown. Margin of the aperture often with alternating white and brown blotches. Interior with a silvery glaze, mainly whitish with a brown to orange apical region, sometimes centrally suffused with white.

Size: Maximum shell length 5 cm, commonly to 3.5 cm.

Habitat, biology, and fisheries: Common on rocky shores exposed to wave action, from mid-intertidal zone to shallow subtidal levels. Collected for food by villagers from the Southeast Asian area to eastern Polynesia.

Distribution: Widespread in the Indo-West Pacific, from Madagascar to eastern Polynesia; north to southern Japan and south to Queensland and New Caledonia.

5. *Cerithidea*

Systematic Position

Kingdom : Animalia
Phylum : Mollusca
Class : Gastropoda
Family : Potamididae
Genus : Cerithidea

Cerithidea is a genus of medium-sized sea snails or mud snails, marine gastropod mollusks in the family Potamididae, the horn snails(WORMS,2020). There used to be three subgenera (Houbrick, 1984) in the genus Cerithidea: subgenus Cerithea, subgenus Cerithideopsis and subgenus Cerithideopsilla. These have been brought to the status of genus.

6. *Cardita* sp

Systematic Position

Kingdom : Animalia
Phylum : Mollusca
Class : Bivalvia
Order : Carditida
Family : Carditidae
Genus : Cardita Bruguière, 1792

Cardita is a genus of marine bivalve molluscs in the family Carditidae. Especially in the early 19th century, this genus was often confused with the Carditid genus Cardites. Cardita was originally established by J.G. Bruguière in 1792. However, in 1801 Jean-Baptiste Lamarck described it under the name Cardites. J.H.F. Link subsequently described a new genus using the name Cardites in 1807. When this homonymy was realised, Megerle in 1811 re-described Link's genus Cardites as Cardita. Megerle's action resulted in four technically valid names which formed two

mutual pairs of homonyms. The matter was ultimately resolved by starting with the oldest name – that of Bruguière – and applying it as intended, and suppressing Lamarck's name so that Link's junior homonym could be used for Cardites.

In addition to the numerous junior synonyms, Byssomera – a junior synonym or subgenus of Carditamera – has sometimes been written as a subgenus of Cardita, due to its type species having been synonymised from Cardita (Byssomera) affinis to Carditamera (Byssomera) affinis (USGSPP, 1992; Olsson and Axel, 1961).

7. *Chlamys islandica*

Systematic Position

Kingdom:Animalia
Phylum:Mollusca
Class:Bivalvia
Order:Pectinida
Family:Pectinidae
Genus:Chlamys
Species:C. islandica

The Iceland scallop, is a species of bivalve mollusc in the family Pectinidae. This North Atlantic scallop attaches itself to hard surfaces such as rocks and can be found from the intertidal zone to a depth of 200 m (660 ft).

Habitat:

In the northwest, it ranges from Greenland to Massachusetts and in the northeast from Norway and Iceland to the Faroes. Its shell can be found further south, including the British Isles, as subfossil remains. It is highly variable in colour and can reach a size of 14 cm (5.5 in).

Uses:

Chlamys has a high commercial fishing value. There is a large European market, especially in the United Kingdom and Spain.

8. Clanculus criuatus

Systematic Position

Phylum:Mollusca
Class:Gastropoda
Order:Trochida
Family:Trochidae
Genus:Clanculus
Species:C. cruciatus

Clanculus cruciatus is a species of sea snail, a marine gastropod mollusk in the family Trochidae, the top snails.

9. Clanculus kraussii

Systematic Position

Phylum:Mollusca
Class:Gastropoda
Order:Trochida
Family:Trochidae
Genus:Clanculus
Species:kraussii

The size of the shell varies between 9 mm and 23 mm. The umbilicate, moderately thick shell has a conoid shape. The five convex whorls are separated by canaliculate sutures. The first whorls are eroded, whitish, the rest roseus, cinereous or brownish, ornamented with a few radiating white streaks. They are spirally granose-lirate with 6 finely beaded lirae on the penultimate whorl, the fifth larger, more prominent, simulating a carina. The body whorl is angulate, plano-convex beneath and concentrically cingulate. The about 7 cinguli are

granose with the interstices sometimes bearing concentric lirulae. The aperture is rhomboidal. The lip within is thickened and sulcate. The basal margin is crenulate. The columella is tuberculose, above twisted plicate, below obsoletely truncate. The white umbilical area is spirally plicate with a crenulate margin. The thin parietal callus is wrinkled.

10. *Conomurex decorus*

Systematic Position

Phylum:Mollusca
Class:Gastropoda
Order:Littorinimorpha
Family:Strombidae
Genus:Conomurex
Species:C. decorus

Conomurex decorus, common name: the Mauritian Conch, is a species of sea snail, a marine gastropod mollusk in the family Strombidae, the true conchs. The shell size varies between 35 mm and 80 mm.

Distribution

Mediterranean Sea, Red Sea, Indian Ocean along Aldabra Atoll, the Mascarene Basin, Mauritius and Tanzania, Pacific Ocean along Singapore.

11. Conus abbas

Systematic Position

Kingdom : Animalia
Phylum : Mollusca
Class : Gastropoda
Order : Neogastropoda
Family : Conidae
Genus : Conus
Species : C. abbas

Conus abbas, common name the abbas cone, is a species of sea snail, a marine gastropod mollusk in the family Conidae, the cone snails and their allies (Bruguière, 1792). Like all species within the genus Conus, these snails are predatory and venomous. They are capable of "stinging" humans, therefore live ones should be handled carefully.

Description

The shell of this species is white, very finely reticulated with narrow orange-brown lines, with a broad central and often narrower upper and lower bands of darker color bearing occasional longitudinal chocolate stripes (Tryon, 1884). The height of the shell is from 1.5 inches (38 mm) to 2.5 inches (64 mm) (Tryon, 1884). The shell is very similar to that of Conus textile, but the shell is smaller, the reticulations much smaller, the longitudinal streaks rarely apparent, and the dark bands of Conus abbas occupy about the same positions as the lightest markings of Conus textile (Tryon, 1884).

Distribution

Conus abbas has a disjunct distribution (Bruguière, 1792). Distribution after Tryon (1884): East Africa, Ceylon, Philippines, New Caledonia (Tryon, 1884). Distribution after Conus Biodiversity website: from South India and Sri Lanka to Java and Bali in Indonesia (Bruguière, 1792). Madagascar (Tryon, 1884).

Ecology

Like all species within the genus Conus, these snails are predatory and venomous. They are capable of "stinging" humans, therefore live ones should be handled carefully or not at all.

12. Conus aulicus

Systematic Position

Phylum:Mollusca
Class:Gastropoda
Order:Neogastropoda
Family:Conidae
Genus:Conus
Species:C. aulicus

Conus aulicus, common name the princely cone, is a species of a predatory sea snail, a marine gastropod mollusk in the family Conidae, the cone snails, cone shells or cones. The size of an adult shell varies between 65 mm and 163 mm. The shell is rather narrow and has an elevated spire. The color of the shell is chocolate-brown, covered by elevated close revolving lines of darker color. The surface is irregularly overlaid by subtriangular white spots, some of which are very large. The operculum is a very minute square on the dorsal surface of the hinder part of the foot. The proboscis of *Conus aulicus* is varied with red and white.

Distribution

This marine species occurs in the Indian Ocean off (Bouchet, 2015) and Mauritius (Bouchet, 2015) in the Indo-Pacific Region (excl. Hawaii).

13. Conus balteatus

Systematic Position

Phylum:Mollusca

Class:Gastropoda

Order:Neogastropoda

Family:Conidae

Genus:Conus

Species:C. balteatus

The size of an adult shell varies between 13 mm and 33 mm. The shell is olive-brown or brown violaceous, with a more or less irregular white band below the middle, and another one below the tuberculate spire. The interior of the aperture is tinged with violet. The basic color of the case is white, sometimes bluish-purple. A colored band with various shades from brown to brownish-red or olive-colored runs around the perimeter of the body on both sides of the middle. There are specimens with separate colored bands and with bands in the basic color in the middle, on the shoulder and at the base, as well as those in which only the tubercles on the shoulder are partially in the basic color.

Distribution and habitat

This species occurs in the Indian Ocean off the Mascarene Basin and in the Western Pacific Ocean (New Caledonia, Vanuatu, Papua New Guinea). *Conus balteatus* is distributed in the Indo-Pacific , in the Indian Ocean from the coast of East Africa (Mozambique to North Somalia) via the Mascarene Mountains , Maldives to Indonesia , in the Pacific Ocean to Japan , Western Australia , Queensland , Fiji and Samoa .

Conus balteatus lives in the intertidal zone and a little below on coral reefs on rough limestone, dead coral rocks, rubble and mixtures of rubble and sand, often

hidden under coral rocks. The form cernicus occurs in the Mascarene Mountains and Somalia at sea depths of 20 to 30 m.

14. Conus bullatus

Systematic Position

Phylum: Mollusca
Class: Gastropoda
Order: Neogastropoda
Family: Conidae
Genus: Conus
Species: C. bullatus

Conus bullatus, common name the bubble cone, is a species of sea snail, a marine gastropod mollusk in the family Conidae, the cone snails and their allies (*Conus bullatus Linnaeus*, 1758). Like all species within the genus Conus, these snails are predatory and venomous. They are capable of "stinging" humans, therefore live ones should be handled carefully or not at all.

The size of an adult shell varies between 42 mm and 82 mm. The thin shell is inflated and grooved below. The color of the shell is white, clouded with orange-red and chestnut, forming two ill-defined bands, with indistinct revolving rows of white and chestnut articulations. The aperture is pink.

Habitat: This species occurs in the Indian Ocean off the Mascarene Basin and Mauritius; in the Indo-West Pacific (the Philippines, New Caledonia)**.**

Uses:

Conus, these snails are predatory and venomous. Cone-snail venom has come to interest biotechnologists and pharmacists because of its potential medicinal properties. Conopeptides are also being looked at as anti-epileptic agents and to

help stop nerve-cell death after a stroke or head injury. Conopeptides also have potential in helping against spasms due to spinal cord injuries, and may be helpful in diagnosing and treating small cell carcinomas in the lung.

15. *Conus consors*

Systematic Position

Phylum:Mollusca
Class:Gastropoda
Order:Neogastropoda
Family:Conidae
Genus:Conus
Species:C. consors

Conus consors, common name the singed cone, is a species of sea snail, a marine gastropod mollusk in the family Conidae, the cone snails and their allies (Sowerby II, 1833).

Like all species within the genus Conus, these snails are predatory and venomous. They are capable of "stinging" humans, therefore live ones should be handled carefully or not at all.

The size of an adult shell varies between 33 mm and 118 mm. The depressed spire is conical, with a shallow channel and revolving striae, sometimes tessellated with chestnut. The body whorl is rather narrow, somewhat convex, grooved towards the base, somewhat round-shouldered, rather thin. The color of the shell is white, yellowish, and orange-brown, variously clouded and indistinctly banded. The aperture is white.

This marine species occurs in the Indo-West Pacific Region to the Marshall Islands, in Melanesia and off Queensland, Australia.

16. Conus geographus

Systematic Position

Phylum:Mollusca
Class:Gastropoda
Order:Neogastropoda
Family:Conidae
Genus:Conus
Species:C. geographus

Conus geographus, popularly called the geography cone or the geographer cone, is a species of predatory cone snail. It lives in reefs of the tropical Indo-Pacific, and hunts small fish. Although all cone snails hunt and kill prey using venom, the venom of this species is potent enough to kill humans (WoRMS (2010). Specimens should be handled with extreme caution. The ground color of the shell is pink or violaceous white, occasionally reddish. It has a mottled appearance, clouded and coarsely reticulated with chestnut or chocolate, usually forming two very irregular bands. This intricately brown-and-white pattern is highly prized by shell collectors (NGSR,2009).

Distribution

Geography cones are common. They occur in the Red Sea, in the Indian Ocean off Chagos, Réunion, Madagascar, Mauritius, Mozambique and Tanzania. They are indigenous to the reefs of the Indo-Pacific region, except for Hawaii (NGSR,2009) and off Australia (the Northern Territory, Queensland, Western Australia).

16. *Conus leopardus*

Systematic Position

Phylum:Mollusca

Class:Gastropoda

Order:Neogastropoda

Family:Conidae

Genus:Conus

Species:C. leopardus

Conus leopardus, common name the leopard cone, is a species of a predatory sea snail, a marine gastropod mollusk in the family Conidae, the cone snails, cone shells or cones. Like all species within the genus Conus, these snails are predatory and venomous. They are capable of "stinging" humans, therefore live ones should be handled carefully or not at all (WORMS,2010).

Description

The size of an adult shell varies between 50 mm and 222 mm. This section needs expansion. You can help by adding to it. (July 2011) shell of Conus leopardus.This marine species occurs in the Indian Ocean off Aldabra, Chagos, Madagascar, the Mascarene basin, Mauritius and Tanzania; in the entire Indo-Pacific Region; off Australia (Northern Territory, Queensland, Western Australia).

17. Conus miles

Systematic Position

Phylum:Mollusca
Class:Gastropoda
Order:Neogastropoda
Superfamily:Conoidea
Family:Conidae
Genus:Conus
Species:C. miles

The size of an adult shell varies between 50 mm and 136 mm. The spire is obsoletely tuberculate or smooth and rather depressed. The thick shell has nodular shoulders of whorls (Linnaeus, 1758). The body whorl is bordered by a broad shoulder and is spirally ridged at the base. The color of the thick shell is yellowish white or pale orange, with close narrow, wavy, thread-like longitudinal chestnut striations, interrupted by a chocolate, fairly narrow, revolving band above the middle. The base is stained chocolate, bordered upwards by progressively lighter bands. The aperture is banded, chocolate and white.

Distribution

This cone snail is found in Aldabra, Chagos, Madagascar, Mascarene Basin, Mauritius, Mozambique, the Red Sea and Tanzania and in the entire Indo-Pacific; off Australia. Like all species within the genus Conus, these snails are predatory and venomous. They are capable of "stinging" humans, therefore live ones should be handled carefully or not at all.

18. *Conus striatellus*

Systematic Position

Phylum:Mollusca
Class:Gastropoda
Order:Neogastropoda
Family:Conidae
Genus:Conus
Species:striatellus

Distribution

This species occurs in the Red Sea, in the Indian Ocean off Tanzania, Madagascar, Aldabra; in the Indo-Western Pacific; off Indo-China, Indo-Malaysia, New Caledonia, Fiji, Vanuatu and Australia (Western Australia).

19. Conus tessulatus (Born, 1778)

Systematic Position

Kingdom : Animalia
Phylum : Mollusca
Class : Gastropoda
Family : Conidae
Genus : Conus

Maximum shell length 6.5 cm, commonly to 5 cm. Found in coral reef areas, muddy sand and gravel flats of sheltered environments. Intertidal and sub littoral zones, to a depth of about 20m. Locally used as food. Widespread in the Indo-West Pacific, from East Africa to eastern Polynesia; north to Japan and south to Queensland and New Caledonia; also occurring in the tropical eastern Pacific, on the offshore islands and mainland from Mexico to Costa Rica.

20. Cypraea tigris

Systematic Position

Kingdom: *Animalia*
Phylum: *Mollusca*
Class: Gastropoda
Family: *Cypraeidae*
Subfamily: *Cypraeinae*
Genus: *Cypraea*
Species: *C. tigris*

Cypraea tigris, commonly known as the tiger cowrie, is a species of cowry, a large sea snail, a marine gastropod mollusk in the family Cypraeidae, the cowries.

Description

As is the case in most cowries, the subadult shell of Cypraea tigris has a different color pattern. The apex of the shell is a barely visible tubercule at the top right of the shell . Roughly egg-shaped and dextral, the glossy shell is large and heavy for a cowry. It measures up to 15 cm (6 in) in length, and the upper or dorsal side is white, pale bluish-white, or buff, densely covered with dark brown or blackish barely circular spots. Akin to many other Cypraea snails, the shells surface is notably effulgent, as if it were deliberately polished. There is sometimes a blurred red line along the length of the shell at the midline on the dorsal surface. The lower margins are rounded (that is, there is no sharp margin between the upper and lower surfaces of the shell as is found in some other cowries). The ventral side is white or whitish, and the shell opening is lined with tooth-like serrations (Poutiers, 1998). As is the case in almost all cypraeids, two lateral extensions of the mantle are able to extend so as to cover the shell completely, meeting at the midline of the dorsal surface. The mantle can also withdraw into the shell opening when threatened. In this species, the exterior surface of the mantle has numerous pin-like projections that are white-tipped.

Distribution and habitat

The tiger cowrie is found on the ocean floor in the Indo-Pacific region, from the eastern coast of Africa to the waters of Micronesia and Polynesia, the Coral Sea and around the Philippines. Along the Australian Coast it is found from northern New South Wales to northern Western Australia, as well as Lord Howe Island, and along the east coast of

Africa including Madagascar (Poutiers, 1998). Found between depths of 10 and 40 metres (35–130 ft), it is often associated with live coral colonies, such as the table-forming Acropora, either found on the reefs themselves or the sandy sea bottom nearby(Poutiers, 1998). Once common, it is now much less abundant due to shell collecting and the destruction of its habitat by such processes as dynamite fishing, especially in shallower areas (Poutiers, 1998). Carnivorous, the adult tiger cowrie eats coral and various invertebrates, while juveniles eat algae. This species is endangered in Singapore (Singapore Red Data Book, 2008).

Diet

The Hawaiian subspecies C. t. schilderiana naturally predates on invasive sponges. Sponge species included Dysidea spp., Mycale parishii, M. grandis, Haliclona caerulea, Halichondria coerulea, Cladocroce burapha, and Gelliodes wilsoni. (Compounds in Monanchora clathrata acted as a repellent and so C. t. schilderiana avoided them.) Thus C. t. schilderiana was found to be controlling invasive populations. This shows the importance of C. t. schilderiana in maintaining the normal variety of life in Hawaiian marine habitats by constraining invasive species in Hawaii (Vicente et al, 2020).

Human use

A decorative carving or cameo cut into the shell of a Cypraea tigris. Despite the fact that this species does not occur in the Mediterranean Sea, shells of the tiger cowrie and the related panther cowrie, *Cypraea pantherina*, have been unearthed at Pompeii, the ancient Roman city near Naples, Italy, where these shells may have been used as some form of ornament (Jashemski etal., 2002). It is also conceivable that the shells were part of a natural history collection. There was an interest in natural history at the time, as exemplified by Pliny the Elder who wrote extensively about seashells in his book Natural History and who died investigating the eruption of Vesuvius. The shells of this species of cowry are still popular among shell collectors, and are also used as a decorative object, even in modern times. The shell of *Cypraea tigris* is believed to help

to facilitate childbirth: some women in Japan hold a shell of this species during childbirth.

Large cowry shells such as that of this species were used in Europe in the recent past as a frame over which sock heels were stretched for darning, i.e. instead of using a darning egg. The cowry's smooth surface allows the darning needle to be positioned under the cloth more easily than when using a darning mushroom made of wood.

21. Arestorides argus

Systematic Position

Phylum: Mollusca
Class: Gastropoda
Family: Cypraeidae
Genus: Arestorides
Species: A. argus

Arestorides argus, commonly called the **eyed cowrie**, is a species of sea snail, a cowry, a marine gastropod mollusk in the family Cypraeidae, the cowries.This is a large cowry species, with specimens averaging 80mm and measuring up to 115mm. The shape of the shell is approximately cylindrical. The ground color is light to medium tan. Overlying the ground color of the dorsum are many rings of a medium brown color and varying sizes. The rings are likened to eye spots, thus the common name eyed cowry.

Habitat:

Usually found under stones and coral slabs, or in crevices in coral reef areas. Occurs at the low tide mark

Uses:

Collected for food. Shell collected for local shell craft industries or sold for collections.

22. Clypidina notata

Systematic Position

Kingdom : Animalia
Phylum : Mollusca
Class : Gastropoda
Family : Fissurellidae
Genus : Clypidina
Species : C. notata

Clypidina notata, common name the black-ribbed false limpet, is a species of sea snail, a marine gastropod mollusk in the family Fissurellidae, the keyhole limpets

23. Drupa morum

Systematic Position
Kingdom:Animalia
Phylum:Mollusca
Class:Gastropoda
Family:Muricidae
Subfamily:Rapaninae
Genus:Drupa

Drupa morum, common name the purple drupe, is a species of sea snail, a marine gastropod mollusk in the family Muricidae, the murex snails or rock snails (Spry,1961).

Thick, globose shell, up to 5 cm, with low spire, large body whorl and flat base. Colour white with dark brown nodules. Dark violet, narrow aperture with conspicuous groups of denticles. Columella with three strong, plicate ridges.

Habitat

Habitat of Drupa morum include rocky shores (Spry,1961).and in crevices among lower eulittoral rocks.

Distribution

Drupa morum lives in the Indo-Pacific.

24. Euchelus asper

Systematic Position

Kingdom : Animalia
Phylum : Mollusca
Class : Gastropoda
Family: Chilodontaidae
Genus: Euchelus
Species: E. asper

Description : The size of the shell varies between 6 mm and 35 mm. The thick, conoidal shell is imperforate in adult specimens. Its color is dull ashen, dotted with brown, rosy, and black. The 5½-6 convex whorls are separated by profound sutures, the first one eroded, the rest rough. They are ornamented with close, granulose, unequal cinguli (the colored bands or spiral ornamentation), with two on the upper, and 3 or 4 on the body whorl more prominent. The penultimate whorl has 12-15 lirae. The globose body whorl is rounded, descending, and convex beneath. The aperture is ovate-rounded, the margins nearly continuous, plicated finely all around. The columella is arcuate. The base of the shell is dentate (Tryon, 1889).

This species is highly variable. It is also known under the form Euchelus asper quadricarinatus (Holten, H.S., 1802) (synonym: Trochus alabastrum Reeve, 1858), common name the four-keeled margarite. The size of the shell varies between 6 mm and 12 mm. It is found in the Indo-Pacific.

Distribution: This species occurs in the Indo-West Pacific.

25. Gibberulus gibberulus

Systematic Position

Kingdom:Animalia
Phylum:Mollusca
Class:Gastropoda
Order:Littorinimorpha
Family:Strombidae
Genus:Gibberulus
Species:G. gibberulus

The adult shell size varies between 30 mm and 70 mm. The smooth shell is gibbous. The spire is occasionally varicose. The body whorl is grooved at the base. The columella is smooth. The interior of the aperture is radiately striate. The shell is mottled and hieroglyphically marked with yellowish brown and white. The markings are often arranged in a few or numerous interrupted revolving bands. The aperture is tinged violaceous, scarlet or dark purplish brown (Roding, 1798).

Distribution

This species occurs in the Red Sea and in the Indian Ocean off Aldabra, Chagos, Kenya, Madagascar, Mauritius, Mozambique, the Seychelles and Tanzania; in the Pacific Ocean off Australia (Northern Territory, Queensland and Western Australia).

26. *Hexaplex nigritis*

Systematic Position

Phylum:Mollusca
Class:Gastropoda
Family:Muricidae
Subfamily:Muricinae
Genus:Hexaplex
Species: nigritus

Hexaplex nigritus, the Northern Radix or Black-and-White Murex or Black Murex, is a species of sea snail, a marine gastropod mollusc in the family Muricidae, the murex snails or rock snails. It is commonly known as the black murex shell.

Distribution

Shell of Hexaplex nigritus (Philippi, 1845), and operculum measuring 78.7 mm in height, from Concepcion Bay, in Mexico.

27. *Inquisitor isabella*

Systematic Position

Phylum: Mollusca
Class: Gastropoda
Family: Cypraeidae
Genus: Cypraea
Species: C. isabella

The shells of these very common cowries reach on average 25–35 millimetres of length, with a minimum size of 8 millimetres and a maximum size of 54 millimetres. The basic color of these cylindrical-shaped shells is light beige or fawn or pale reddish-brown, the dorsum surface is crossed by thin discontinuous longitudinal markings and the extremities show orange-red terminal spots. The base is mainly white and the long and narrow aperture has several short teeth. In the living cowries the well developed mantle is black matt and almost velvety, with external short antennae. Living cowries of this species can be encountered in a wide range of habitats, in shallow and in intertidal waters up to about 35 metres of depth. During the day they usually stay under rocks and stones or in small holes or coral caves. At dawn or dusk they start feeding on sponges, algae or coral polyps.

This species lives in the Red Sea, along the East African coast, the Mascarene Basin and in the Indo-West Pacific Ocean up to Hawaii.

28. Mitra mitra

Systematic Position

Phylum:Mollusca
Class:Gastropoda
Family:Mitridae
Genus:Mitra
Species:M. mitra

Mitra mitra, common name the episcopal miter, is a species of large predatory sea snail, a marine gastropod mollusk in the family Mitridae, the miters (Rosenberg, 2010).

The maximum shell length for this species is 18 cm, usually to 14 cm (Poutiers, 1998). Like in all Mitridae, the shell is elongate, somewhat fusiform, with a high spire. The aperture is elongate and narrow, and the outer lip is smooth and not lirate (grooved). Unlike other species of the genus Mitra, the spire is not strongly shouldered. The surface of the shell is smooth, with a few weak, spiral grooves towards the anterior end. The colour is white, with spiral rows of large irregular orange or red spots.

Distribution

Widespread in the Indo-Pacific, from East Africa, including Madagascar and the Red Sea, to eastern Polynesia. North to southern Japan, Wake Island, and Hawaii, and south to Australia.

Habitat:

This species lives in intertidal and sublittoral zones, to a depth of around 80 m.

29. Monetaria moneta

Systematic Position

Phylum : Mollusca
Class : Gastropoda
Family : Cypraeidae
Genus : Monetaria
Species : M. moneta

Monetaria moneta, common name the **money cowry**, is a species of small sea snail, a marine gastropod mollusk in the family Cypraeidae, the cowries. This species is called "money cowry" because the shells were historically widely used in many Pacific and Indian Ocean countries as shell money before coinage was in common usage

Description and characteristics

It is a quite small cowry, up to 3 cm (1.2 in), irregular and flattened, with very calloused edges and roughly subhexagonal. The color is pale (from white to dirty beige), but the dorsum seems transparent, often greenish grey with yellowish margins, with sometimes darker transverse stripes and a delicate yellow ring. The opening is wide and white, with pronounced denticules. The mantle of the live animal is mottled with black and off-white.

The shell of *Monetaria moneta* varies widely in shape and color, with some of these varieties having been described as full species. Thus, this species has numerous taxonomic synonyms

Distribution

This is a very common species which is found widely in Indo-Pacific tropical waters. It is present in numerous regions, including East and South Africa, Madagascar, the Red Sea and the Persian Gulf, Maldives, eastern Polynesia,

Galapagos, Clipperton and Cocos islands off Central America, southern Japan, Midway and Hawaii, and northern New South Wales and Lord Howe Island (Poutiers, 1998).

Habitat

This cowry lives in intertidal rocky areas and shallow tide pools among sea weed, coral remains, and empty bivalve shells (Poutiers, 1998). It can be found on and under rocks in shallow water and on exposed reefs at low tide. It feeds on algae and marine vegetation growing on loose rocks and pieces of dead coral.

uses

The shell is used in jewelry and in other decorative items such as baskets and wall hangings. Shells of this cowry were commonly used as a medium of exchange (Poutiers, 1998) in many areas of Africa, Asia and the Pacific islands until the late 19th century.

The Maldives provided the main source of cowrie shells, throughout Asia and parts of the East African coast. Huge amounts of Maldivian cowries were introduced into Africa by slave traders(Hogendorn etal., 1986). It was also traded to Native Americans by European settlers. The shell is still used in divination rituals in some African religions (Poutiers, 1998).

In the State of Kerala, in India, special money cowry shells (Kavidi(are used for divination as part of Hindu astrology, as Prashnam. For Prashnam, 108 shells of Monetaria moneta are rotated a number of times and the blessings of God and one's Guru are invoked. A portion of the Kavadis are separated and counted to find out the ruling planet at that time. The results of the Prasna horoscope (a horoscope formulated at the time of arrival of the persons) are compared with the results of the Prasnam, and the predictions are pronounced on that basis.

30. Monetaria sp

Systematic Position

Phylum:Mollusca
Class:Gastropoda
Family:Cypraeidae
Genus:Monetaria

Monetaria is a genus of sea snails, marine gastropod mollusks in the family Cypraeidae, the cowries.

31. Murex sp

Systematic Position

Kingdom:Animalia
Phylum:Mollusca
Class:Gastropoda
Order:Neogastropoda
Family:Muricidae
Genus:Murex

Murex is a genus of medium to large sized predatory tropical sea snails. These are carnivorous marine gastropod molluscs in the family Muricidae, commonly called "murexes" or "rock snails".

The common name murex is still used for many species in the family Muricidae which were originally given the Latin generic name Murex in the past, but have more recently been regrouped into different newer genera.

The word murex was used by Aristotle in reference to these kinds of snails, thus making it one of the oldest classical seashell names still in use by the scientific community.

Distribution

Murex is solely an Indo-Pacific genus, as demonstrated by Ponder & Vokes (1988). The species from the western Atlantic that were formerly considered to belong to the genus Murex are now placed in the genus Haustellum.

Habitat

Most Murex species live in the intertidal or shallow subtidal zone, among rocks and corals.

Use

Costly and labor-intensive dyes Tyrian purple (or royal purple) and tekhelet were historically made by the ancient Phoenicians using mucus from the hypobranchial gland of two species commonly referred to as "murex", Murex brandaris and Murex trunculus, which are the older names for Haustellum brandaris (Bolinus brandaris) and Hexaplex trunculus (Phyllonatus trunculus).[3] This dye is a rare animal-produced organobromine compound, which the snails make using a specific bromoperoxidase enzyme that operates on dissolved bromide in sea water.

This dye was used in royal robes, other kinds of special ceremonial or ritual garments, or garments indicating high rank. It is hypothesised that the dye was the same dye as that which featured prominently in the ancient Temple in Jerusalem, the clothing of the High Priest (or Kohen Gadol) officiating there; it is sometimes still used by Jews today in the ritual fringes (tzitzit) on four-cornered garments. A consensus has yet to be reached regarding the Biblical source of the "blue" dye.

32. *Nebularia chrysostoma*

Systematic Position

Phylum:Mollusca
Class:Gastropoda
Order:Neogastropoda
Family:Mitridae
Genus:Nebularia
Species:N. chrysostoma

Nebularia chrysostoma is a species of sea snail, a marine gastropod mollusk in the family Mitridae, the miters or miter snails.

33. *Nebularia pelliserpentis*

Systematic Position

Phylum : Mollusca
Class : Gastropoda
Order : Neogastropoda
Family : Mitroidea
Genus : Nebularia
Species : pelliserpentis

34. *Nerita albicilla*

Systematic Position

Kingdom:Animalia
Phylum:Mollusca
Class:Gastropoda
Family:Neritidae
Genus:Nerita
Subgenus:Theliostyla
Species:N. albicilla

N. albicilla grows up to 4 cm; its shell surface is smooth or with slight transverse ridges; it has small pustules and four weak teeth on the columella. Its outer shell

color is variegated black and white, occasionally with three conspicuous bands (Kumazawa et.al, 1988). The interior is white, with a pinkish-grey, granular operculum.

Habitat:

It is found on rocky cliffs, on rocks in the littoral fringe, and sometimes on mangrove trees.

Uses:

It is collected as food by coastal dwellers as well as for its shell for the shell trade.

35. Nucleolaria nucleus

Systematic Position

Kingdom:Animalia
Phylum:Mollusca
Class:Gastropoda
Family:Cypraeidae
Genus:Nucleolaria
Species:S. nucleus

Nucleolaria nucleus, the wrinkled cowry, is a species of sea snail, a cowry, a marine gastropod mollusk in the family Cypraeidae, the cowries (Felix and etal,2002).

These quite rare shells reach on average 16–20 millimetres (0.63–0.79 in) length, with a maximum size of 30 millimetres (1.2 in) and a minimum size of 10 millimetres (0.39 in). This shell is oval, the dorsum surface is light orange-brown with a thin longitudinal line in the middle, many small round protuberances and two orange areas at the extremities. The base is light orange and the small teeth are extended to both sides of the entire base. In the living cowries the mantle is brownish, with well-developed papillae.

Distribution

This species is distributed in the Red Sea and in the Indian Ocean along Aldabra, Chagos, Kenya, Madagascar, the Mascarene Basin, Mauritius, Réunion, the Seychelles, Somalia and Tanzania, as well in Western Central Pacific Ocean (Philippines, Indonesia, Australia, Guam and Hawaii).

36. Ocenebra ernacius

Systematic Position

Phylum:Mollusca
Class:Gastropoda
Family:Muricidae
Genus:Ocenebra
Species:O. erinaceus

Ocenebra erinaceus, common name the European sting winkle, is a species of predatory sea snail, a marine gastropod mollusk in the family Muricidae, the murex and rock snails Also known as the Oyster Drill, it is a pest in Oyster beds (Roding 1798).

The name Ocenebra erinaceus is the accepted name according to the database World Register of Marine Species (WoRMS), and the name is also accepted as valid by the ICZN (Op. 886) The size of the shell varies between 8 mm and 65 mm. The shell has four to seven varicose, nodulous, encircled by prominent cord-like, raised ribs. These are alternately smaller, the smaller ones minutely scabrous. The varices are sometimes frondose, sometimes lamellated, occasionally appressed.

This marine species occurs in European waters from Norway to the Black Sea; in the Atlantic Ocean off the Azores and Madeira.

37. Palmadusta asellus

Systematic Position

Phylum:Mollusca
Class:Gastropoda
Family:Cypraeidae
Genus:Palmadusta
Species:P. asellus

Palmadusta asellus has a shell reaching a length of about 2.8 centimetres (1.1 in) (Verdcourt,1954). The shells are white with three large brown transversal bands on the upper surface. The brown mantle shows several whitish spots. In the living cowry it covers almost entirely the shells.

Distribution

This species is distributed in the seas along Aldabra, Chagos, the Comores, Kenya, Madagascar, Mauritius, Mozambique, the Red Sea, Réunion, the Seychelles and Tanzania.

38. Pectiniidae Sp

Systematic Position

Phylum:Cnidaria
Class:Anthozoa
Order:Scleractinia
Family:Pectiniidae

Pectiniidae was a family of stony corals, commonly known as chalice corals, but the name is no longer considered valid.

39. Perna perna

Systematic Position

Kingdom:Animalia
Phylum:Mollusca
Class:Bivalvia
Order:Mytilida
Family:Mytilidae
Genus:Perna
Species:P. perna

Perna perna, the brown mussel, is an economically important mussel, a bivalve mollusc belonging to the family Mytilidae. It is harvested as a food source but is also known to harbor toxins and cause damage to marine structures. It is native to the waters of Africa, Europe, and South America and was introduced in the waters of North America.

The brown mussel can also be mistaken for the more famous greenish-brown species Perna viridis, as their color and shell shape can change depending on environmental conditions.

Distribution

The brown mussel is native to the tropical and sub-tropical regions of the Atlantic Ocean and Western Indian Ocean . It is found in waters off the west coast of Africa and the coast of South America up to the Caribbean, as well in the East Coast of Africa and Madagascar. It is accidentally introduced as an invasive species to the coast of Texas via the boat hulls and water ballasts of ships from Venezuela.

Uses

Perna perna is harvested as a food source in Africa and South America. The bivalve is considered for cultivation as it can grow quickly to the commercial size of 60 to 80 mm in just 6 or 7 months. It is also well-suited to tropical and

subtropical regions. However, the mussel can harbor saxitoxin from consumed dinoflagellates. Its consumption has caused outbreaks of paralytic shellfish poisoning in Venezuela.

40. Plicatula australis

Systematic Position

Kingdom:Animalia
Phylum:Mollusca
Class:Bivalvia
Order:Pectinida
Family:Plicatulidae
Genus:Plicatula

Description

Plicatulidae are small, with weakly convex shells which are irregularly oval or even almost triangular. Typically, they attach themselves to a hard surface by the right valve. The ligament is internal and triangular.

41. Reishia bitubercularis

Systematic Position

Phylum:Mollusca
Class:Gastropoda
Order:Neogastropoda
Family:Muricidae
Genus:Reishia
Species:R. bitubercularis

Reishia bitubercularis, common names bituberculate rock shell, bituberculate rock snail, chestnut rock shell, is a species of sea snail,[Lamarck 1882], a marine gastropod mollusk, in the family Muricidae, the murex snails or rock snails.

42. Tawera lagopus

Systematic Position

Kingdom:Animalia
Phylum:Mollusca
Class:Bivalvia
Order:Venerida
Family:Veneridae
Genus:Tawera

Typical shell length 40 mm[Simon 2020]. A more solid shell than T.gallinula.Brown markings, when present, are restricted to distinct radial zones.Scale like striae are present between the cocentric ridges.

43. Tibia curta

Systematic Position

Kingdom:Animalia
Phylum:Mollusca
Class:Gastropoda
Family:Rostellariidae
Genus:Tibia
Species:T. curta

Common Size 150 mm, but the size of the shell varies between 120 mm and 185 mm (Liverani, 2014). Common name the Indian tibia, is a species of large sea snail.

Distribution

This marine species occurs from the Persian Gulf to the Bay of Bengal.

44. Trisidos semitorta

Systematic Position

Kingdom:Animalia
Phylum:Mollusca
Class:Bivalvia
Order:Arcida
Family :Arcidae
Genus :Trisidos
Species :Trisidos semitorta

Half-buried in sand and gravel bottoms under the influence of currents, with the twisted posterior end of shell lying horizontally on the surface. The posterior surface of the left valve, which slightly projects above the sand surface, is often extensively eroded or damaged and colonized by other sessile organisms. Juvenile specimens are abyssally attached inside empty shells of the species and other bivalves, to ensure protection against predators and water movement Members of the class Bivalvia are mostly gonochoric, some are protandric hermaphrodites. Life cycle: Embryos develop into free-swimming trocophore larvae, succeeded by the bivalve veliger, resembling a miniature clam.

Distribution

Indo-West Pacific: from Thailand and western Indonesia to the Philippines; north to Taiwan Province of China and south to Queensland.

45. *Trochus sp*

Systematic Position

Phylum:Mollusca
Class:Gastropoda
Order:Trochida
Superfamily:Trochoidea
Family:Trochidae
Genus:Trochus

Sea snails in the genus Trochus have large, thick, solid shells that have a broadly conical spire and a flat base. The periphery is angulated. The base of the shell is flat or convex. The outer and basal lips are smooth within. The columella has a strong fold above, ending in an obtuse tooth below. The interior of the shell is pearly and iridescent because of a thick layer of nacre (mother of pearl) (Tryon (1889).

Trochus niloticus, commonly known as 'top shell' or 'trochus shell', is a member of the family Trochidae, a large family of marine gastropod molluscs containing several hundred species (Nash 1993). ... Trochus occupy a well-defined habitat (the intertidal and shallow subtidal zones on the seaward margin of the reef). When the word "trochus" or "Trochus" is used in reference to fishing sea snails for commercial purposes, the usual species targeted is Tectus niloticus, which is valued for its nacre or mother of pearl layer, which was traditionally made into items such as pearl buttons and jewelry

46. Turritella communis

Systematic Position

Kingdom:Animalia
Phylum:Mollusca
Class:Gastropoda
Family:Turritellidae
Genus:Turritella
Species:T. communis

Turritella communis (Hayward and etal 1996), common name the "common tower shell" is a species of medium-sized sea snails with an operculum, marine gastropod mollusks in the family Turritellidae.

The tall, conical shell is brownish-yellow to white. It is sharply pointed and contains 16-20 enlarged whorls. The spiral ridges are numerous (with 3 - 6 more prominent) and may have a beaded appearance. The shell grows to a length of 3

cm and may become 1 cm wide. The angulate shell aperture is small. The outer lip is crenulate. There is no umbilicus. The concave operculum is small and circular and has numerous pinnate bristles on its edges.

The snail shows white markings on the tentacles, siphon and foot. This small foot shows dark spots and streaks.

Turritella communis feeds on deposits through ciliary feeding. In order to prevent larger particles entering the mantle cavity, it possesses at the mantle edge a curtain of tentacles of which the larger ones are pinnate.

Distribution

This species occurs in the Eastern Atlantic Ocean from the Lofoten Isles south to the Mediterranean Sea and North Africa. It is rare or absent from the eastern English Channel and the southern North Sea. This tower shell can be found in the sublittoral zone to depths up to 200 m, where it is usually found burrowed in gravelly mud at an angle of about 10°. There it remains stationary for long periods. It can be locally abundant on muddy sediment in shallow waters.

47. Zoila venusta bakeri

Systematic Position

Kingdom:Animalia
Phylum :Mollusca
Class :Gastropod
Family:Cypraeidae
Genus :Zoila
Species:Zoila venusta

48. Zoila venusta venusta

Systematic Position

Kingdom:Animalia
Phylum:Mollusca
Class:Gastropoda
Family:Cypraeidae
Genus:Zoila
Species:Zoila venusta

DISCUSSION

The coastal marine ecosystem supports variety of habitats that consequently support high species diversity. In coastal areas, the intertidal zone is considered as most diverse and productive because within few meters' various kinds of flora and fauna are observed (Underwood, 2000). The intertidal zone has been studied extensively for its biodiversity in last two-three decades (Little and Kitching,1996). Vertical zonation is the most important process or phenomena observed on the rocky intertidal area in which from upper to lower intertidal area, different bands or zones containing different biodiversity are observed (Stephenson and Stephenson, 1949; Bandel and Wedler, 1987; Ellis, 2003).

Gastropods are the largest and most diverse class of mollusc which include species that are well studied within areas of taxonomy, aquaculture, biomineralization, ecology, microbiome, and health. The variation of distribution and abundance of organisms in different zones of intertidal zone has provided basis for so many ecological experiments, such complex patterns of variation have been studied well specially for in organisms of rocky intertidal areas (Archambault and Bourget 1996; Blanchard and Bourget 1999; Trivedi et al., 2012).

Molluscan shells have been found important for various commercial purposes like poultry food, medicines, industrial raw material, fisheries, handicrafts, and interior decoration. Different kinds of marine habitats cover the total coastal area include 29 % of muddy flats, followed by 28 % of sandy beaches, 22 % of marshy coast, and 21 % of rocky coasts. Neendakara coast is very diverse in the case of marine biota and studies on distribution and diversity of marine invertebrates have been carried out by many researchers (Venkatesh etal.,2015; Sajikumar, 2015; Salim *et al*, 2017; Mumthas and Miranda, 2018).

The commercially important gastropods are harvested extensively in various marine areas of India, presently their population is declining at alarming rate. So, for conservation of the gastropod species, studies are required to carve out the real picture of the population status of various species (Apte, 1998). Few studies have been done on the intertidal distribution of gastropod species along the coastal region of Kollam, Kerala (Venkatesh etal.,2015; Sajikumar, 2015; Salim et al., 2017).

In the present study, sixty-two species of gastropods were obtained from the study sites. Numerical abundance was recorded maximum at site I (66%) compared to site II (19%) and III (15%). The greater abundance of gastropods along the reef areas is due to the presence of Halimeda, most important constituent of the lagoon sands, and it plays most important role in building up the reef (Mallik, 2017).

Many of the gastropods obtained in the present study have an ornamental value and are thus, commercially important. Studies on age and growth are available for numerous species of gastropods, but such studies on *Trochus radiatus* is lacking, which is also commercially important species for the South-East coast of India.

During the present study, around 12 species of Conidae were identified from the study sites. This gastropod family of Conidae is notable for its very high species diversity in tropical seas and its use as complex of potent neurotoxic venoms to overcome both invertebrate and vertebrate prey (Ravinesh *etal.*,2018). These venoms are also increasingly important in medicine and neurobiology. Conidae is a large family of exclusively marine gastropod molluscs with more than 800 extant species worldwide. Conus is by far its most species-rich genus, with about 80% of all the species.

The animals of this family are well known for producing a wide array of unique peptide toxins that are used to overcome prey animals and are finding increasingly varied applications in medicine and neurobiology (Craig et al.1999; Terlau & Olivera 2004;

Garber 2005). They are also economically important, because shell collectors and commercial traders have established active markets for their shells globally (Rice, 2007)

In a study carried out by Sinu and Miranda (2013) along the coast of Arthungal in Kerala, higher abundance of molluscs were recorded among the macro faunal population. The configuration of immediate substrate of occupation, both as a refuge and more critically, as a source of food is often the paramount factor governing distribution of macro invertebrate fauna, and the bottom sediment of aquatic ecosystems are known to serve as shelter for macro benthic invertebrates and direct or indirect food source for detritus and grazers (Bishop, 1973).

The ornamental gastropod is an emerging resource in the Indian seas. However, there are no shell crafting firms located in Kerala. During the present study among these gastropods, many species are of economic importance, most of them edible, mainly used as seafood and exported to many countries (e.g., China, Indonesia, Japan, Taiwan, Thailand, and Vietnam etc.) Their shells are being used in shell craft industry, with damaged shells send to calcium carbide industries located in Tamil Nadu. The gastropod shell is used to make attractive models, garlands, studs, rings, bangles, paper weights, curios, ash trays, door, window curtains, sacred chanks, bathi stands, lamp shades, key chains etc. The curios and other trinkets made from shells are expensive articles, as they have great demand in the home as well as foreign markets.

Gastropods are also used as bioindicators for biomonitoring. They have a higher ability to accumulate metals in their bodies compared to other aquatic animals, hence are used for environmental monitoring. *Babylonia japonica* is generally considered edible for humans, it is known to bioaccumulate toxins under certain conditions, namely the surugatoxin family, which causes blockage of autonomic ganglia, and tetrodotoxin (pufferfish toxin). In September 1965, a food poisoning outbreak occurred after ingestion of this species from Suruga Bay. The symptoms largely corresponded to

ganglionic blockage, with parasympathetic dysfunction being more common than sympathetic dysfunction (Hayashi and Yamada, 1975; Noguchi etal., 1981).

Littoraria scabra, Nassarius reticulatus, Nerita albicilla, Nucella lapillus, Gibberulus gibbosus, Terebralia palustris, and *Telescopium telescopium* are always used in biomonitoring metal pollution (Wolf, *et al.,* 2001; Wolf and Rashid, 2008). The main indicator shown by gastropods is declining abundance and body size, with other indicators are bioavailability of heavy metals in soft tissues and shells. The ability of heavy metal deposits is influenced by environmental factors, body size, weight, and gender. Heavy metals can affect hard, thickness, volume, and color of the shell (Samsi *et al*., 2017; Mumthas *e tal*.,2018).

Recently, the International Union for Conservation of Nature (IUCN) Red list assessed status of studied species are classified Critically Endangered (CE - 02), Endangered (EN-02) as Vulnerable (V- 03). The remaining species were categorized as of least concern (LC - 14) for extinction, due to their extensive distribution and perceived abundance, 41 species are not enlisted (NE) with insufficient data to classify.

Some species like *B. ampulla* and *B. bufonia* are indicator species, important in coastal Environment Risk Assessment Programs, used as bio-monitoring agents signalling coastal marine pollution. During the present study, variations in the diversity status of gastropods were found. This gained information will be valuable in practice of their conservation and validation of the present findings, to gain more baseline data on gastropods in other coastal communities in the intertidal regions of Kollam coast.

CONCLUSION

The gastropod diversity was documented along the inter-tidal region of the coast of Kavaratti, Lakshadweep and Kollam. Sixty-two species of gastropods were obtained during the study, which is significant as an exhaustive preparation towards a biodiversity register of marine gastropods along the coast of Kavaratti, Lakshadweep and Kollam in Kerala.

SUMMARY

A study was carried out to identify and document the diversity of gastropods, along the intertidal region along the coast of Kavaratti, Lakshadweep and Kollam in Kerala. The site selected for study included site I: Kavaratti, Site II: Thirumullavaram and site III: Kollam Harbour.

Sampling was carried out during the months of January and February, 2021. Gastropod shells were handpicked from the inter-tidal region twice a month during the morning hours. Collected samples were brought to laboratory, sorted, preserved, identified upto species level using standard keys. Handpicked samples from site were brought to the laboratory in polythene bags, transferred to a large, white-bottomed tray, and animals were hand sorted. After this preliminary examination, the whole sample was treated with 5% buffered formalin and kept for further analysis.

Large samples are then subdivided into sub-samples (live and worn out ones) of roughly equal size to be sorted more comfortably, placed in different jars in preserving solution and being labelled properly. Fine sorting was performed under a dissection microscope, with digital image taken for each sample. The preserved fauna was identified to major taxonomic groups using appropriate keys and standard taxonomic references along with available expertise.

A total of 62 species of Gastropods were obtained from the study sites. Numerical abundance was recorded maximum at site I (66%) compared to site II (19%) and III (15%). Among Gastropods, *Inquisitor isabella*, a critically endangered species belonging to family Pseudomelatomidae was found to be numerically abundant at site I, whereas least abundant species found were *Chlamys islandica, Conus aulicus, Conus leopardous, Conus tessulatus, Crypaea family, Erronea pallida pallida, Gibberulus gibberulus, Lambius Scorpius, Maurita arabica (EN), Nebularia chrysostomia,*

Nebularia pelliserpentis, Nerita albicilla, Nucleolaria nucleus (V) and *Trisidos semitoria.* At site II, the dominant species were *Trochus radiatus* and the least abundant species were *Babylonia zeylanica and Cellana rota*. At site III, the numerically abundant species were *Babylonia japonica, and Turritella communis* (NE), *Gibbula sp and Pirenella sp* (LC).

This work presents an ample checklist of marine gastropods, distribution, characters, use and its present IUCN status from Kavaratti Island, Lakshadweep, and Kollam. The study is thus significant as an exhaustive preparation towards a biodiversity register of marine gastropods along the coast of Kavaratti, Lakshadweep and Kollam in Kerala, which is beneficial for Environmental Risk Assessment of the coastal waters.

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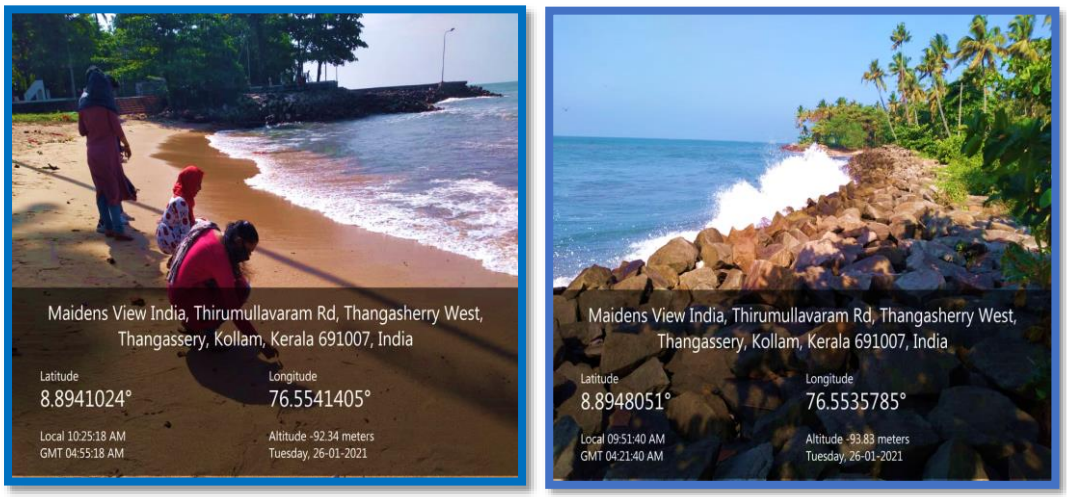
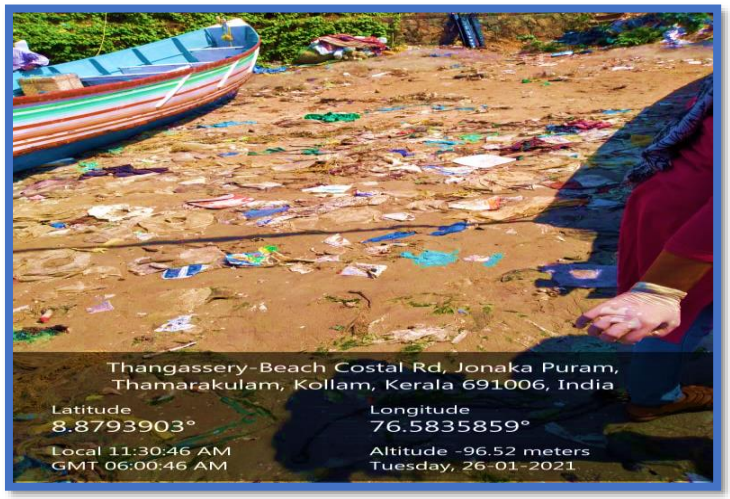
PLATE – I

A) Sampling from the intertidal coast of Kavaratti,Lakshadweep (Site I)



B) Sampling from the intertidal coast of Thirumullavaram,Kollam (Site II)



C) Sampling from the intertidal coast of Kollam Port(Site III)

D) Sorting


TKM Rd, Karicode, Peroor, Kottamkara, Kerala 691005, India
Latitude
8.9159214°
Longitude
76.63479°
Local 01:53:00 PM
GMT 08:23:00 AM
Altitude -67.4 meters
Friday, 29-01-2021


TKM Rd, Karicode, Peroor, Kottamkara, Kerala 691005, India
Latitude
8.915898°
Longitude
76.6349362°
Local 10:55:54 AM
GMT 05:25:54 AM
Altitude -66.2 meters
Friday, 05-03-2021


TKM Rd, Karicode, Peroor, Kottamkara, Kerala 691005, India
Latitude
8.9158293°
Longitude
76.634912°
Local 11:06:14 AM
GMT 05:36:14 AM
Altitude -66.2 meters
Friday, 05-03-2021


TKM Rd, Karicode, Peroor, Kottamkara, Kerala 691005, India
Latitude
8.9159097°
Longitude
76.6349484°
Local 10:55:47 AM
GMT 05:25:47 AM
Altitude -66.2 meters
Friday, 05-03-2021

D) Identification

Table 1 Gastropod Diversity along the study sites

SI. No	TAXA	Site I (Kavaratti)	Site II (Thirumullavaram)	Site III (Kollam Harbour)	IUCN Status
1	*Babylonia areolata*	0	0	11	NE
2	*Babylonia japonica*	0	0	21	NE
3	*Babylonia zeylanica*	0	1	0	NE
4	*Cellana rota*	0	1	0	NE
5	*Cerithidia* sp	0	25	0	LC
6	*Cardita* sp	3	0	0	NE
7	*Chlamys islandica*	1	0	0	NE
8	*Clanculus criuatus*	6	0	0	NE
9	*Clanculus kraussii*	0	0	0	NE
10	*Conomurex decorus*	2	0	0	NE
11	*Conus abbas*	7	0	0	LC
12	*Conus aulicus*	1	0	0	LC

Table 1 Gastropod Diversity along the study sites

13	*Conus balteatus*	20	0	0	LC
14	*Conus bullatus*	3	0	0	LC
15	*Conus consors*	3	0	0	LC
16	*Conus geographus*	2	0	0	LC
17	*Conus leopardous*	1	0	0	LC
18	*Conus magus*	2	0	0	LC
19	*Conus miles*	4	0	0	LC
20	*Conus* sp	3	0	0	LC
21	*Conus striatellus*	2	0	0	LC
22	*Conus tessulatus*	1	0	0	LC
23	*Crypaea family*	1	0	0	NE
24	*Cypraea tigris violette*	27	0	0	EN
25	*Arestorides argus*	9	0	0	CE
26	*Clypidina notata*	0	12	0	EN

Table 1 Gastropod Diversity along the study sites

27	*Drupa morum*	3	0	0	NE
28	*Erronea caurica caurica*	6	0	0	NE
29	*Erronea pallida pallida*	1	0	0	NE
30	*Euchelus asper*	0	12	0	NE
31	*Gibberulus gibberulus*	1	0	0	NE
32	*Gibbula* sp	4	0	1	NE
33	*Hexaplex nigritis*	5	0	0	NE
34	*Inquisitor isabella*	57	0	0	CE
35	*Lambius scorpius*	1	0	0	NE
36	*Luria isabella*	14	0	0	NE
37	*Lyncia carneola*	5	0	0	NE
38	*Lyncia vitellus*	27	0	0	NE
39	*Maurita arabica*	1	0	0	NE
40	*Mitra mitra*	2	0	0	EN

Table 1 Gastropod Diversity along the study sites

41	*Monetaria moneta linne*	1	0	0	NE
42	*Monetaria* sp	10	0	0	NE
43	*Murex* sp	0	0	11	NE
44	*Nebularia chrysostomia*	1	0	0	NE
45	*Nebularia pelliserpentis*	1	0	0	NE
46	*Nerita albicilla*	1	0	0	V
47	*Nucleolaria nucleus*	1	0	0	V
48	*Ocenebra eranaceus*	3	0	0	NE
49	*Palamadeta asellus*	1	0	0	NE
50	*Pectinidae* sp	3	0	0	NE
51	*Perna perna*	0	0	3	NE
52	*Pirenella* sp	0	0	1	LC
53	*Plicatula australis*	0	0	0	NE
54	*Reishia bitubercularis*	5	0	0	V

Table 1 Gastropod Diversity along the study sites

55	*Tawera lagopus*	3	0	0	NE
56	*Tibia curta*	0	0	10	NE
57	*Trisidos semitoria*	1	0	0	NE
58	*Trochus radiatus*	0	13	0	NE
59	*Trochus* sp	4	10	0	NE
60	*Turritella communis*	0	0	1	NE
61	*Zoila venusta bakeri*	2	0	0	NE
62	*Zoila venusta venusta*	1	0	0	NE

EN – Endangered; CR – Critically Endangered; LC – Least Concern; V- Vulnerable; NE – Not Enlisted

PLATE II - VII

Babylonia areolata

Babylonia japonica

Clanculus criuatus

Clanculus kraussii

Conomurex decorus

Conus abbas

Conus aulicus

Conus balteatus

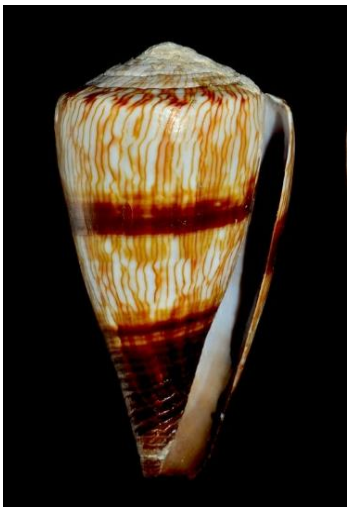
Conus bullatus

Conus consors

Conus geographus

Conus leopardous

Conus magus



Conus miles

Conus sp

Conus striatellus

Crypaea family

Conus tessulatus

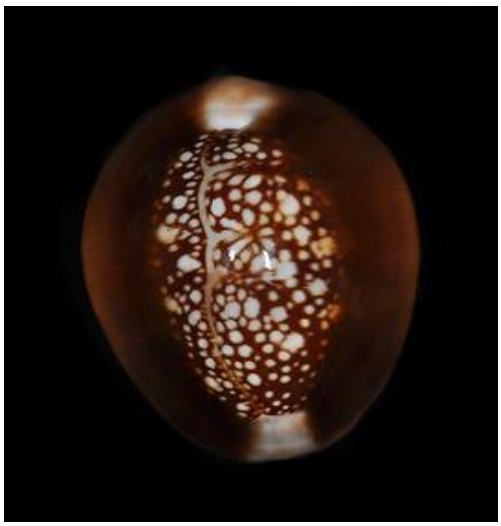
Cypraea tigris violette

Arestorides argus

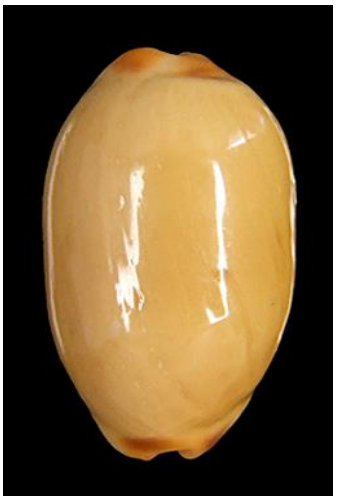
Erronea caurica caurica

Erronea pallida pallida

Luria isabelle



Lyncia carneola



Lyncia vitellus

Arestorides argus

Maurita arabica

Mitra mitra

Monetaria moneta linnae

Drupa morum

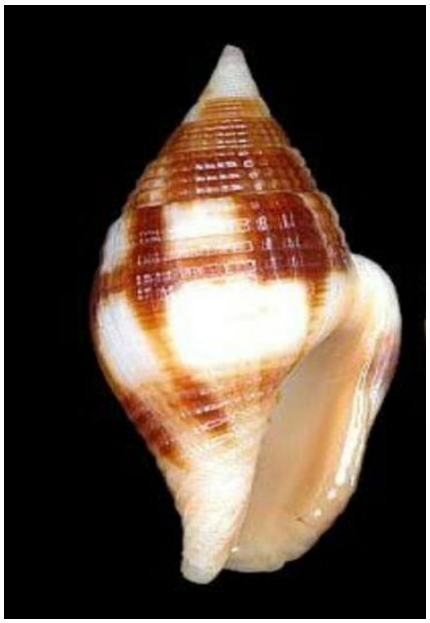
Gibberulus gibberulus

Hexaplex nigritis

Gibbula sp

Monetaria sp

Murex sp



Nebularia

chrysostoma

Nebularia s

Nerita albicilla

Nucleolaria nucleus

Ocenebra erinaceus

Palmadusta asellus

Reishia bitubercularis

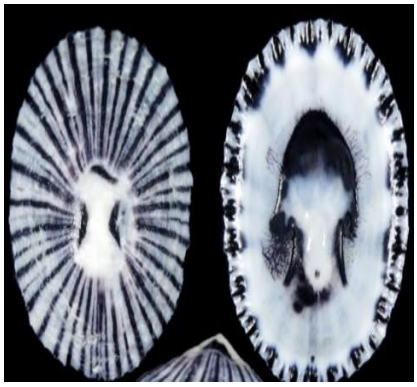
Trochus sp

Turritella communis

Zoila venusta bakeri

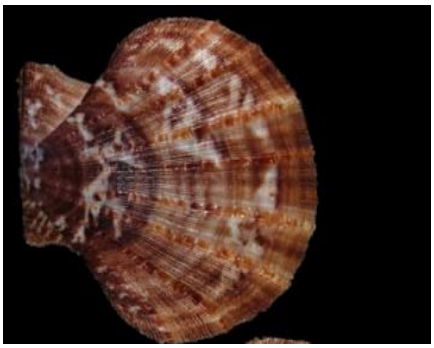
Trochus sp

Zoila venusta venusta



Clypidina notata

Cardita sp



Chlamys islandica

Donacilla cornea

Pectinidae sp

Perna perna

Donax vittatus

Plicatula australis

Tawera lagopus

Trisidos semitoria